Physics Education of Physicists
Saturday, January 21

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Chetty, Indrin	ASTRO
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Fallone, Gino	CCPM
Gerbi, Bruce	ACMP
Gerdeman, Anthony	ABR
Greenspan, Bennett	CAMPEP
Hazle, John	ACR
Hendee, Bill	AAPM
Huang, Eugene	ARRO
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King, Lenna	ACR
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Massoth, Richard	AAPM
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Rzeszotarski, Mark	AAPM
Seibert, Tony	AAPM
Solberg, Tim	ACMP
Sprawls, Perry	ICTP
Sullivan, Lisa	AAPM
Thomas, Steve	ABR
Michael Yester	ABMP

Hendee General Issues:

How well are we doing in educating medical physicists,
Relationship between education and certification
Ensuring pathway for bringing quality individuals into the field

Eric Klien:

Physics Ed

AAPM needs to look at why ASTRO decided to go it alone for residency start-up programs and not through the AAPM

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Physicians: accredited medical school-approved residency program-board certification-continuing education

Vendor sponsored but to include a review board
Eric: solution more residencies programs and have to go through them and then sit by for the board

Gerbi: what is the fundamental body of knowledge required to be a medical physicists; then exams; the quality is built in at the end

Feels regulatory agencies could be a strong ally

Tim Solberg: we have an opportunity to take a lead role in setting quality; can look at what defines quality in medical physics;

Does AAPM fund the CAMPEP board members representing AAPM?

2 meetings per year at AAPM and RSNA per year

Clarke: feels that sponsoring organizations should provide funding for CAMPEP administratively

Too long timeline between applying and approval;

Thomas: are thinking about directing accreditation in both directions vs. radiation oncology and imaging

Russ: ABR may require residencies in 2012?

Accredit a program with satellite locations which will have qualified mentors

Group A: Table 1:

1. Funding: no clear answers here, should be funded at least at the administrative level
2. Residency program should be accredited, but multiple graduate training pathways should be permitted. Considerable diversity of opinion here. Goal should be med phys grad education but is far away.
3. Satellite challenges - funding, geography, coordination, quality oversight, utility of consulting groups as a possible resource for diagnostic but not therapy.

Group A: Table 2:

1. Agree with Table 1's conclusion

2. in these training programs two components didactic and clinical programs; CAMPEP programs courses may or may not have clinical component
3. what are the core proficiencies for the individual coming out
4. want to define core didactic components and clinical proficiencies
5. ABR deadline of 2012 forces people to go through the entire program; no way to stop someone from dropping out

Group A: Table 3:

1. Support ($$$) for CAMPEP is an important need; especially for smaller programs that may not be able to afford a higher fee
2. consideration for research vs. clinical tracks
3. Colleges and universities may resist redundant accreditations; why can't they just follow the program without going through the CAMPEP program.
4. Small programs are vulnerable to these pressures.
5. CARE Act requires minimal standards;
6. grandfathering of individuals and programs to get around certification issues
7. Use medical errors in HDR, MLC, and Therapy planning as was done in UK.

Group A: Table 6:

1. duration of residencies program – two-years is adequate for those from medical physics programs for those that come from other programs may need three year residencies
2. funding for CAMPEP from sponsoring organizations should be provided
3. Question of sponsorship? Are 4 organizations sufficient as sponsors? ASTRO and RSNA?
4. concerned about CAMPEP accreditation of partial programs for graduate programs; two with radiotherapy but not imaging; these should not be the direction of CAMPEP due to the importance of imaging in therapy today
5. affiliated institutions for residency programs; fully support the AAPM Ad Hoc committee for alternative pathways
6. perception of CAMPEP in medical physics community; many medical physicists due not recognize the importance of CAMPEP accreditation to the field;

Group A: Table 5:

1. support for CAMPEP – annual fee; looking at different sources; goal is to obtain board certification perhaps office of education at these institutions; talk language of medical education office, sponsoring organizations a yearly fee of $3,000 and institutions for an annual fee
2. workload for CAMPEP – how many institutions could handle in the review process; need for administrative help – limitations are funding; perhaps 10 per year the volunteer base for the reviews would have to increase to about 20 per year from both accredited programs and others; change in process CAMPEP

would give temporary accreditation status which might smooth interaction between CAMPEP and the institution

