SPECTRUM HEALTH

Preparing for Part 3 of the ABR Diagnostic Physics Exam

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SPECTRUM HEALTH

Outline

Exam Background

Exam Preparation

Suggested Resources

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Location, Time, and Eligibility

- Test administered in Louisville, Kentucky
  - Crown Plaza Hotel
  - Located next to airport
- May 21-24 test dates for the 2017 exam.
- Candidates are eligible to take Part 3 after they have passed Part 2, no other requirements apply.

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Exam Organization

- Five exam categories:
  - Radiography, Mammography, Fluoroscopy, Interventional Imaging
  - Computed Tomography
  - MRI and Ultrasound
  - Informatics, Image Display, Image Fundamentals
  - Radiation, Dosimetry, Protection, Safety

- Five examiners:
  - Each examiner asks 5 questions, one from each category
  - 30 minutes per examiner
  - Questions are presented on a computer, slides are controlled by the examiner

Exam Topics

- The ABR provides category descriptions for the five categories on their website: http://www.theabr.org/ic-mp-study-guide
- Even with the category descriptions, you may still be uncertain about:
  - The type of questions to expect
  - The level of detail to which you need to know material
  - The most important areas to focus on
- When deciding how you will prepare to study, remember the *goal* of the exam.

Goal of the Exam

- The exam is a test of material relevant to a *diagnostic imaging* physicist practicing in a *clinical environment*.
- The material covered on Part 2 and Part 3 is similar, but on Part 3 the focus is on practical applications and general understanding of fundamentals.

Preparing for the Exam

- Begin a general review of material early to refresh yourself in areas that you may not have worked in recently.
- Talk to individuals that have recently taken the exam for details of their exam preparation.
- Study groups can be helpful to review material.
- Commercial services exist to assist with board preparation.
- Preparation for Part 2 also helps prepare for Part 3. A good understanding of the fundamentals of image science and each modality is key to success in Part 3.

Examples of Helpful Review Activities

- Conduct ACR tests for CT, MR, & Mammography – work through all image analysis and calculations yourself to understand the entire process
- Calculate effective dose, SSDE, & fetal dose from CT exams; calculate peak skin dose and effective dose for fluoroscopy exams
- Calculate MTF & NPS from radiographic or CT images
- Browse the DICOM headers of images for each modality – check that you understand what the standard tags are referring to, why they are there, and how they influence the image or acquisition

Modality Checklist

To help gauge the progress of your studying, look at each modality (Rad, Fluoro, Mammo, CT, MR, US) and ask yourself if you know:

- How it works – draw and label a functional diagram of system
- How to test it – draw and label a diagram of common test configurations
- Standard test procedures and phantoms for ACR testing or equivalent
- Typical image presentation methods and appearance of typical clinical images
- How to identify common image artifacts, their causes, and what corrective measures are needed
- Modality specific patient safety concerns – SAR, MI, TI, etc.
- For modalities with ionizing radiation:
  - Doses for typical procedures
  - Dose limits
  - Estimation of effective dose
  - Radiation shielding design
  - Radiation safety for operators

My Personal Study Recommendations

- Much of the preparation for what is needed for Part 3 happens automatically if you are performing the routine duties of a clinical medical physicist as many questions draw upon these experiences.
- Not all physicists work routinely in all areas covered by the exam. If this is the case for you, make sure to spend considerable time working in areas you are less knowledgeable in, preferably under the guidance of an experienced physicist.
- Start early to give yourself enough time to review all of the topics that could be tested.

