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Professional Peer Review: It's Not Personal

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Using Instructional Technology to Teach Medical Dosimetry Students to Give and Receive Constructive Criticism in a Clinical Environment

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Join in the conversation and share your thoughts about our talk. #VirtualPeerReview #AEIRS

ctt.ec/occdd

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The University of Texas MD Anderson Cancer Center-Houston, Texas
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Medical Dosimetry Program

- Two year bachelors of science program
- Accept approximately 21 juniors each year
- Students complete clinical rotations at:

  - The University of Texas MD Anderson Cancer Center, Houston, TX
  - The Proton Therapy Center at MD Anderson Main Campus, Houston, TX
  - The Houston Proton Therapy Center in Nassau Bay, TX
  - The MD Anderson Regional Care Center in Katy, TX
  - The MD Anderson Regional Care Center in Sugar Land, TX
  - The MD Anderson Regional Care Center in the Woodlands, TX
  - Additional affiliation site: Texas Oncology, Presbyterian Cancer Center, Dallas, TX

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Topics to Discuss

- Establish the need for peer review in medical dosimetry education
- Benefits of technology in didactic and clinical education
- How to structure classroom and laboratory exercises to include opportunities for peer review and constructive criticism
  - Wiki
  - Online surveys
  - Gaming student buy-in, e.g., “the head fake”
  - Results of the integration of peer review exercises
  - Future plans
  - HTML modules – virtual clinics

Relevance for other imaging and radiologic science programs
Radiation Treatment

- Radiation treatment is the use of high energy ionizing radiation to eradicate cancer cells.
- It is a complex process requiring a team of professionals working together to deliver the prescribed dose of radiation to the tumor and minimize radiation to the surrounding healthy tissues and normal structures.

The Radiation Oncology Team

The Radiation Oncologist defines the area of treatment, prescribes the dose of radiation, and orders the beam modality and technique.

The Medical Dosimetrist designs a plan to deliver the prescribed dose of radiation to the tumor while minimizing the radiation dose to the healthy tissues.

The medical physicist reviews and checks the plan for precision and accuracy.

Based on the plan, the radiation therapist sets up the patient on the treatment couch and delivers the beam of radiation.
Doctor approves plan
Physics reviews plan
Therapist treats with plan

Peer review for the purpose of quality improvement
Peer review for the purpose of quality assurance
Peer review for the purpose of professional development
Creating a Context for Peer Review

• Evaluation of an individual's work or performance by another person, intended to provide quality improvement or assurance

• Give and receive performance reviews in one's academic and/or professional life

Medical Dosimetry Junior Year

• Junior students complete treatment planning practicums for 10 different anatomic sites
• Supervised by program faculty and instructors in a treatment planning laboratory
• Program faculty administer and grade the junior practicums
• Junior practicums include an evaluation of professional conduct:

5. Incorporates advice and constructive criticism from program officials into treatment plans

Medical Dosimetry Junior Year

• Senior students complete treatment planning competencies for 10 additional anatomic sites
• Supervised by clinical medical dosimetrists/medical physicists in MD Anderson clinics and affiliates
• Clinical practitioners administer and grade the senior competencies

Medical Dosimetry Senior Year

• Clinical evaluations include a component of professional conduct:

- Respectful, professional attitude
- Accepts advice and constructive criticism
- Independence and industry
Medical Dosimetry Senior Year

- Additional opportunities to receive constructive feedback:
  - Presentations of competencies
  - Clinical task checklist

1. Student demonstrated an appropriate level.
10. Student answered additional questions correctly.

Presentation of a patient's plan to a physician.
Creating a Context for Peer Review

• Collaborate with a team for a school or work-related project

• Function as a member of a health care team to provide quality patient care

MOTIVATION FOR EXPANDING THE ROLE OF PEER REVIEW

Motivation for Peer Review

• Evolution of student body
Results of the Alumni Surveys

It would have helped if we had more interaction with physicians...

Some of the challenges I found when I started my career were learning how a smaller center operates, the different and somewhat expanded role of a dosimetrist working in a community setting, and keeping radiation therapists happy...

