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Preparing for Part 2 of the ABR Diagnostic Physics Exam

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Outline

Exam Background

Exam Preparation

Suggested Resources

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Location, Time, and Format

- Tests administered at Pearson Vue Test Centers
  - Locations should be familiar to you from the Part 1 exam.
- August 9th test date for the 2016 exam.
- Computer-based exam with the same format as the Part 1 exam.
  - 80 single-answer, multiple-choice questions.
  - 53 simple, 27 complex questions.
  - 237 minutes in length.
  - Calculator is a computer emulation of the TI-30XS.

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Eligibility

- Candidates are eligible to take Part 2 after the following conditions have been met:
  - Part 1 has been passed
    - Effective Jan 1, 2015 there is a 10 year limit to become approved for Part 2 after passing Part 1.
  - Earned a graduate degree
  - Completed clinical experience or residency requirements
    - Candidates who took Part 1 in 2014 must complete a CAMPEP accredited residency program.

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Exam Topics

- Diagnostic generating equipment and sources
- Clinical diagnostic medical physics
- Geometric considerations
- Recording media and their applications
- Information transfer theory
- Sensitometry
- Technology of medical imaging
- Ultrasound
- Magnetic resonance imaging (MRI)
- Computed tomography (CT) Informatics
- Digital techniques and image processing
- Picture archiving and communication systems
- Dosimetry
- Calibration of diagnostic equipment
- Quality assurance
- Radiation protection
- Ionizing radiation safety
- Ultrasound safety
- MRI safety

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Determining What to Study

- The list of topics provided by the ABR is very general.
- When you begin your preparation, it can leave you uncertain about:
  - What type of questions to expect?
  - What areas to focus on?
  - To what level of detail do you need to know material?
- An important guide in steering your study direction is consider the *goal* of the exam.

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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 2 the focus is on theory and calculations.

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Examples of Important Review Topics

- CT Dosimetry – CTDI, DLP, SSDE
- ACR testing guidelines for CT, MR, & Mammography
- MQSA requirements for Mammography
- Radiation shielding design for both radiographic and CT installations
- Basic radiation safety and dose limits
- Basics of equipment function for each modality
- Performance metrics – MTF, NPS, DQE, etc.
- Sampling theory

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Preparing for the Exam

- Begin a general review of material early to refresh yourself on topics that you may not have had exposure to for several years.
- 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.

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My Personal Study Recommendations

- The best way to learn the concepts needed to answer the questions is to *actually perform* the clinical duties that are being testing on the exam.
- Having exposure to all imaging modalities and associated areas of expertise should happen automatically if you are enrolled in a residency.
- If you are not enrolled in a residency program, review the requirements for one, and set up your own routine to accomplish the same goals.
- If you have a working understanding of topic, it becomes much easier to brush up on any gaps in your knowledge. In addition, it provides much of the preparation needed for Part 3 of the exam.

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Study Guide

- The ABR does not provide a list of references and resources on which to base your review.
- However, they do provide such a guide for the MOC exam for diagnostic medical physics:
- http://www.theabr.org/sites/all/themes/abr-media/pdf/DMP_Study_Guide_5-2015.pdf
- Since the content and goals of the MOC exam are broadly similar to Part 2 of the Initial Certification exam, this may serve as a useful list when collecting your study materials.

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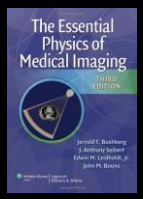
Recommended Review Resources

Essential Physics of Medical Imaging by Bushberg, et al.

- Provides a basic resource for nearly all topics of relevance to the diagnostic physicist
  - Useful to gain a basic understanding of a topic
  - Deepen your knowledge with more specific resources



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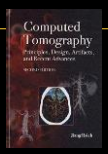
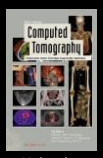
CT Specific Resources

- Hsieh has an excellent chapter in his book on CT Artifacts
- Kalender has an excellent introduction to CTDI



Hsieh



Kalender

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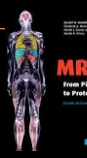
MR Specific Resources

Topics diagnostic physicists should be familiar with:

- Basics of scanner operation and image acquisition
- Fourier Transforms and image reconstruction
- Image Artifacts
- MR Safety – SAR limitations, siting considerations, etc.



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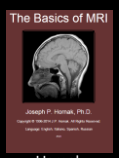

Hornak

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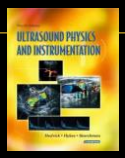
Ultrasound Specific Resources

- A dedicated text on Ultrasound is useful to supplement your knowledge if you have not had much exposure to it.
- Tutorials published in *RadioGraphics* provide a nice introduction to various topics in Ultrasound.



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RadioGraphics Tutorials

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ACR Testing Guidelines

Review the ACR Quality Control Manuals and Phantom Instructions

- Be sure you are familiar with the equations to calculate required quality metrics and the limits for the metrics
- Independently performing ACR testing of the various modalities and writing up the reports can greatly aid in your preparation.

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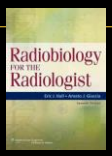
Radiation Safety Resources

Become familiar with basic concepts in radiation safety.

- You may become RSO-eligible after passing Part 3



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AAPM & NCRP Reports

- 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
- NCRP 147

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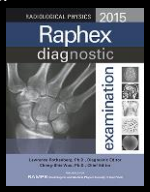
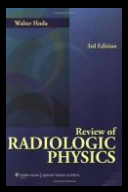
Sources for Sample Questions

Diagnostic physics related question banks provide a way gauge your progress.

- Raphex exams in radiological physics, WePassed questions, and *Review of Radiologic Physics* by Huda can all be good resources.



Raphex



Huda

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Thank you