Preparing for Part 3 of the ABR Diagnostic Physics Exam

Nicholas Bevins, Ph.D.
Henry Ford Health System, Detroit, MI

Outline
- Exam details
- Preparing for the exam
- During and after the exam

Where + When
- Louisville, Kentucky
  - Crown Plaza Hotel
  - (by the airport)
- May 15-18, 2016
- Specific date/time sent in March
  - ~8 sessions in 2015

Eligibility and Cost
- Eligible for the Oral Exam after passing Part 2
  - No other requirements
- Assuming success on Part 2, an invitation for the Oral Exam will be sent out in early 2016
  - $765 fee due with registration
- Cancellation fees
  - $400 if ≥ 20 days
  - $1920 if < 20 days

Exam Preparation
- Familiarize yourself with the exam
  - Question categories
  - Question format
  - Exam format
- Gather study materials
  - Textbook, reports, papers
  - Study partners (in-person, remote)
- Don't wait to start
  - Dedicate time each week to study
  - Find weaknesses, and address them early
Oral Exam Categories

- 5 examiners, 30 minutes each
- 5 questions per examiner
- Each examiner asks questions from **ALL** categories (not just one category)

<table>
<thead>
<tr>
<th>Category</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Radiography, mammography, fluoroscopy, and interventional imaging</td>
</tr>
<tr>
<td>2</td>
<td>Computed tomography</td>
</tr>
<tr>
<td>3</td>
<td>MRI and ultrasound</td>
</tr>
<tr>
<td>4</td>
<td>Informatics, image display, and image fundamentals</td>
</tr>
<tr>
<td>5</td>
<td>Radiation, dosimetry, protection, and safety</td>
</tr>
</tbody>
</table>

Exam Goal

- From the ABR:
  - The oral examination is designed to test your knowledge and fitness to practice applied medical physics in the specified specialty (diagnostic, nuclear, therapy).

  **Tip:** Draw upon your clinical experience

Imaging questions

- Basic imaging principles
  - Sampling criteria to avoid aliasing
- Imaging systems
  - Ultrasound image formation
- Image acquisition, processing, display
  - T1/T2/PD contrast formation
- Image quality and artifacts
  - Beam hardening artifacts in CT

Other questions

- QA/QC testing and measurement
  - Typical annual tests for mammography
- Safety/Shielding/Risk
  - CT suite next to examination rooms
- Dose metrics, calculation, reduction
- Fetal dose and associated risk
- Informatics
  - Functionality of PACS

Review Resources

- *Essential Physics of Medical Imaging* by Bushberg, et al.
  - Good general resource
    - Review previously studied topics
    - Introduce new topics
    - Lots of color figures (new edition)
    - Go-to source for basic x-ray principles, image science, informatics, radiation safety
      - Tubes, generators, grids, detectors
      - Basics of image processing, informatics
      - Categories 1, 4, and 5
      - Supplement with topic-specific texts

CT Resources

- CT is its own exam category
- Bushberg has a good review of the topic
- Other CT-specific texts are available
MR Resources

- MR-scientist-level knowledge of MR principles and operation is unnecessary
- Introductory level texts and references are sufficient

Ultrasound Resources

- Like CT and MR, Bushberg covers most of the basics to an adequate level
- Additional references are available

Radiation Safety Resources

- Radiation safety covers a variety of topics
- Expert level knowledge for any given subject is unnecessary

Informatics Resources

- Informatics is very broad
- Not covered by many physicists
- Focus on what is covered (PACS and displays)

AAPM Reports

- Display Monitors: Online Report 03 (TG18)
- QC in Diagnostic Radiology: Report 74
- Computed Radiography: Report 93
- Digital Radiology: Report 151
- CT Radiation Dose: Report 96
- MR Acceptance Testing: Report 100
- Exposure Index: Report 116
- SSDE in CT: Reports 204/220

ACR Accreditation

- ACR Quality Control Manuals and Phantom Instructions
- Know the phantoms, what they look like when imaged, and how to score them
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
  - FDA website
  - FFDM manufacturer guides for QC
- State Policies
  - Good to demonstrate knowledge of local laws

Question Sources

- Good question sets for Part 3 are harder to find than for Parts 1 and 2
  - General questions are good for review, but not necessarily representative

Group Study

- Divide and conquer
- Meet regularly + motivate
- Mock oral exam questions
- Fill-in knowledge gaps between members
- Doesn’t need to be in-person
- Meet in Louisville early and study as a group

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Day of Exam

- What to bring:
  - Photo ID (license, passport, military ID)
- What not to bring:
  - Anything else
Day of the Exam

- Five examiners (separate rooms)
- Five questions per examiner
  - One question from each category
- 30 minutes per room

Mock Exam Question

- What modality generated these images?
- What is the relationship between these two images?
- What would happen to the image on the left if this happens?

Mock Exam Question

- What modality likely generated this image?
- What is this image showing?
- How would you score this image?
- What are some other aspects of QC in mammography?

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!

After the Exam

- Results are posted within a week

Pass Rates

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Conditioned</th>
<th>Fail</th>
<th>Pass</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Time Takers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAMPEP Graduate – First Time Takers</td>
<td>12%</td>
<td>22%</td>
<td>65%</td>
<td>242</td>
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<tr>
<td>CAMPEP Residency – First Time Takers</td>
<td>18%</td>
<td>5%</td>
<td>77%</td>
<td>39</td>
</tr>
<tr>
<td>CAMPEP Graduate and Residency – First Time Takers</td>
<td>0%</td>
<td>19%</td>
<td>81%</td>
<td>31</td>
</tr>
<tr>
<td>CAMPEP Graduate and Residency – First Time Takers</td>
<td>7%</td>
<td>14%</td>
<td>79%</td>
<td>29</td>
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</tbody>
</table>
Possible Results

- **Pass**
  - You're done with initial certification…
  - …on to MOC!

- **Conditional (fail one of the five sections)**
  - You must retake one section of the oral boards
    - Two examiners, five-ish questions each
    - All questions are from the missed category

- **Fail (fail two or more sections)**
  - Retake the exam next year

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!

From the ABR

“Certification is not a hallmark of excellence. It is simply documentation that at the time of the oral exam you had a firm grasp of the essentials of the discipline necessary for you to work with healthcare providers and patients.”

Thank you