As a new dosimetrist, I could have benefited from more interaction with physicians and therapists...

We learned from lots of opinions and ideas in the clinic from professionals who specialize in their current area...

Trend for Accountability in Health Care

- Peer review is very topical in health care
  - Medical dosimetry Listserv debate
  - Medical dosimetry
  - Important but controversial component of quality assurance (QA)
- CARE bill – Consistency, Accuracy, Responsibility, and Excellence in Medical Imaging and Radiation Therapy
  - Sought to prevent patients from overexposure to radiation during medical procedures and reduce costs
  - Reimbursement

BENEFITS OF TECHNOLOGY IN THE CLASSROOM
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Benefits of Technology in Class and Lab

Captures the interest of learners

Khan Reference: 13.2 Field Shaping

http://www.youtube.com/watch?v=E5Hp0jWQbu8

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Benefits of Technology in Class and Lab

Experiential learning – making meaning from direct experience

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Benefits of Technology in Class and Lab

Flexibility – students can practice outside of normal clinical hours
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Technology mediated classroom appeals to differing learning styles

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Interactive – gains student involvement in class discussion

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Self growth as an instructor
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GAME PLAN

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Previous Junior Student Laboratory
Class Format

Direct instruction
- demonstration of treatment plan

Student practice & lab reports – independent and in groups

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Treatment Planning “Lab Report”

Patient Positioning
Describe the patient’s positioning during simulation/treatment
Why was the patient positioned this way?

Radiation Prescription
What is the prescription for this patient?

Hot Spot
What is the clinically significant hot spot and where anatomically is it located?

OAR Dose
For this anatomic site, where is the required dose for the clinically significant target?

Critical Structures
What critical structures are important when constructing this treatment plan?

Beam Modifiers
List the beam modifying devices used to construct the optimal plan.

Challenges
List two challenges you encountered while completing this plan.
Lab Report Turned in to Virtual Classroom

Where's Waldo?
http://whereswaldo.com/index.html#home

Previous Junior Student Laboratory
Class Format
Direct instruction
- demonstration
of treatment plan
Student practice
- independent
and in groups
Assessment
- demonstrate
competency in
treatment planning
Wait… What’s a Wiki?

WIKI CREATION

Wiki

• According to Wikipedia...
  – Web application that allows people to add, modify, or delete content in collaboration with others
  – Different from a blog in that the content is created without any defined owner or leader
  – Little implicit structure allowing format to emerge according to the needs of the users
  • http://en.wikipedia.org/wiki/Wiki

Wiki

MDAnderson

Sakai/MD Anderson

Collaborative and Learning Environment

Wiki
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**Background for peer review**

**Student instructions for the activity**

Posted 3 anonymous plans for peer review

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**Junior students review patient radiation plans in virtual classroom**

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**Instructor would ask a open-ended question to generate discussion**
Student discussion on the wiki was robust.

Inserting Weblinks in the Wiki

Take a look at these two fields. Do you think the primary or the
HTML Compression Question.pdf

Review the attached weblink for additional discussion about a
Further Contributions Discussion

Additional instructional video inserted into wiki. Recorded using Camtasia.
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Constructing FAQs in the Wiki

Review the list of topics before constructing common problems encountered while constructing a step and

- Why does my pace get very bad all of a sudden when I add weight to a control jacket?

  - [link to full description]

- Why is my dose not so high?

  - [link to full description]

- Why are my beam isocenter position not so large?

  - [link to full description]

- Why is my photon energy not so large?

  - [link to full description]

- Why does my dose not so high?

  - [link to full description]

- Why is my beam isocenter position not so large?

  - [link to full description]

- Why is my photon energy not so large?

  - [link to full description]

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iVote

- Created an online poll
- Students review peers’ plans
- Vote for their favorite and provide justification

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iVote – Dosimetry Plan Ranking Survey

- Created an online poll
- Students review peers’ plans
- Vote for their favorite and provide justification
And the winner is... Plan 4a!