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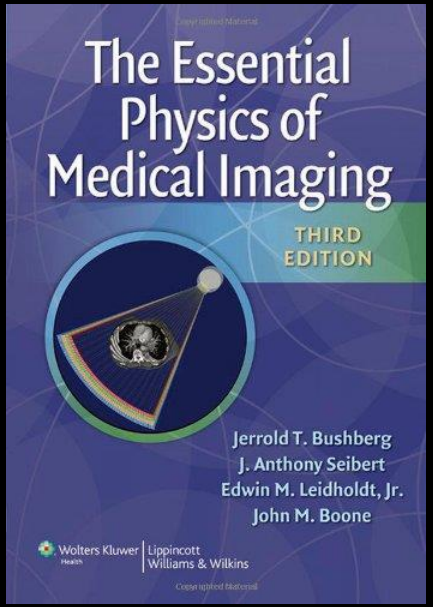
Study Guide

- The ABR provides a list of category descriptions for Part 3, but not a list of references and resources.
- Such a guide is provided for the MOC exam, and should be helpful for both Part 2 and Part 3:
- http://www.theabr.org/sites/all/themes/abr-media/pdf/DMP_Study_Guide_7-2016.pdf
- Given the relatively short time between the Part 2 and Part 3 exams, your preparation for Part 2 can also serve as your initial preparation for Part 3 - giving you time to correct any weaknesses.

Recommended Review Resources

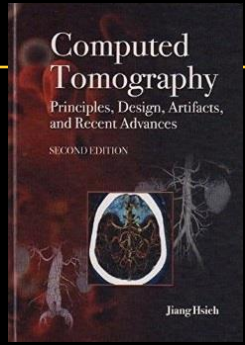
Essential Physics of Medical Imaging by Bushberg, et al.

- A good starting point for your review
  - Covers introductory x-ray physics, image science, radiation safety and each modality
  - Refer to other resources for more in depth treatment of equipment testing, artifacts, etc.



CT Specific Resources

- CT is one of the five exam categories
- Be sure that you are able to explain CT specific concepts that are important in daily operations such as:
  - Dosimetry
  - Artifacts
  - Reconstruction Kernels
  - Tube Current Modulation
  - Protocol Management



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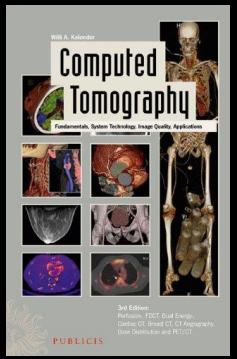

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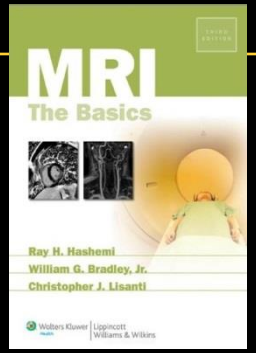
MR Specific Resources

MR topics diagnostic physicists should be familiar with include:

- Theory of operation and data acquisition
- Basic pulse sequence design
- Appearance of common clinical images
- Common image artifacts
- MR Safety – SAR limitations, siting considerations, etc.



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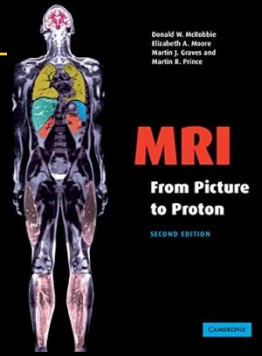

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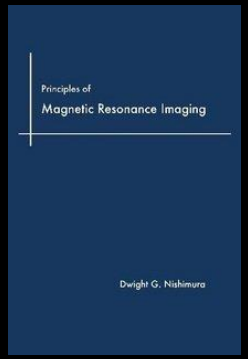

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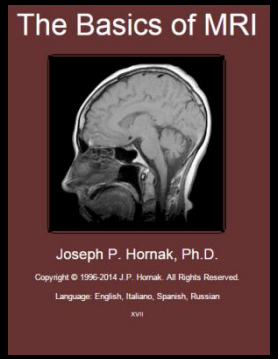

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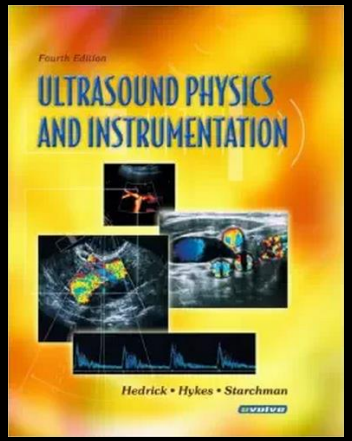
Ultrasound Specific Resources

- Bushberg covers the basics, refer to dedicated textbooks or tutorials published in *RadioGraphics* for further details in specific areas.



