

Physics Education of Radiologists – An Overview and an Opportunity

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Core Tenets of Radiology

- Tradition
- Domain of Expertise
 - Clinical
 - Technological
 - Cost-Effectiveness
- Dedication
 - Quality
 - Safety
 - Patient Care

Challenges to Radiology

- Clinical demand
- Lowered reimbursements
- Personnel shortages
- Technological complexity
- Dependence on referrals
- Intrusion of other specialties (self referral)

Strengths of Radiology

- Clinical Acumen
- Mastery of Technology
- Quality and Safety

Clinical Acumen

- Radiology attracts best and brightest
- Full-time devotion to imaging procedures
- Image interpretation is a learned skill
- Difficult to quantify
- Subject to challenge

Technology Mastery

- Challenge of selecting the best technology
- Complexity of data acquisition
- Complexity of image presentation
- Complexity of the acquisition/display interface
- Challenge of storing, retrieving and distributing images

Quality and Safety

- Displaying optimal images for interpretation
- Minimizing procedural costs
- Reducing risk and assuring safety
- Improving procedures through CQI
- Documenting and demonstrating quality
- Inter-relationship of technology, quality and safety

Quality Requirements for the Radiologist

- Recognize what's needed
- Program the technology to acquire it
- Manage the technology/patient interface
- Pre- and post- process the information
- Recognize distortions and artifacts
- Interpret images quickly and accurately
- Correlate findings with other information
- Communicate interpretation
- Manage and store information

Bottom Line Conclusion

- Clinical Acumen
- Quality of Images
- Safety of Patients
- Cost Effectiveness of Procedures

CANNOT BE MAINTAINED WITHOUT

- Mastery of Technology

But Mastery of the Technology Requires

UNDERSTANDING THE UNDERLYING PHYSICS

AND

**USING THIS UNDERSTANDING IN
TECHNOLOGY APPLICATIONS**

What Does Understanding the Underlying Physics Mean?

“If you want to teach me how to drive a truck, don’t tell me how to build a motor.”

University of New
Mexico resident

Indicators of How Well Radiologists Understand Physics

- Resident selection criteria
- Physics learning process during residency
- Attitudes towards physics education (residents, attendings, program directors, physicists)
- Performance on certification exams
- General recognition of inadequate understanding of physics

Reasons for These Indicators

- Discomfort with quantitative sciences
- Demands of clinical services
- Pressure to produce more work
- Fewer persons to do the work
- Expansion of imaging capabilities
- Overwhelming complexity of the technology
- Quality and structure of physics teaching
- Relevance of the certification examination
- Ease of passing the certification examination

What Must be Examined to Change These Indicators?

- Resident selection criteria
- The learning process for physics during residency
- Active support for the learning process in the department
- What and how physics is taught
- The physics certification process for radiologists
- Incorporation of physics and technology mastery into the MOC process

This Examination is the Purpose of Today's Meeting

- Think
 - Globally
 - Deeply
 - Thoughtfully
 - Constructively
 - Objectively
- Listen carefully
- Focus on solutions
- Help meet the challenge
 - And capitalize on the opportunity