Preparing for the ABR Diagnostic Medical Physics Oral Exam

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Detroit, Michigan
Outline

I. Background Information

II. Oral Exam Content

III. Preparation: Resources and Tips
Where + When

Crown Plaza Hotel (airport)
Louisville, Kentucky

May 2015

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Eligibility and Cost

- Eligible for diagnostic oral exam (part 3) after passing diagnostic part 2 exam
- $760, due around January 2015
  - dress accordingly
- Cancellation fees
  - $400 if > 20 days
  - $1905 if < 20 days
What to bring and not to bring?

- **Bring**
  - valid, legal, photo ID
  - (credit card / cash)

- **Do Not Bring**
  - anything else
  - cell phone!
New Oral Exam Categories for 2015

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<th>Category</th>
<th>Subject</th>
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<tr>
<td>1</td>
<td>Radiography, mammography, fluoroscopy</td>
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<td>2</td>
<td>Computed tomography</td>
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<td>3</td>
<td>MRI + ultrasound</td>
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<td>4</td>
<td>Informatics, PACS, image processing and display</td>
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<td>5</td>
<td>Radiation shielding, protection, dosimetry, and patient safety</td>
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- 5 examiners, 30 minutes each
- 5 questions per examiner, ~5 min/question
- Each examiner asks questions from **ALL** categories (not just one category)
Exam Goal

- Test your **knowledge and competence** as it relates to the **clinical practice** of diagnostic medical physics

- **Tip:** Draw upon your clinical experience
Imaging questions

- Basic imaging principles
  - e.g. sampling criteria to avoid aliasing

- Imaging systems
  - e.g. fluoroscopic imaging chain

- Image acquisition, processing, display
  - e.g. T2 contrast in MR

- Image quality and artifacts
  - e.g. beam hardening in CT
Other questions

- QA/QC testing and measurement
  - e.g. typical annual tests for mammography unit

- Safety/Shielding/Risk
  - e.g. clerical office adjacent to general rad room

- Dose metrics, calculation, reduction
  - e.g. determination of CTDIvol

- Informatics
  - e.g. relationship between IOD, SCP, SCU
Mock Exam Question

- What is the device indicated by the red arrow? What does it measure? When/how is it used?
- What is the GSDF? How is it related to the JND index?
- What is the pattern shown on the right? Describe what can be evaluated with the different regions.
During the exam

- Answer questions clearly and concisely
- Ideally, questions set stage for a broader + deeper discussion about the topic
- Follow up questions

If you don’t know the answer...

- be honest
- discuss what you do know about the topic
- examiners often help steer/guide
- there are 5 examiners!
Pass Rates

- Overall pass rate is around 50% (diagnostic, therapy and nuclear)

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<tr>
<th>Year</th>
<th>Percent Passed</th>
<th>Number Taking</th>
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<td>55</td>
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<td>2010</td>
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<td>2011</td>
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<td>2013</td>
<td>50</td>
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Preparation

- Completion of a CAMPEP imaging residency

**Oral Pass Rates 2013**

- **All Takers**: 50%
- **First Time Takers**: 59%
- **CAMPEP Graduate**: 68%
- **CAMPEP Residency**: 74%
Good Review Resources

- *Essential Physics of Medical Imaging*
  by Bushberg et al.

- *Review of Radiologic Physics*
  by Huda
Radiobiology and Health Risks

- Radiobiology for the Radiologist
- BEIR VII Report
AAPM Reports

- Display Monitors: Online Report 03 (TG 18)
- QC in Diagnostic Radiology: Report 74 (TG 12)
- Computed Radiography: Report 93 (TG 10)
- CT Radiation Dose: Report 96 (TG 23)
- MR Acceptance Testing: Report 100 (TG 1)
- Exposure Index: Report 116 (TG 116)
- SSDE in CT: Report 204 (TG 204)
ACR Accreditation

- ACR Quality Control Manuals and Phantom Instructions
Other Resources

- Code of Federal Regulations
  - Performance Standards for Ionizing Radiation Emitting Products (Title 21, Part 20)
  - Standards for Protection Against Radiation (Title 10, Part 20)

- MQSA Regulations

- NCRP Report 147

- Pregnancy/Fetal Dose
Informatics Resources

- HIS/RIS/PACS
- DICOM/HL7
- IHE

http://medical.nema.org/dicom/

http://www.ihe.net/
Question Sources

- Raphex Exams
- AAPM/RSNA Physics Modules

**AAPM/RSNA Physics Modules**

- **Fundamentals**
  1. Atoms, Radiation, and Radioactivity
  2. Interactions of Radiation and Tissue
  3. Radiation Measurements and Units
  4. X-Ray Tubes and Spectra

- **Basic Imaging Science and Technology**
  1. Image Perception and Performance Evaluation Including CAD
  2. Image Display
  3. Image Processing and Reconstruction
  4. PACS

- **Radiation Biology**
  1. Basic Radiation Biology
  2. Radiation Effects

- **Radiation Protection**
  1. Fundamentals of Radiation Protection
  2. Radiation Dose and Risk
  3. Radiologic Dosimetry and Nuclear Regulations
  4. Estimating Cancer Risk from Imaging Procedures

- **Projection X-Ray Imaging**
  1. Basic Concepts in Radiography
  2. Digital X-Ray Imaging
  3. Radiographic Image Receptors
  4. Image Quality and Dose in Radiography
  5. Mammography: Image Quality and Dose

- **Fluoroscopy**
  1. Fluoroscopy Systems
  2. Radiation Dose and Safety in Interventional Radiology
Group Study

- Pool knowledge and fill in gaps
- Divide and conquer
- Meet regularly + motivate
- Mock oral exam questions
- Meet in Louisville 1.5 days prior to exam and study as a group
Final Tips

- **Goal:** Demonstrate competence and working knowledge of the clinical practice of diagnostic medical physics

- Draw upon your clinical experience

- Be confident and be honest

- Good luck!
End of Module