

Patient Consult:
 Direct Interface of Physicist with the Patient
 in the Course of Treatment

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UC San Diego
 RETHINKING MEDICAL PHYSICS



The Evolving Clinical Medical Physicist

- **How have we traditionally impacted patient care?**
 - Implementing vendor-provided technologies
 - Performing equipment/patient-specific quality assurance
- **Is this path sustainable?**
 - Technologies and commercial products becoming more robust and automated¹
 - Quality assurance and commissioning becoming well characterized and automated^{2,3}
- **Our profession must change**
 - Need to utilize our unique skillsets to have a meaningful impact
 - Need to be willing to expand the scope of our profession

¹ Lubinski, V. Benefits of Automation in Radiation Oncology. *Oncology Times* 2017
² Padmanabhan, S. et al. Rapid Acceptance Testing of Modern Linear On-board KV and MV Imaging Systems. *Medical Physics* 2017
³ Zeng, S. et al. Commissioning and QA for VMAT Delivery Systems: An Efficient Time-reduced System Using Real-time 2DCT Imaging. *Medical Physics* 2017

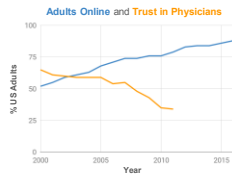
Learning from Radiation Oncologists

- Faced a dilemma of clinical practice in latter half of last century
- Often viewed merely as technicians that treated referrals
- Began to participate in tumor boards, multidisciplinary clinics, etc.
- Transformed from radiotherapist to radiation oncologist



Learning from Patients

- **Access to the internet is increasing**
 - Adults online: 52% (2000) to 88% (2015)
 - Pew Research Center (2015)
- **Trust in physicians is decreasing**
 - "Great confidence": 73% (1966) to 34% (2012)
 - Harris (1966-2012)



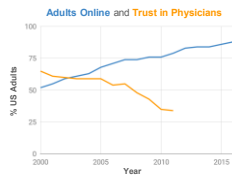
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Learning from Radiation Oncology Patients

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 - Harris (1966-2012)
- **Online patient information is too complex for general population**
 - Rosenberg, S. et al. *Pract Radiat Oncol* (2017)
- **Patient-related distress can negatively impact outcomes following RT**
 - Habboush, Y. et al. *Adv Radiat Oncol* (2017)



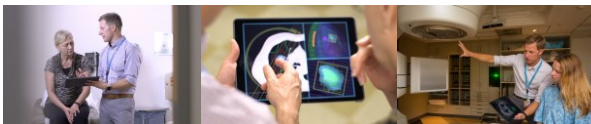
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Physics Direct Patient Care Initiative

- Goals**
- Establish an independent professional relationship with patients
 - Meet with the patient at regularly scheduled appointments
 - Take ownership of all technical aspects related to treatment
 - Allow physicians to focus on other aspects of patient care
 - Lay groundwork for future innovations and patient responsibilities

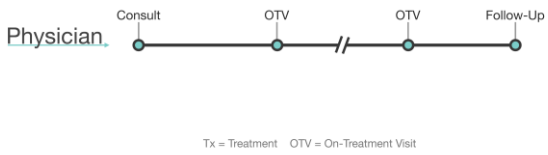


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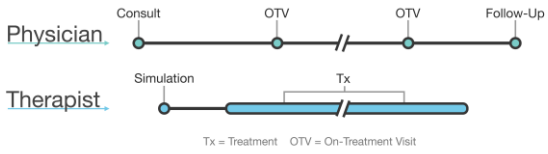
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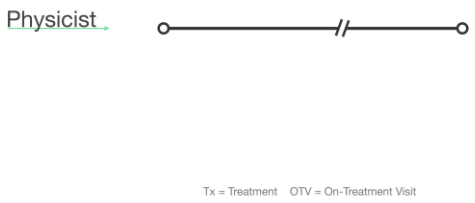
PATIENT INTERACTIONS



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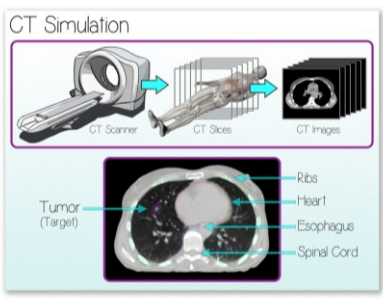
Tx = Treatment OTV = On-Treatment Visit

PATIENT INTERACTIONS

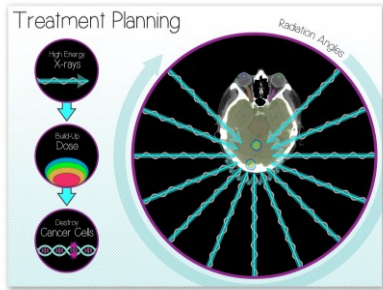


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PERSONALIZED
INFORMATION
for the
PATIENT



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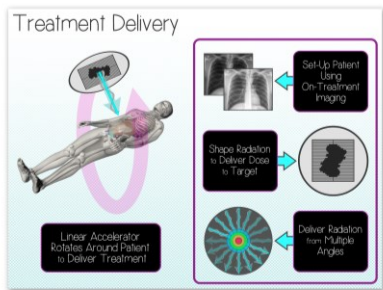


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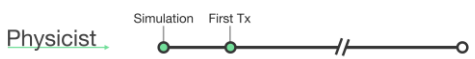


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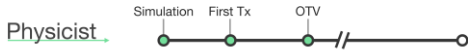
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PATIENT INTERACTIONS



