Focus on Residents

Strategies for Success:
Preparing for the Physics Portion of the Diagnostic Radiology Core Examination:
Why, What, How, and When?
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Why physics?
A strong foundation in knowledge and understanding of medical physics is clearly important in the field of diagnostic radiology (DR). This foundation allows the clinical radiologist to optimize image acquisition, keep radiation dose as low as possible, assess equipment for purchasing, and counsel patients about the relative risk of radiation. Understanding of medical physics separates DR from the numerous other clinical specialties that use imaging in daily practice. In recognition of its importance in the practice of clinical radiology, physics has a significant footprint on the Core Examination.

Studying for the physics portion of the Core Examination can be challenging. This subject matter is not frequently discussed during daily work or typical clinically oriented lectures. As a result, the learner does not have a chance to refresh his or her memory, test theories, or participate in guided discussion about difficult concepts. Therefore, it is critically important that residents organize their approach to this material.

What do I need to know?
Today’s residents have an enormous collection of physics educational resources at their disposal. This study material is available in both hard copy and electronic format, and its volume can be overwhelming. An excellent way to start the journey of learning this material is to begin by understanding what knowledge will be tested.

Resources that address what residents are expected to know include the following:
• **Core Examination Study Guide**
  The study guide is written and updated by the trustees of the ABR. It provides a list of concepts and knowledge elements for the entire examination, including physics, and defines the expected knowledge domain of physics.

• **Physics “Blueprint” Document**
  This document describes how the domain of physics is distributed across the Core Examination. Physics items are embedded in specialty modules. The Core Examination physics questions are carefully crafted to ensure that they are clinically relevant, and numerous examples of item types are provided so the interested candidate may gain an understanding of the breadth and depth of expected knowledge.

• **Core Practice Examination**
  The ABR maintains an online practice examination that can be found on the ABR website. Completing a practice examination provides the candidate with a realistic sense of the types of questions that will be asked.

**How and when should I prepare?**
This section will discuss resources and strategies to use in preparing for physics content in the Core Examination.

**Resources**
The ABR Core Examination Study Guide is a list of knowledge elements that define the domain of physics, but it does not provide details or explanation. Candidates must use other educational resources to learn the expected domain. Educational content resources available to candidates include the following:

• **Medical Physicists**
  One of the best resources available to most residents is a medical physicist, regardless of whether he or she is embedded in the department or visits the department on a regular basis. The medical physicist can devise a curriculum that is thoughtfully delivered over the course of a residency. Passive didactic lectures may be of value in some situations. However, educational literature supports the use of interactive or learner-centered methodology, such as the flipped classroom, to optimize adult education. These active techniques require that the learner come to the “lecture” prepared in advance. The key is to be an active rather than passive learner, regardless of the type of didactic session.

• **Textbooks**
  Textbooks are available for both general physics and specific modalities, such as helical CT and MRI. Textbooks offer the advantage of a comprehensive overview.
of the domain and are excellent reference resources. In the ideal situation, they should be used in conjunction with guided discussion and self-assessment questions and problems that test learning.

- **RSNA modules** The RSNA and AAPM conjointly developed modules that cover important topics in medical physics. The modules are currently being revised and updated. Residents are encouraged to use these modules, but they should not supplant lectures and guided discussions with a medical physicist.

- **Radiographics ABR Diagnostic Radiology Core Examination Study Guide** The RSNA has created a “one-stop shop” of Radiographics articles that are relevant to studying for the Core Examination. A section of peer-reviewed educational articles that pertain to physics is available for review.

- **Review Courses**
  Attendance at a review course is a matter of personal choice. To maximally benefit from such a course, the learner should already have some understanding of most, if not all, of the concepts that will be taught so the experience is truly a review.

- **Other**
  Other online resources are accessible on the Internet. A listing of relevant websites is available at [www.radiologyeducation.com](http://www.radiologyeducation.com). Some of the listed websites offer simulations, tutorials, and questions and answers that may help the learner improve his or her understanding of medical physics.

**Strategies**
Clearly there are many resources available to a candidate who is trying to prepare for the Core Examination. This section will discuss the optimal use of these resources.

Recommended preparation for the Core Examination was covered in a previous edition of *The Beam*. Studying for physics should not be different from studying for any other topic. Ideally, a candidate should dedicate time and effort to this topic throughout his or her residency. A common error committed by both residency programs and residents is to delay efforts to learn physics until a short time before the examination. Delaying studying until just before any exam has been shown in the educational literature to be disadvantageous to the learner.

Use of passive studying techniques, such as just reading a textbook or modules, is also known to be an inefficient method for gaining knowledge and understanding of a topic. Active learning methods that include discussion; spaced, recurrent topic review; teaching of peers; and rigorous, regular self-assessment are much more likely to result
in a deeper understanding of any topic. Residents are encouraged to form learning groups with their peers to help accomplish these goals. It is ideal if a medical physicist or faculty member with an in-depth knowledge of medical physics facilitates the learning group’s discussion.

Summary
Medical physics is a subject that demands dedicated attention rather than a “binge-and-purge” approach. Residents are encouraged to take a long-term approach to learning and maintaining knowledge and skills in medical physics. Command of this topic helps radiologists provide the safest and most cost-effective care, which our patients deserve.