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

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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

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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

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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

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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

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Bottom Line Conclusion

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

CANNOT BE MAINTAINED WITHOUT
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

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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

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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

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