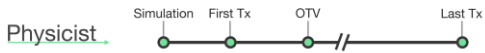
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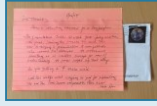
Initial Observations

- o **Medical physicists easily integrated into care team**
- o **Wide variety of patient "types"**
 - Anxious, distrusting, scared and confused about radiation
 - Calm, thankful, fascinated by the therapy
- o **Most patients want to be included in the process**
 - Want their questions heard and answered
 - Want to be a part of the decision-making
 - Want personalized information (to review and share)
- o **Rewarding experience as a medical physicist**

Initial Observations

Unexpected Experiences

- o Requested by returning patients (not just for RT)
- o Thank you notes from patients after treatment
- o Prompted new physician-physicist interactions



Learning Experiences

- o Deferring medical questions devalues the interaction
- o Poorly chosen words can instantly derail a session
- o Formal communication training is a necessity



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UCSD TRAINING PLAN



Randomized Clinical Trial

Phase 1

Assess patient anxiety and satisfaction

- o **Group 1:** Physics direct patient care group
- o **Group 2:** Standard practice group
- o Questionnaire given at 3 time points
 - After the simulation appointment
 - After the first treatment
 - After the last treatment

Figure 1: RCT Results

Random Patient Questionnaire

Number of patients who completed their survey at each time point and patient group. Patients who did not complete the questionnaire at any time point are listed in the 'Did not complete' row. The number of patients who did not complete the survey at any time point is listed in the 'Did not complete' row.

Time Point	Group 1	Group 2	Did not complete
1. Post-simulation	1	2	3
2. Post-first treatment	1	2	4
3. Post-last treatment	1	2	4
4. Did not complete	1	2	4

The bar graphs illustrate the patient anxiety and satisfaction scores at each time point for each group. The scores are based on a 5-point Likert scale (1 = Not at all, 2 = Somewhat, 3 = Neutral, 4 = Somewhat, 5 = Very Much).

1. How satisfied are you with your understanding of the technical aspects of your radiation treatment? (1 = Not at all, 2 = Somewhat, 3 = Neutral, 4 = Somewhat, 5 = Very Much)

2. How satisfied are you with your understanding of the medical aspects of your radiation treatment? (1 = Not at all, 2 = Somewhat, 3 = Neutral, 4 = Somewhat, 5 = Very Much)

3. How satisfied are you with your overall radiation treatment experience? (1 = Not at all, 2 = Somewhat, 3 = Neutral, 4 = Somewhat, 5 = Very Much)

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Randomized Clinical Trial

Six questions related to patient anxiety
(Validated State-Trait Anxiety Inventory)

Four questions related to patient satisfaction and technical understanding
(Modified from validated questionnaires)

Figure P13-1782C

Randomized Clinical Trial

Number of patients who completed each question and the percentage of patients who answered "Not at all", "Somewhat", "Moderately", and "Very Much"

Question	Not at all	Somewhat	Moderately	Very Much
1. I feel calm	1	2	3	4
2. I feel nervous	1	2	3	4
3. I feel relaxed	1	2	3	4
4. I am confident	1	2	3	4
5. I am nervous	1	2	3	4

The following questions were asked to assess the patient's understanding of the technical aspects of their treatment. The questions were asked to assess the patient's understanding of the technical aspects of their treatment. The questions were asked to assess the patient's understanding of the technical aspects of their treatment.

6. How satisfied are you with your understanding of the technical aspects of your treatment?

Not at all	Somewhat	Moderately	Very Much
1	2	3	4

7. How satisfied are you with your understanding of the technical aspects of your treatment?

Not at all	Somewhat	Moderately	Very Much
1	2	3	4

8. How satisfied are you with your understanding of the technical aspects of your treatment?

Not at all	Somewhat	Moderately	Very Much
1	2	3	4

9. How satisfied are you with your understanding of the technical aspects of your treatment?

Not at all	Somewhat	Moderately	Very Much
1	2	3	4

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Randomized Clinical Trial

- Start with a lead-in phase
 - Enroll 30 patients
 - Test overall process (consent, questionnaires, etc.)
 - Evaluate results from the physics direct patient care group
 - Test randomization process
- Preliminary results
 - 15 patients completed
 - 10 currently on study
 - All from physics direct patient care group

Figure P13-1782C

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Patient Anxiety

(15 patients, scale: 1 = Not at all, 4 = Very much)

"I feel confident"

"I am relaxed"

"I feel calm"

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Patient Satisfaction

(15 patients, scale: 1 = Not at all, 4 = Very much)

"How satisfied are you with your overall radiation oncology experience?"

"Do you feel that adequate time was devoted to explaining the technical aspects of your treatment?"

"How satisfied are you with your understanding of the technical aspects of your treatment?"

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Next Steps

- o Move to randomization on clinical trial
- o Phase 2: evaluate physician time savings
- o Begin to broaden the scope of the project

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VISION

Establishing independent professional relationships with patients is **expected** of a clinical medical physicist.

But this is just the beginning...

Next we combine our technical expertise with direct patient care to establish new clinical responsibilities and expand the scope of our profession.

- Managing knowledge-based systems/data
- Shared decision-making with the patient
- Determining optimal image combinations
- Target volume delineation

The possibilities are endless, but it all begins here.

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Thank You



Collaborators:
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Todd Pawlicki, PhD
Jim Murphy, MD
Kevin Moore, PhD
