

Navigating the Board Exam Process

Parts 1 & 2

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Conflicts of Interest

- License royalties from IBA

Disclaimer

- Coming to this seminar will not guarantee that you pass! ☺

Millennials...

3 BIGGEST FEARS OF OUR GENERATION



Millennials...

4 ~~3~~ BIGGEST FEARS OF OUR GENERATION



Agenda

- Timeline of exams
- Part 1 & 2
 - Structure
 - Survey results
- Summary and Recommendations

Part 1

Navigating the board exam process

Timeline

Part 1 (typically offered in August, \$505)

- Requirement: Must be enrolled in or have completed a CAMPEP-accredited program (graduate program, DMP program, certificate program, or medical physics residency)
- Apply between September 1 and October 31 the year before the exam

Part 2 (typically offered in August, \$690)

- Requirement: Must pass part 1, must complete a CAMPEP-accredited residency by August 31 of the year in which Part 2 is to be taken
- Apply between December 1 and January 31 the year before the exam

Part 3 (typically offered in May, \$765)

- Requirement: Must pass part 1 and 2
- Will be invited after passing part 1 and part 2

Cost and dates: <https://www.theabr.org/cp-dates>
 Requirements: <https://www.theabr.org/cp-req>
 When to apply: <https://www.theabr.org/cp-process>

Part 1 specifics

- Part 1 consists of two parts

- General

- 80 questions*, 4 hours
- Some are "simple" questions worth 1 point, others are "complex" questions worth 3 points

- Clinical

- 75 questions*, 1.5 hours

- What if you fail?

- If you pass general only, you can retake only the clinical portion
- If you pass clinical only, you must retake both parts

- Information

- <https://www.theabr.org/exam-information/exam-breakdowns>

*Number of questions likely to increase with conversion to new question types

ABR provides constants for Part 1 & 2

- Physical values
 - Planck's constant, mass of electron, speed of light, speed of sound, gyromagnetic ratio, flux capacitor ratio, etc
- Half-lives of common radionuclides
- Radiation and tissue weighting factors
- Dose rate constants and TVLs

List of constants: <https://www.theabr.org/cp-constants-physical-values>

New question types

- Four new types of questions
 - Fill in the blank

1. For a pressure of 750 mm Hg and a temperature of 21°C, the temperature-pressure correction factor for an unsealed ion chamber is _____ (Round to the third decimal place.)

Answer: 1.002

How to get to the answer: $((273.15 + 21) / 295.15) \times 760 / 750 = 1.0019$. Round to third decimal = 1.002

New question types: <https://www.theabr.org/cp-new-question-types>
Part 1 sample questions: <https://www.theabr.org/cp-sample-part1#compagn>

New question types

- Four new types of questions
 - Fill in the blank
 - Multiple correct options

1. A charged particle is in a vacuum. Under which two conditions will it emit electromagnetic radiation? (Please select two options.)

- A. Linear with constant speed
- B. Circular with constant speed
- C. Linear with constant acceleration
- D. No motion

New question types: <https://www.theabr.org/cp-new-question-types>
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New question types

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1. A charged particle is in a vacuum. Under which two conditions will it emit electromagnetic radiation? (Please select two options.)

- A. Linear with constant speed
- B. Circular with constant speed
- C. Linear with constant acceleration
- D. No motion

Answer: B and C.

New question types: <https://www.theabcr.org/crp/new-question-types>
Part 1 example questions: <https://www.theabcr.org/crp/sample-part1/#compen>

New question types

- Four new types of questions
 - Fill in the blank
 - Multiple correct options
 - Point and click

1. Point and click on the pectoralis muscle.

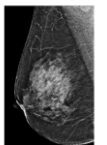


New question types: <https://www.theabcr.org/crp/new-question-types>
Part 1 example questions: <https://www.theabcr.org/crp/sample-part1/#compen>

New question types

- Four new types of questions
 - Fill in the blank
 - Multiple correct options
 - Point and click

1. Point and click on the pectoralis muscle.



Click anywhere in the shaded area



New question types: <https://www.theabcr.org/crp/new-question-types>
Part 1 example questions: <https://www.theabcr.org/crp/sample-part1/#compen>

New question types

- Four new types of questions
 - Fill in the blank
 - Multiple correct options
 - Point and click
 - Case-based questions
 - Two or more (typically three) sequentially related questions on a single topic. These questions are targeted to replace the "complex" type questions in Part 1. The questions are linked in a one-way direction that does not allow the examinee to go back to change an answer after moving to the next question.