3. future for CAMPEP – perhaps 1 FTE in an organization that would take advantage of the infrastructure but dedicated to CAMPEP once it grows; how many programs should be accredited; 20 -25 graduate programs but many more residency programs
4. models for certifications needs for individuals – MR certifications of physicists; need to look at models for demonstrating advantages to modality certification like MR certification from ABMP;
5. educational curriculum changes that CAMPEP needs to understand – NRC changes regulations for RSO who now needs to have training and experience over all aspects of the programs
6. need to educate administrators who hire individuals to serve as medical physicists which may not have the qualifications

Brenda: concern about accreditation in radiation therapy only, how would advise the CAMPEP board to proceed; have the course work but no students in imaging and have the difficulty of pulling diagnostic physics faculty into the entire program; require didactic in imaging as if applies to radiation oncology

Hazle: it doesn't make a lot of sense to go that way; at the graduate level want to include the didactic curriculum; any faculty should be able to teach, definition should come at the board certification level and as a basis for practicing medical physics; don't need to have practical experience in all areas shouldn't be defined as the graduate level and set the minimum level to enter the field

Ervin: tell the institution to get to some minimal standards to cover

Pickens: component in radiation therapy but not imaging; on the diagnostic side we teach course work on medical imaging; from their perspective don't have the group of people to support the training level for medical imaging side

Hendee: graduate education by itself is not adequate to move into clinical practice; get residency or practical experience elsewhere

Hazle: any consideration to combining nuclear medicine and diagnostic into one exam; urge the board to consider it

Yester: Issue is what does it mean to be certified in nuclear medicine

Clarke: As chair of ABMP they are still around, still certifying in medical health physics; MR; and MOC for diplomates

Question: What should ABMP future be?

Group B: Table 5:

1. Eligibility requirements and how closely are they followed? Need more definition by ABR
2. certification; looking at the constructs of what we have been confined in as far as certification areas; perhaps we need to think about the current status and a rethinking of how we might rearrange the curricula and certifications o reflect today's state of practice
3. cross training; ABMS doesn't allow it any more, CAQ process is defunct
4. ABR presence of a clinician on what level is necessary for a physicist to have today
5. getting new input from the general public; is getting outside questions to help establish questions; add cross expertise to part 2 exams
6. ABR is a totally volunteer organizations as far who writes the questions and their process for certification
7. ABR process might be more appropriate to better define the clinical requirement for the 6 and 12-month credit and having AAPM and others for assisting with defining the external requirements like NRC

Group B: Table 4:

1. discussed pathway into medical physics ideal path is through a CAMPEP program and a residency
2. believes that meeting the ABR's goal of 2012 is not realistic
3. clinical is 36-month concern is that residents that finish a CAMPEP program that is a two-year residency is a potential problem since they still need another year for clinical not eligible to sit for the exam, propose graduates from a 2-year CAMPEP residency should be eligible for the ABR exam
4. concern about Canadian graduate and clinical residency; problematic is the NRC's requirement that they are precepted by an ABR-certified physicist; concern is that they are not eligible; would request that it be addressed
5. clinical training is easier for therapy and not diagnostic radiology

Group B: Table 3:

1. diagnostic and nuclear physics subspecialty exams; regulatory patient safety and imaging research combinations; going forward there may be more gene-based compounds that may or may not be radiolabeled
2. Combining DRP and MNP issue:
    a. Historically different skill/didactic components with common imaging component. May need to maintain in at least short-run.
    b. Regulatory, safety and imaging research ramifications to combining
    c. MOC cost may be prohibitive for multiple certifications, not for old RP diplomates.
3. "Regulatory Space" has an impact on practice of each MP subspecialty, especially in 35.300 uses, clinical trials, research and training.
4. MOC may be cost limited if multiple certifications

