

Medical Physics 3.0

Re-Envisioning the Role of Medical Physics in Modern Medicine

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From inaugural 9 to 27



MP3.0

- AAPM Adhoc (2016) Committee of 27
- 4 videos
- 16 national events
- 5 international events
- 5 magazine articles
- 6 journal articles



Outline

- Rationale
- The essence of MP3.0
- The activities and plans ahead

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Rationale

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Overarching need and presuppositions

Medicine: Discerning and intervening in the health state of the patient with sufficient **accuracy**, **precision**, and **safety** for definitive **clinical outcome**

Possible?

Healthcare is about the patient and the particularities of the techniques – techniques are valued to the extent they benefit the patient

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**Reality check 1:
Clinical practice**
Heterogeneous and Complex

- Varying technologies
- Varying technical parameters
- Varying patients
- Varying human operators
- Competing interests

Variability in the quality of care

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**Reality check 2:
There is a cost**

Most people will experience at least one diagnostic error in lifetime
Improving Diagnosis in Healthcare, NAM 2015

- 10% of patient deaths
- 6-17% hospital adverse events
- Leading type of paid medical malpractice
- Claims twice as likely to result in death

Variability in the quality of care harms patients

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Define, grow, express, and practice sustainable innovative precision care through clinical application of physical sciences

Secure the future of our profession

Physics for Every Patient

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Seven horizontal lines for notes.

Why precision care needs medical physicists?

- 1. Our historical grounding: Roentgen
2. Our unique skillset and perspective
3. Our ethical mandate

Optimum care needs purposeful contribution of medical physics

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Seven horizontal lines for notes.

Medical Physics Progression

1.0

Equipment Specifications Quality check Presumption Compliance Physics in Medicine



3.0

Operation Performance Consistency Actual utility Excellence Physics for Medicine Physics of Medicine

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Seven horizontal lines for notes.

Practices of MP3.0 Physicist

- Evidence-based practice**
Practice informed by science
- Precision practice**
Personalization of care in quantitative terms
- Experimental practice**
Skepticism, focus on actual utility as opposed to presumed utility
- Quality practice**
Doing more than just the minimum, compliance vs excellence
- Value-based practice**
Scrutiny on safety, performance, consistency, stewardship, efficiency, ethics

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Does that apply to me?

- The clinic
- The academy
- The industry
- The government
- Research organizations
- Professional organizations
- ...

Multiple practice settings, one overarching goal ...

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The Essence of MP3.0



The Essence of MP3.0

1. SOUL: Realizing who we are (or ought to be)
2. SKILL: Extending the competencies of med physicists
3. REALITY: Developing sustainable models of 3.0 practice
4. CULTURE: Changing the expectations
5. EDGE: Extending the boundaries of medical physics



1. SOUL

Realizing who we are (or ought to be)

1. **Science-oriented** (in discovery AND application)
 - **Scholarship:** evidence-based, methodical pursuit
 - critical thinking, curiosity
 - **Quantitation:** measurement, numerical orientation
 - medicine scientifically approachable when quantified
 - **Innovation:** agency of advancement
 - better understanding, practice solutions, care delivery, technological solutions, education, regulations, ...



1. SOUL

Realizing who we are (or ought to be)

2. Service-oriented (towards ultimate clinical use)

- **Care:** customer mindset
- **Personalization:** personalized and cohORIZED care
- **Optimization:** care maximized per intervention
- **Consistency:** managing variability across diverse technologies and patient factor

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1. SOUL

Realizing who we are (or ought to be)

3. Multi-vision (in incorporating science in context)

- **Dual-vision:** Myopic AND systemic visions
- **Dual-calling:** Scholar AND healthcare provider

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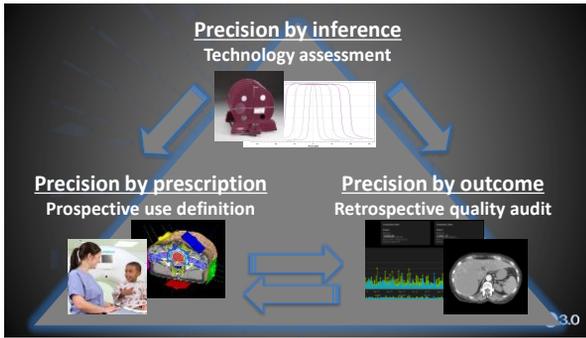
2. SKILL

Extending the Competencies

1. Hard skills (Positioning the physicist to be competent)

- Be the scientist "in the room"
- Focus on *actual* utility and quality of service
- Master the latest science in MP proper
- Master the edge of MP proper: process engineering, optimization, bio-informatics, data science and AI, radiomics
- Integrate prospective and retrospective science in practice

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2. SKILL

Extending the Competencies

2. Soft skills (Positioning the physicist to be confident)

Dealing with	Intelligence in
<ul style="list-style-type: none">• Self• People• Projects• Finances• Constraints, voids (ethics, regulations, ...)	<ul style="list-style-type: none">• Vision• Love• Action• Honesty• Stewardship of Pain

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3. REALITY

Developing Sustainable Models of 3.0 Practice

- Gain ability to articulate our essential and contextual value proposition
- Devise and use pragmatic resources, smart tools for “busy clinical people”
- Automation and tracking tools

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4. CULTURE

Changing the Expectations from Medical Physics

- Seek meaning beyond checklists, enthusiasm beyond duty, curiosity beyond “answers”
- Devise pathways for translation of science to practice
- Own the quantification of value in value-based care
- Update the regulatory expectations

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5. EDGE

Extending the Boundaries of Medical Physics

- Identify and encourage clinical growth where care can be excelled with physics contribution
- Claim and advance the profession beyond radiation medicine
 - bio-statistics, photonics, pathology, dentistry, surgery, 3D printing, virtual reality, nano-medicine, radiogenomics...

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Activities and plans ahead

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“Smarts” initiative

1. Smart regulations
2. Smart tools
3. Smart practitioners
4. Smart practice
5. Smart advocacy
6. Smart grassrootsing
7. Smart expansion



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MP3.0 for YOU

- Join MP3.0
- Be an ambassador for MP3.0
- Take part in MP3.0 Workshop (Fall 2020)
 - 3 day event to demonstrate the components and successful implementation of MP3.0 practice in
 - In imaging
 - In therapy
 - Beyond radiation medicine

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