New question types: <https://www.theabr.org/cp-new-question-types>
 Part 1 example questions: <https://www.theabr.org/cp-sample-part1/#/compaq>

Case based questions

• Example

1. For a 2D ultrasound image that consists of 100 A-mode lines resolving an object at a depth of 15 cm and an acquisition time per scan line of 13 μ s/cm, what is the total time per frame?

- A. 5.0 ms
- B. 11.2 ms
- C. 19.5 ms
- D. 27.3 ms

There will be a block between the questions that permits the candidate to review the previous question, but not to change the answer.

2. If the time per frame is 19.5 ms, what is the frame rate?

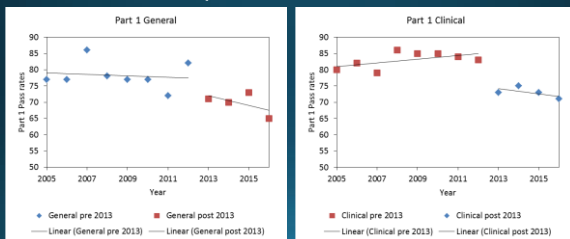
- A. 26 Hz
- B. 51 Hz
- C. 100 Hz
- D. 769 Hz
- E. 5000 Hz

Answer: 1 = C; Answer 2 = B

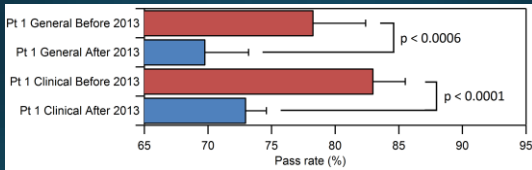
Good news, this style of question allows partial credit! This is better than a single "complex" type question worth 3 points.

Part 1 example questions: <https://www.theabr.org/cp-sample-part1/#/compaq>

What is the pass rate?

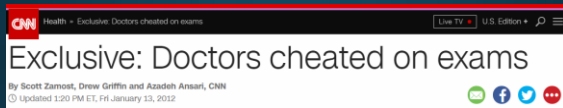


I know, you guys want statistics...



Statistics by Stephen Graves, PhD

So what happened? *Dan's hypothesis

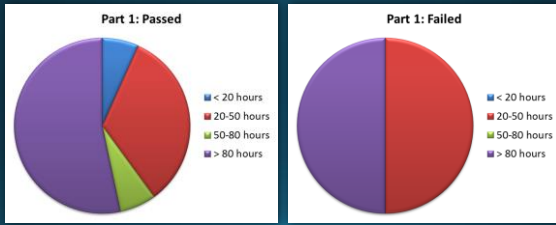


- "For years, doctors around the country taking an exam to become board certified in radiology have cheated by memorizing test questions, creating sophisticated banks of what are known as 'recalls,' a CNN investigation has found."

So how can we help? Survey!

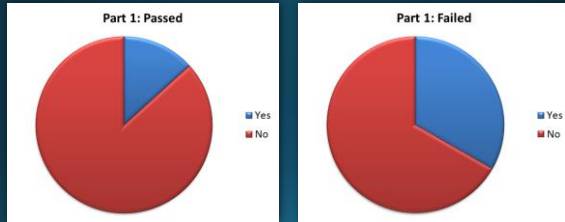
- Blake and I took the exam a long time ago (cause we're old), so we wanted some fresh data!
- Survey was sent out seeking advice from recent test takers
 - MedPhysUSA listserv
 - Med Phys Board Preparation Yahoo Group
- Received 107 responses!
- Answers from those that passed and those that failed were categorized

Part 1: How much time should I dedicate to studying?