5. regulatory space that needs to be watched and monitored especially 35.300 and 35.1000
6. whether or not we should stick with a BS as the bar for what an accredited master's program might accept for example if they want to take the remedial physics for their masters degree

Group B: Table 2:

1. certification definitely a need for an avenue to lobby providers and insurers and the American Hospital Association that certification is a requirement as it may impact patient safety
2. need for information and a public relation mission within and outside our field on MOC; needs to a process with broad buy-in for the physicists for whom it is not required to step up for a role model
3. sub-specialization – an area with difficulty in training and demonstrating for efficiency; demonstration of competency may be a way to address this

Group B: Table 1:

1. The long-term goal is to have medical physicists complete both a CAMPEP accredited graduate education program AND a CAMPEP approved residency program. Currently, graduates of medical physics graduate programs often go to work for $100k per year instead of a residency at $40k per year. Many individuals proceed to the ABR certification process without completing a residency.
2. The proposed new rule is to go through a CAMPEP accredited residency program. Issues with Canada if ACGME takes it over, gamble relating to whether or not there will be enough funded residency programs. What are the appropriate transition steps? The pass rate would increase but the number of candidates would go down.
3. We discussed the issue of competency assessment and a requirement for signoffs for training. Is the graduate ready to perform his or her duties and is able to work independently and competently, as they are required to in diagnostic residency programs?

Clark: Canadians have established MOC five-years ago, everyone must go through; no lifelong certificate; have had 100 per cent buy-in

Hendee: how many do you believe it would be in the best interest of medical physics to gradual raise the bar for both written and oral certifications: about 13 to raise the bar? Is it the passing the score to raise or tighten the criteria?

Response: need to look at both aspects

Herb Mower
Challenges to Education

Saturday, January 21, 2006 rough notes

- What are the Time Challenges to Physics Education in Medical Physics Residency Programs?
- What are the Cultural Challenges to Physics Education?
- What are the Resource Challenges to Physics Education?
- Are there Challenges Related to the Dedication and Ability of Physicists to Teach?
- Can Physicists Really Teach Medical Physics Residents?
- Should Such Programs be accredited?
- What Other Challenges Handicap Physics Education in Medical Physics Residency Programs?
- Remember the Points from this Morning!
- Think "OUT OF THE BOX!"

Group C:

Group C: Table 2:

1. insert Tim's notes
2. don't support master-only students
3. key issue how do we get dedicated funding for faculty
4. AAPM/ACMP symposium on negotiating what's important
5. models

Group C: Table 4:

1. differences of on-the-job and residency; idea of residency training is better
2. need to look at other pathways problem is that residency is neither mandatory or a sufficient number of slots available; concerns about the 2012 ABR goals for requiring CAMPEP residencies
3. funding for residency programs may be difficult to obtain outside source funding federal grants
4. main impediment to expanding number of residency programs is lack of funding especially in diagnostic radiology since training is more difficult to obtain and there are more jobs available without residency
5. much discussion about alternative pathway but the ideas are not clearly identified

Group C: Table 1:

1. NY Fl TX and HI currently require licensure of medical physicists. The CARE bill may result in a national licensing program. It provides an implied protection for the patient, possibly eliminates non-boarded individuals from the job pool or a time-limited grandfathering clause for others. It should elevate the profession over time. Puts you on a professional level similar to physicians and lawyers! MOC will likely become a requirement either through hospital medical staff appointment requirements or directly through the licensing rules.
2. There are concerns about the graduate school training qualifications for entering a CAMPEP accredited residency program. CAMPEP should establish and define the criteria necessary to enter a residency: e.g., bachelors in a physical science

AND a masters or PhD in medical physics or possibly other specialties. This establishes the basic training requirements for a physicist to enter a residency program and could more clearly define the "allowable pathways." As ABR implements CAMPEP accredited residency training in the future, it should provide for better assurances of adequate training of medical physicists.

