Automation and the Evolution of Dosimetry

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Outline

• History
• Current state
• Possible future directions
• Panel discussion
• Change management
• Attendee discussion
About the panel

• Chris Amaloo, BS – Dosimetrist
• Lane Hayes, MS – Medical Physicist
• John Moody, MD – Radiation Oncologist, Medical Director
• Benjamin “BJ” Sintay, PhD – Exec Director & Chief Physicist
• David Wiant, PhD – Senior Physicist & Dosimetry Supervisor

Our vision is to be a leader in the innovation and advancement of value for radiation oncology patients.

Purpose of Dosimetry/Planning Automation

1. Efficiency/productivity - More w/less, reduce cost, produce faster
2. Safety - Consistency/reliability, computerized checks, interlocks & controls
3. Quality - Increased complexity, higher performance, leverage information
4. Engagement - Work at top of license, reduce mundane/repetitive work (happier dosimetrists!)
5. Access - High quality care available everywhere
History of Automation

- First computers used for planning and contour capture in the late 1960’s by JR Cunningham
  - The term “dosimetrist” was first used in 1969 (https://www.merriam-webster.com/dictionary/dosimetrist)
- Modern computerized planning started in mid-1980’s along with Monte Carlo
  - Michigan U, Mass. Gen., UNC, MSK, etc.
- IMRT, TomoTherapy, VMAT (1990’s)
- Deformable, adaptive, model/atlas-based (2000’s)
- For more info, see AAPM slides from 2014, “Evolution of Radiation Treatment Planning”
Current State: Getting started...

• If it’s not “out of the box”… it’s “homebrew”
• *Logic* is still *logic*
  • Lots of languages (C#, swift, PHP, javascript…)
• Get to know your API, you have one!
  • Required by law (Cures Act – 2016)
  • Find out what your vendors support and go for it!
• Find a project you connect with
  • Small and manageable *OR*
  • Large tension and high motivation
• Find a mentor/community
• **Resources:** GOOGLE, StackOverflow, codecademy…

Future State / Possibility

**On the Horizon**
• Completely discretized electronic records
  • SMART on FHIR is getting us there
• Decision support through AI and Machine Learning
• Automated workflows, active event monitoring

**Possibilities**
• Fully integrated cloud systems
• Roles that don’t even exist today
  (and disappearance of some that do)
Why do I care? (Make me believe)

Vision: Be leaders in innovation of value in health care

• Raises the floor of quality
• Allows planners to focus on higher level tasks
• Allows patients to get treated faster
• Improves patient access
• Allows us to serve a larger patient population with reduced costs

How does this affect me?

• Day to day
• Place on the team
• Self respect / self esteem
• Influence with other team members
• Long term job outlook
Panel Discussion

• Dosimetrists’s perspective
• Physicists’s perspective
• Physicians’s perspective
• Administrators’s perspective

Additional Panel Discussion

• What is the ideal state of automation for dosimetry & tx planning?
• What are the dangers of automation?
• What will the role of a dosimetrists be in 20 or 50 years?
• What do humans uniquely bring to the table?
Attendee Questions