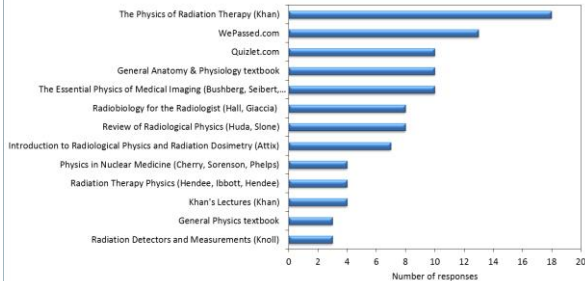
- Inconclusive
 - 52% of people that passed studied 80+ hours, while 50% of those that failed also studied 80+ hours

Part 1: Should I study with others?



- Recommendation: Studying in groups for part 1 may not be advantageous
 - Potential reasons: Hard to stay focused due to breadth of potential topics

Most effective study materials



Comments from exam takers

- Study by doing actual questions!
 - "Study more calculation problems"
 - "Practice as many example problems as possible, and do them with the exam calculator"
 - "I found the use of RAPHEX exams invaluable. The ability to test and assess your command of the topics was invaluable. Furthermore, I could time myself on how long it took answer a complete set of questions."
 - RAPHEX: Radiological Physics Examinations – useful as a practice test or advanced study guide
- I agree, some resources where you can practice questions:
 - Raphex
 - Online (WePassed, Quizlet, etc)

Tips for success

- DO NOT
 - Study recalls
- DO
 - Start early, you need to dedicate a SIGNIFICANT amount of time to exam preparation
 - Practice questions – in my opinion, this is the most efficient use of your time
 - You have already had the coursework, just need to "freshen" up your skills
- MAYBE
 - Study in a group, but you need a way to stay focused
 - On the flip side, if you find yourself surfing the internet every 5 minutes while studying by yourself, maybe a group would help

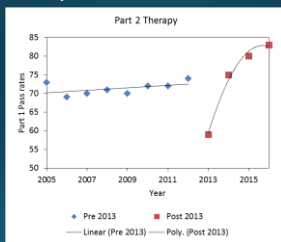
Part 2

Navigating the board exam process

Part 2 specifics

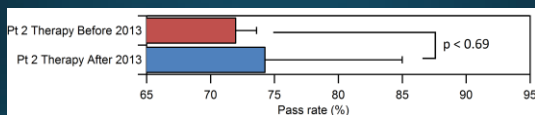
- Questions are specific to your subspecialty (therapeutic physics)
 - 80-120 questions (Range of questions is to account for the conversion of complex items to multi-part questions)
 - 4 hours
- What if you fail?
 - You can take it again next year ☺
- Information
 - <https://www.theabr.org/exam-information/exam-breakdowns>

What is the pass rate?



Annual report archives: <https://www.theabr.org/news-landing#annualreportarchive>

GIVE US THE STATISTICS!



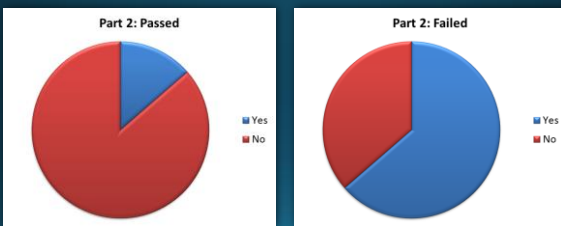
Statistics by Stephen Graves, PhD

Part 2: How much time should I dedicate to studying?



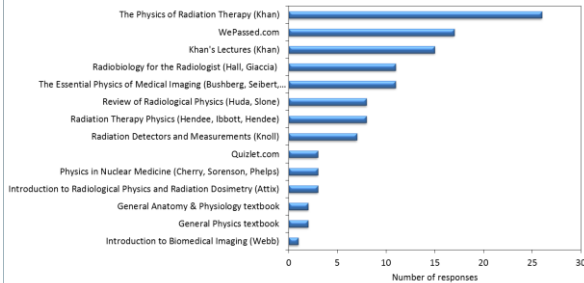
- Inconclusive
 - According to these results, studying more actually decreased your chance of passing!

Part 2: Should I study with others?



- Recommendation: Studying in groups for part 2 may not be advantageous
 - Written test? No need to say answers out loud?