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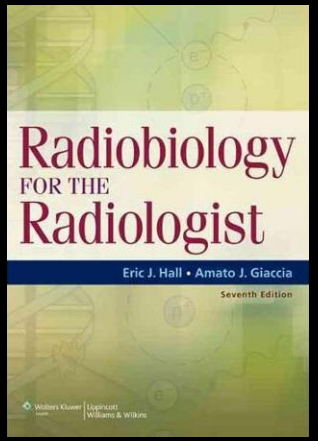
RadioGraphics Tutorials

Radiation Safety Resources

- Radiation safety is part of its own category
- Be familiar with practical application of the concepts – questions could refer to safety aspects within a specific modality, for example



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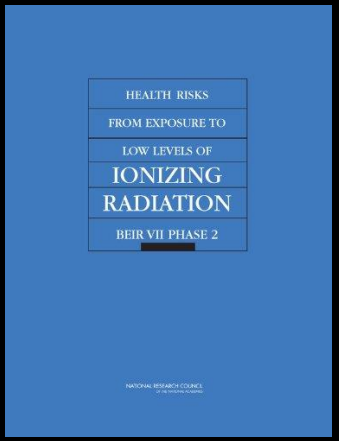
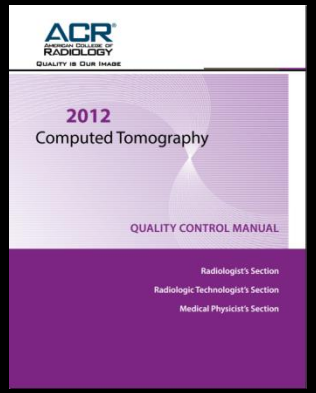


BEIR VII

ACR Testing Guidelines

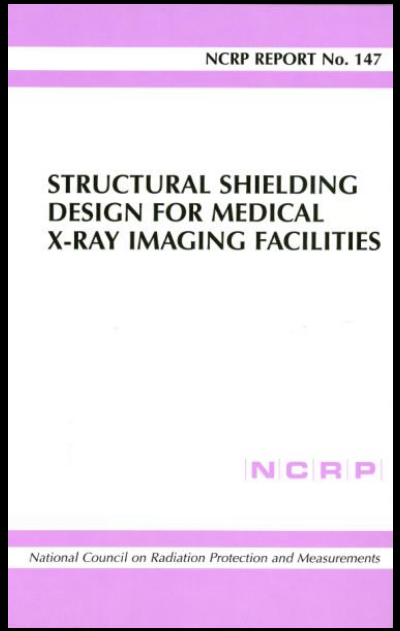
Review the ACR testing manuals for each modality. As you do so, check that you can explain:

- The phantom modules and supporting materials required for testing
- Rationale behind performing various tests
- Pitfalls and common issues to be aware of – knowledge gained though repeatedly doing the tests, not simply reading the manuals



AAPM & NCRP Reports

- Refer to relevant reports as you perform the tests that they describe, important reports include:
  - Display Monitors: Online Report 03 (TG18)
  - QC in Diagnostic Radiology: Report 74
  - Computed Radiography: Report 93
  - CT Radiation Dose: Report 96
  - MR Acceptance Testing: Report 100
  - Exposure Index: Report 116
  - Digital Radiology: Report 151
  - SSDE in CT: Report 204 & 240
  - NCRP 147



Additional Resources

- Board Certified Medical Physicists
  - Work with ABR certified physicists to gain practical experience and a perspective that you won't get from just reading the books and reports mentioned previously.

- Study Group Members
  - If you spend time working with a study group, develop sample questions to ask others and have them ask you questions as well.
  - The ability to clearly and concisely verbally answer a question is key to success on Part 3 – learn how to do this early, not on the day of the exam.

Thank you