

Pathways into medical physics for the CAMPEP graduate

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Purpose of presentation

- **The attendee will**
 - **Identify the educational requirements for individuals who wish to enter clinical careers in medical physics**
 - **Recognize non-clinical career pathways for graduates of CAMPEP-accredited graduate programs**

Questions?

- **Text me at (713) 906-7259**

Educational requirements for clinical career

- **Core education in advanced physics, mathematics (undergraduate physics degree)**
- **Principles of medical physics (graduate medical physics degree)**
- ***Problem-solving (clinical project or thesis)***
- **Clinical knowledge and skills (residency)**

Educational requirements for clinical career

- **Minimal clinical competence validated by passing certification examination (ABR, CCPM, ABSNM, ABMP)**

Standard pathway towards clinical competence

- **Undergraduate degree in physics (4 yr)**
- **CAMPEP-accredited graduate program (2 yr)**
- **CAMPEP-accredited residency program (2 yr)**
- **Certification examination**

Alternatives to undergraduate degree in physics

- **Undergraduate degree in physical science or engineering**
- **Minor in physics**
 - **Generally taken to mean 3 upper-division (junior or senior) physics courses**
 - **Broad interpretation of what constitutes “physics”**

Graduate degree in medical physics

- **Curriculum based on AAPM Report 197 - “Academic Program Recommendations for Graduate Degrees in Medical Physics”**
- **Designed to ensure that individuals entering residency programs have adequate didactic preparation in medical physics**

Alternative to graduate degree in medical physics

- **Courses identified in AAPM Report 197S,
“The Essential Medical Physics Didactic
Elements for Physicists Entering the
Profession through an Alternative
Pathway: A Recommendation from the
AAPM Working Group on the Revision of
Reports 44 & 79”**

Alternative to clinical residency

- **There are no alternatives**
- **In order to take the ABR examination,
a candidate must have completed a
CAMPEP-accredited residency
(effective 2014)**

Here's the problem(s)

- **There aren't enough residency programs to meet the demands of graduates of CAMPEP-accredited graduate programs**
- **Residency program admission is biased toward PhD graduates**

Number of residency programs (7/1/13)

- **Therapy**
 - Accredited: 66
 - In review: 8
 - New therapy physicists – 111/yr
- **Imaging**
 - Accredited: 8
 - In review: 3
 - New imaging physicists – 16/yr

(assumes 1.5 residents/yr/program)

Staffing needs (as per MDMills, PhD)

- **Therapy – 125-150/yr**
- **Imaging – 20-25/yr**

- **Target date: July 1, 2015**
 - **Medical physics students entering CAMPEP-accredited programs in fall 2013 will be completing MS degrees**

We need more residency positions!

- **...but not too many more residency positions**

AAPM actions

- **Hub and spoke workshop**
 - **Encourage smaller clinics to affiliate with larger centers to accommodate more residents**

AAPM actions

- **Provide administrative support for residencies**
 - **Smaller practices can afford residents but not administrative overhead**

AAPM actions

- **AAPM/RSNA funding initiative for imaging physics residencies**
 - **Provide partial funding for residents for new imaging physics programs with program commitment to continue funding**
 - **3 programs selected for initial funding**

**...but that's not the only
problem**

Admission bias



MS Medical Physicists accepted to CAMPEP Residency Programs



PhD Medical Physicists accepted to CAMPEP Residency Programs

...and this does not include alternative pathway PhDs

Admission bias

- **MS students are more likely to seek clinical careers**
- **Residency programs occasionally are administered out of GME offices, which require residents to have been awarded terminal degree in their discipline**

Admission bias

- **Are PhD graduates smarter than MS graduates?**
- **No significant difference between MS and PhD applicants in GRE scores or undergraduate GPA**

...but is this discrepancy real?

Results of 2013 CAMPEP Survey		
	MS graduates	PhD graduates
Total number graduating	200	55
Number entering residency	44	25
Number taking junior position	61	16
Number entering another degree	50	1
Number taking job in industry	7	9
Other	17	4
Still looking for position	16 (9%)	6 (8%)

**Pct of MS still looking for position is lower than
pct of PhD still looking**

**What is going to happen
when junior physicist
positions are no longer
available to graduates?**

What not to do

- Place limits on the number of students graduating from programs
 - No organization has the authority to do so

What to do – programs

- **Ensure that MS physicists have opportunities for clinical training**
 - Targeted residencies (LSU model)
 - Professional doctorate (Vanderbilt model)

What to do – programs

- **Publicize programs “track record”**

“A program must make information available to the public, preferably through an open- access web site, that describes the program and the achievements of its graduates and students. This information must be updated yearly and include, for each degree program (MS and/or PhD), the number of: applicants to the program, students offered admission, students matriculated, and graduates. Information on the destinations of graduates must also be provided, i.e., residencies, industry positions, etc.”

CAMPEP Guidelines for Accreditation of Graduate Educational Programs in Medical Physics

What to do – students

- **Consider career path that does not require ABR certification**
 - **Research**
 - **Teaching**
 - **Regulatory**
 - **Corporate**
 - **Entrepreneurship**

What to do – students

- **Many successful medical physicists are not ABR-certified**
 - **Since 2009 2 Coolidge Award winners not certified**
 - **Since 2009, 3 Quimby Award winners not certified**

Take-home message

- **The path to clinical competency in medical physics includes 2 yr of didactic instruction followed by 2 yr of clinical training.**
- **There are an insufficient number of residency programs to meet the desires of all graduates of CAMPEP-accredited graduate programs. This is particularly true for MS graduates.**

Take-home message

- **This issue is not likely to be alleviated in the near future. Consequently not all graduate students who are seeking clinical careers will have access to them.**
- **However, medical physicists who are not Board-certified can have successful careers.**

Thank you