Most effective study materials



Comments from exam takers

- **Raphex**
 - "Raphex was very helpful for the short answer questions."
 - "I found practicing the raphex exams most useful. I did several years worth and it helped a lot with confidence and intuition."
- **Online materials**
 - "WePased is such an extraordinary resource. For Part 2 studying, I went through and did all the practice questions."
 - "The questions on wepassed.com are very indicative of the types of questions you will be seeing on the exam."
 - "WePased has a lot of practice problems, abphysics help has a better structure for studying concepts."
- **Rules of thumb**
 - "For part two - know how to do very quick calculations. In other words, if there is a quick formula out there for anything related to medical physics or radiobiology, know it backward and forward."
 - "Learn the approximations for many things. The exam is multiple choice and an approximation will get you there faster than the full blown math."
- **Calculator**
 - "Practice, practice, practice problem solving. Especially with using mouse/keyboard for calculator practice. The greatest hindrance was being forced to use the desktop calculator."
 - "Learn to use the damn calculator. Buy one and do all calculations on that POS calculator. Learn how to use the statistical functions as well."

Rules of thumb

- **Electrons**
 - $\text{Range} \approx E/2$
 - $R_{90} \approx E/3$
 - $R_{95} \approx E/4$
 - $d_{\text{max}} \approx E/5$
- **Ion Chambers**
 - $Q \approx 0.3 \text{ nC/cc/cGy}$
- **Tolerance (for almost everything)**
 - $2\%/2\text{mm}$
- **Answer to almost every radiation interaction question**
 - SCATTER!

Tips for success

- This is the easiest of all three tests
 - Narrower scope than Part 1, not as high pressure as Part 3
 - You should be well prepared for this after graduate school and residency
- With this being said, start your studies EARLY!
- **Focus on your weaknesses**
 - You will have been working for a minimum of 2 years, you should know your weaknesses
 - Get extra help in these areas / spend more time on them
- Good luck!

Navigating the Board Exam Process

Part 3

Blake Dirksen, MS, DABR

Conflicts of Interest

- None applicable to this talk.

Outline

Why certification?
The oral exam
Study tips
Resources

Why become certified?

- About more than money
 - But the raise is nice
 - Dan keeps asking me, "what raise??"
- Only non physician profession certified by a physician certification body. Provides professional credibility.
- Our work carries great responsibility and we owe it to our patients to ensure that we are up to the task.

We are professionals



Six components of a profession

- 1) A commitment to the interest of clients in particular, and the welfare of society in general.
- 2) A body of theory of special knowledge.
- 3) A specialized set of professional skills, practices, and performances unique to the profession.
- 4) The developed capacity to render judgements with integrity under conditions of ethical uncertainty.
- 5) An organized approach to learning from experience, both individually and collectively, and thus of growing new knowledge from the context of practice.
- 6) The development of a professional community responsible for the oversight and monitoring of quality in both practice and professional educators.

The Content

- Dan and I do not know content, in fact, it is unethical to disclose the content so don't trust anyone who claims they know the content of the exam.
- Five examiners will each ask you one question from each of five categories (examples on theabr.org)
 - Radiation protection and patient safety
 - Patient-related measurements
 - Image acquisition processing and display
 - Calibration, quality control, and quality assurance
 - Equipment

Format

- One on one oral exam
- Five examiners with 25 minutes each
 - Approximately five minutes per question
- Held at a hotel in Louisville
- Get assigned five hotel rooms and you rotate through the five examiners over 2.5 hours
- In each room is an examiner with a computer screen with a question on it. The examiner will read the question to you out loud and then you can proceed.

Pro's

- Can further explain reasoning
- Mention references
- Talk through problems

Con 's

- Cannot BS your way through
- Cannot rote memorize
- No multiple choice (~~25%~~ chance with a guess)

How do I improve my odds?

	All Takers	First Time Takers	CAMPEP Residency
Total	390	267	47
Pass	218 (56%)	171 (60%)	41 (87%)
Condition	59 (15%)	42 (16%)	4 (9%)
Fall	113 (29%)	74 (28%)	2 (4%)

	All Takers	First-Time Takers	In CAMPEP Residency
Total	414	285	42
Pass	207 (50%)	167 (59%)	37 (76%)
Condition	66 (16%)	47 (17%)	6 (14%)
Fall	141 (34%)	71 (25%)	4 (10%)

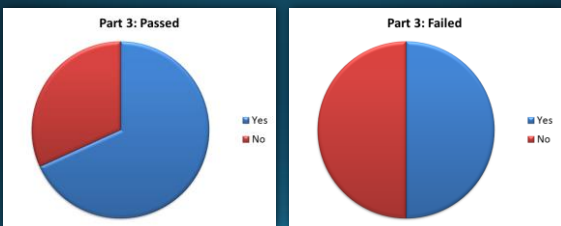
Not good!
Success!