- Cheers from your peers:
  - "Plan has the best conformity and meets the dose requirements."
  - "Clinically significant hot spot minimized"
  - "From the BEVs it looks like the critical structures were spared the least."
  - "Hot spot is small and located within the PTV"

GAINING STUDENT PARTICIPATION

Gaining Junior Student Participation in Peer Review

- Make it mandatory
Gaining Junior Student Participation in Peer Review

- Include testable content in peer review exercises
- Instructor comments would provide hints about important concepts

RESULTS

- Informal feedback from students was positive
- Participation was greater than the minimum required
- Instructors gained technical prowess

Results of Junior Student Peer Review Exercises
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Future Plans for Peer Review

• Continue the use of technology to engage students in the treatment planning laboratory
  – Critical Thinking Wiki
  – www.polleverywhere.com
  – Turning Technologies student response software, “clickers”
  • Ethics and professional integrity exercise

http://www.turningevents.co.uk/home/rc_lcd_receiver_kit-3/
http://www.polleverywhere.com/

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Future Plans for Peer Review (cont’d)

– Possibility of creating HTML modules
  • Walk students through fictional case histories
  • Make decisions concerning the patient’s care plan
  • Critique the professional performance and decisions of peers in a virtual clinical environment
HTML: The Virtual Clinic

- Use Adobe Dreamweaver CS6 to create a virtual comprehensive cancer center which can be loaded onto a course management system (Sakai)
- Develop a fictional patient that students would follow through his/her cancer diagnosis and treatment
- Students make decisions concerning test interpretation and treatment administration
- Allows students to receive peer feedback and offer critiques in a protected environment
Creating a Fictional Patient
• Select a fictional cancer patient and construct his/her:
  – Demographic data
  – Laboratory reports with significant markers
  – Diagnostic tests and images
  – Radiation treatment prescriptions
  – Radiation treatment plans

• Could place links to relevant past lectures, current journal articles, and topical websites in the virtual clinic exercise at appropriate points
  – Demonstrate applicability and relevance of didactic content to clinical practice
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HTML: Student Resources Within the Virtual Clinic

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MD Anderson Cancer Center
Interdisciplinary Case Study
October 2 2001

Student groups must decide what diagnostic tests or treatments are required at that stage in the patient's care.
• Student groups collaborate to answer questions concerning the patient’s care
• Each student must participate and face peer review and feedback about their contribution

RELEVANCE FOR OTHER IMAGING AND RADIOLOGIC SCIENCE PROGRAMS

Demonstrate Relevance of Peer Review to Your Students
• Remind your students of the consequences of their clinical decisions and the need to collaborate
• Share a documented incidence with your students where lack of peer review led to a mistake in patient care
• Look at previous news headlines, clinical textbooks, professional society reports, etc

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The Need for Peer Review: A Patient’s Story
• 2008 – Patient underwent prostate brachytherapy implants at a cancer center

http://cancer.uc.edu/cancerinfo/TypesOfCancer/ProstateCancer/InterstitialBrachyther.aspx

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The Need for Peer Review: A Patient’s Story (cont’d)
• No peer review or QA took place for a four year period for prostate implants at this center
• For 12 months, network connectivity issues prevented CT images from being imported
• No second check that the correct seeds were being implanted in the OR
• Allied health staff at the center knew about the low radiation doses but did nothing:
  – No policy in place to handle the situation

http://pixshark.com/health-care-team-collaboration.htm

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Peer Review Relevance for Other Imaging and Radiologic Science Programs

Our graduates will need to give and receive constructive criticism in their professional career
Peer review is necessary for all branches of health care
Appropriate quality review ensures the best care for our current and future patients
Summary and Conclusion

• Medical dosimetry program wanted to integrate peer review into curriculum
• Peer review necessary for health care graduates:
  – Professional career growth
  – Excellence in patient care
• Use of technology facilitates the introduction of additional peer review exercises for students
  – Wiki
  – Online surveys
  – HTML modules to create a virtual clinic
• Relevance of peer review pertaining to quality in patient care

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http://www.mdanderson.org/publications/conquest/issues/2012-fall/medical-dosimetry.html