Group C: Table 3:

1. Departments which are not purely "Medical Physics" may impose many additional requirements on students in an MP track so as to dilute graduate training.
2. Chicken and egg problem in accrediting programs. "Junior" programs need to begin accreditation process early-before graduates complete. Avoid the "Regulatory literalism with 'deemed accredited' status.
3. Getting the programs to recognize that CMS will fund "paramedical" residencies – like MP.
4. Training of MP to teach MP
    a. In grad school, maybe
    b. In residency – depends upon MP resident – not all can teach, but will 'have' to conduct in-service training.

Group C: Table 5:

1. cultural change of getting the word out that the medical physics certified physicist is what we strive for, if you can change the culture than perhaps you can find the money
2. how do you develop a program from scratch
3. need to look at European models/ "The Emerald Project" in Europe
4. Lack of diagnostic physicists to devote the time for the training
5. Are there enough diagnostic physicists? Yes but we can't afford to make them available to do the training
6. virtual training modules
7. time and money is what it boils down to
8. how do you set the bar to ensure that competent individuals float to the top; need for litmus-type questions

Hendee: do you think there is a perception problem on who a medical physicist is; more so in diagnostic?

Hazle: we the diagnostic physicists haven't done a good job in educating the administrators to promote the professional

Andy: diagnostic physicists have a problem; from the disconnected medical physics services; fringe folks; we are at least holding on to more advanced applications; certainly the teaching of the residents; need to take ownership of teaching physics to the residents

Mark: problem of the sole physicists; how does the sole physicist learn all these new modalities; lack of support from your peers makes it challenging; how do we handle that?

Hazle: physicists working in research that they would expect to pull out of the lab and expect them to communicate the clinical medical physics; need to be sure we communicate to the department chairs and program coordinators who should be teaching physics

Geoff: one of the problems diagnostic physicists don't take part in radiology conferences, matter of language and communicating

Yester: diagnostic physicists are mainly consulting physicist

Safety compliance regulatory piece and clinical piece

Need to focus on diagnostic consultants and academic institutions differently;

Several other impediments to think about:

1. cultural change issue
2. presence of physicists in a department and how it can be enhanced
3. align with radiology group or hospital administration
4. how to negotiate contracts and teach as part of educational programs
5. Have heard that we should not encourage master degree medical physicists?

Group D:

Group D: Table 2:

1. master and PhDs entering without appropriate clinical expertise; new paradigm for medical physics professional degree: professionally recognized medical degree two-years of didactic and two-years clinical; using the synergism of existing programs; fairly self-supporting in that student would be expected to pay for the education like medical school and law; leverages existing programs and relieves doctor vs. mister in the clinic; think of it like a JD; doctor in medical physics
2. University of Toronto thinking about granting a doctorate degree after a residency
3. What would happen to the terminal master degree? Still have three choices: MS, Doctor in Medical Physics or PhD
4. should be a CAMPEP accreditation process

Worth flushing out the concept of a professional degree

Look at the MD model

Group D: Table 3:

1. Pursue community mentoring programs; accreditation/affiliation/alternate track for additional residency programs.
2. Update the old list of MP effort in various tasks, especially diagnostic. Workload studies of new methods/techniques and modalities would be useful.
3. Play golf with administrators.
4. Use expanded workload through white papers to bootstrap residency slots
5. Emphasize in publication/presentation/communication that patient safety means more than regulatory minima especially new therapy modalities.
6. Explore CMS/DHHS funding similar to the Coalition of Allied Health Leadership; useful in the CARE Act lobbying model.

Group D: Table 1:

1. Equipment selection: place RSNA tutorial in virtual library. Emerging technologies - refresher courses at RSNA - place on virtual library. Same with Physics Tutorial for Residents. There will be 64 continuing education modules at AAPM this summer. Encourage incorporation of these modules into graduate training programs. Make into a weekly seminar series in graduate education and residency training programs.
2. Training programs must develop standardized methods to measure the competency of the physicist residents throughout their training.
3. Problem with clinical education in imaging physics education. Adopt the European model: Emerald Project - consortium of programs to develop teaching/study guide for imaging physics. Define a prescribed course of study which is laboratory oriented to develop expert instruction in imaging for residents. Web-based with simulators. Provides strong training support for small programs, solo physicists, has grant potential. Focus a summer school to develop the topic. A grant would be needed to expand on this extensively to create the modules. Provides ability to perform expert distance learning, assists in MOC. Examples: tomotherapy, proton therapy, PET/CT, MDCT.
4. Mentors - encourage it, special program at AAPM - Professional Development
5. Develop simulators - virtual or videotape. Example TG51 or commissioning of an accelerator. Include videotaping of vendor training. Tie in with mentors who can help you with that one step you don't know.