Part 3: How much time should I dedicate to studying?



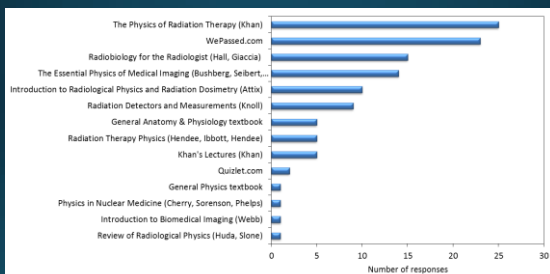
- Inconclusive, but short answer is A LOT!

Part 3: Should I study with others?



- Recommendation: Unlike the written tests, there appears to be an advantage to group study for Part 3

Most effective study materials



Other Resources to Consider

- Classic texts
- AAPMTG and MPPG reports
- ADCL calibration sheets
 - The "extra" paper you get with your calibrations is a good source of how things are calibrated and related uncertainties.

Comments from exam takers

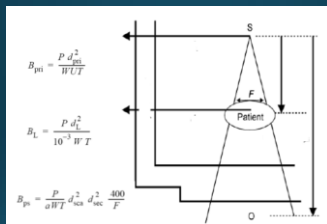
- Practice
 - "It's invaluable to practice answering questions out loud whether studying with another physicist or going through a mock oral exam"
 - "If you can find a group, work mock oral exams with a partner/partners"
 - "I had a study group that would meet weekly via video teleconferencing (Google Hangouts) and practice mock orals with electronic slides, one questioner, one examiner, with group providing feedback after the elapsed time."
 - "If you can find a group, work mock oral exams with a partner/partners"
 - "Start studying early and practice verbalizing answers with others so that you can simulate the situation. I also did a mock oral exam hosted by a local chapter that was very helpful for practicing and gaining confidence."
- Early preparation
 - "Start early, take thorough notes (I liked using Microsoft OneNote so I could access and add to my notes from work and home), and review as you go. I ended up leaving review for near the end of my studying and had definitely forgotten some of the stuff I hadn't looked at in months. Practicing talking through questions was also very helpful • even a <30 min commute in the morning gives enough time to talk through a question or two."
 - "Prepare as soon as possible setting goals and time frames. Really probe the topics. It will help tremendously to get you prepared and you will become a more knowledgeable physicist. Don't brush it off as easy. It's not. Pay attention to the study guide on the ABR website. Ask others about their experience. A review mock exam is helpful but it won't replace the actual experience. I felt it was helpful but I also felt it misguided my perception of what I was really prepared for."

Tips for Preparation

- Start by reading the ABR website (theabr.org) to best understand the process.
- Organize a schedule — list of knowledge areas and timelines of when to complete
- Work through your answers out loud, preferably with someone else
- Mock exams are very helpful but won't save you
 - Many AAPM chapters hold events each year
 - There are other organizations that host ABR prep events. These are typically more expensive but chapter events are put together by volunteers
- Learn the content AND the references
 - We cannot know everything but you should at least know where to look

Things to avoid during the exam

- Do not "just wing it" on an answer
- Avoid blurting out everything you think you know about a topic. Simply answer the question.
- Do not rush through memorized answers
 - In an oral exam it is easy to tell what is memorized and what is understood
- Lastly, do not panic



What does this diagram represent? What are the functions on the left used for? What is the difference in the radiation at various points in the diagram?

Tips to help during the exam

- Be slow and deliberate
- Ok to refer to a reference
- Be ready for no reply from the examiner—very unnerving
- Be ready for wacky follow up questions
- Reference "your clinic" or "your experience" in a positive
 - Good: "In my clinic we achieve that tolerance by calibrating the system prior to each patient case."
 - Bad: "In my clinic we don't do that so I have no idea what you are talking about."

Best of Luck

- Questions?
- Please take a minute to network with those around you. This is a good time to find study partners.

DABR-DOOOOOOOOOO!