Education Council Symposium: Medical Physics Education: Beyond the Future

Future training of diagnostic medical physicists

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American Association of Physicists in Medicine (AAPM) 2018 Annual Meeting
Nashville, TN
July 31, 2018

Disclosures

- Member of CAMPEP GEPRC
- Member of CAMPEP Board of Directors

Traditional Training of Dx Imaging Physicists

- Physics of Medical Imaging
- Evaluating Performance of Systems
- Compliance with local, state, fed laws/regulations
- Accreditation testing
- In some cases, minimal interaction with clinical operations (or at least minimal operation with radiologists or other MDs)

- These Basics are Still Important!
- This is the basis of being a Diagnostic Imaging Physicist

Traditional Training of Dx Imaging Physicists

- AAPM Report 197
- AAPM Report 197S
- CAMPEP standards

Trends in Medicine

- Personalized Medicine
- Evidence-Based Medicine
- Precision Medicine
- Value-Based Medicine

- How will these be developed and evaluated in Diagnostic Imaging?

Medical Physics 3.0

- Move from
  - Equipment
  - Specifications
  - Quality Check
  - Compliance
- To
  - System Performance Characterization
  - Clinical Deployment and Utilization
  - Excellence
- Physics for Medicine

Future Training

- Need to provide diagnostic medical physicists with skills to be able to ***lead*** efforts to incorporate new methods, techniques and technologies into the practice of medicine
- Diagnostic medical physicists are ***exceptionally positioned to lead these efforts*** because of their unique combination of
  - Background
  - Skills
  - Technical expertise

Future Training

- How can we prepare future Diagnostic Imaging Physicists for the leadership roles?
- ***Exercising/Developing Critical Thinking and Analytical Skills***
- Move from the concept of "acceptance testing" (does the system meet specifications set by standards and/or manufacturer?) to one of system characterization
  - What happens to performance when we change this parameter or this set of parameters?
  - And how does that differ from the other system that we currently have?

Future Training

- How can we prepare future Diagnostic Imaging Physicists for the leadership roles?
- ***Communication Skills***
- Oral (presentation) and written skills
- Persuasive writing skills (Proposals)
- Interacting with Radiologists/other MDs
- Interacting with Technologists
- Mentorship of trainees and junior physicist

Example Paradigms to Frame Training

- Maximizing Effectiveness and Ensuring the Safest Possible Operation of Diagnostic Imaging Equipment in the Clinic
  - Tradeoffs in Radiation Dose and Image Quality
  - Radiation Dose Monitoring and Reporting
  - Establishing Protocols for Lung Cancer Screening
- Diagnostic Imaging Physicists are UNIQUELY positioned to lead these efforts if they have the technical, clinical and communication skills

Conclusion

- Diagnostic physicists will always need conventional medical physics training.
- However, to prepare them for the future of medicine which involves precision medicine, personalized medicine, etc, we need to prepare them to be active leaders in ensuring the safest possible operation of diagnostic imaging equipment in the clinical environment.

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