Group D: Table 4:

1. degree requirements – MS degree plus residency is sufficient for clinical work; Ph.D. more prestigious but do not support the concept that a PhD is required to work in medical physics
2. status of medical physicists in diagnostic – need for support in diagnostic radiology departments; need to emphasize the need for medical physics support in these departments
3. number of residency position available in North America is too low funding is the main problem; need to identify possible sources for residency positions; especially tough in diagnostic

4. eligibility to sit for the board exam three-year requirements and a two-year residency; this is a disconnect between CAMPEP and board requirements
5. Funding for graduate students at MS level; one does not need to aspire every grad students because more training could be done with use of the funds differently; funding for residency and a master supported like on the resident side (physician)

Group D: Table 5:

1. is 2012 a good timeframe; recommend design transition processes to minimize folks from falling under those cracks; communication
2. when you're a graduate of a residency program the need for negotiate professional work concerns symposium **have PC look at this**
3. how to fund graduate programs – clinical and translational research awards
4. how do you get more funds into institutions philanthropy
5. selling the skills value added of diagnostic physicists needs to be relooked at; advertising materials

Clark: empty slots on CAMPEP boards coming up; if you're interested let your organizations know

Hendee's wrap-up:

1. Organizations in education and educational accountability in medical physics (AAPM, ABR, ABMP, ACMP, etc.) and within AAPM many groups – also regulatory agencies and licensing boards – need to weave these efforts together in a common focus towards shared objectives obvious responsibility of AAPM.

2. Physicians – undergraduate degree-med school-residency-board certification-continuing education – MOC; no similar program for medical physics.

3. CAMPEP has a huge responsibility
    a. Educational standards (AAPM)
    b. Program accreditation
    c. Pathway definition - graduate education, residency, and/or alternate pathways
    d. Affiliated programs for accreditation and almost no resources

4. Should the purpose of accreditation and certification be better defined (clinical vs. research)?

5. Consensus that partial accreditation is undesirable. Also that it is the residency/experience component of education that defines the specialty and is most meaningful to certification. Graduates of medical physics education programs going directly into unsupervised clinical positions should be discouraged. Linking accreditation and certification (goal of 2012) will largely address this issue.

6. ABR should reexamine current demarcation of medical physics specialties.

7. Find ways to involve more physicists and physicians in written and oral exams.

8. Need to address requirement of mentoring by ABR certified physicists as a handicap for Canadian physicists.

9. Consensus bar (entry criterion and exam process) should be gradually raised for medical physicists.

10. How do licensure and the CARE bill fit into the accreditation issue?

11. Educational programs in medical physicists and accredited education programs. Work with institutional leaders and national organizations like the AHA and the AAHC. Networking is important.

12. Educational programs in medical physics probably should include issues such as
    a. Equipment acquisition
    b. Negotiating skills
    c. How to teach
    d. Mentoring skills
    e. Benefits

13. Today's discussion related to yesterday's on Mastery of Technology as essential to clinical acumen of radiologists and to quality, safety and cost-effectiveness of procedures, all of which are essential to preservation of radiology and its turf. This is major educational, service and research role of the physicists. Quality and safety more than regulatory minimum.

14. Similarly, tomorrow's discussion will focus on the importance of physics in the major of the technological complexity of radiation oncology including quality and safety and cost-effectiveness – elevated role for the physicist.

15. Doctor of medical physicists is not a pathway for incompetence – must satisfy CAMPEP requirements. This is driven by the need for educational quality.

16. Emerald Project is a web-based educational program in imaging physics serve as a mold for distance education/MOC