New Roles for Medical Physicists in Radiation Oncology

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Disclosures

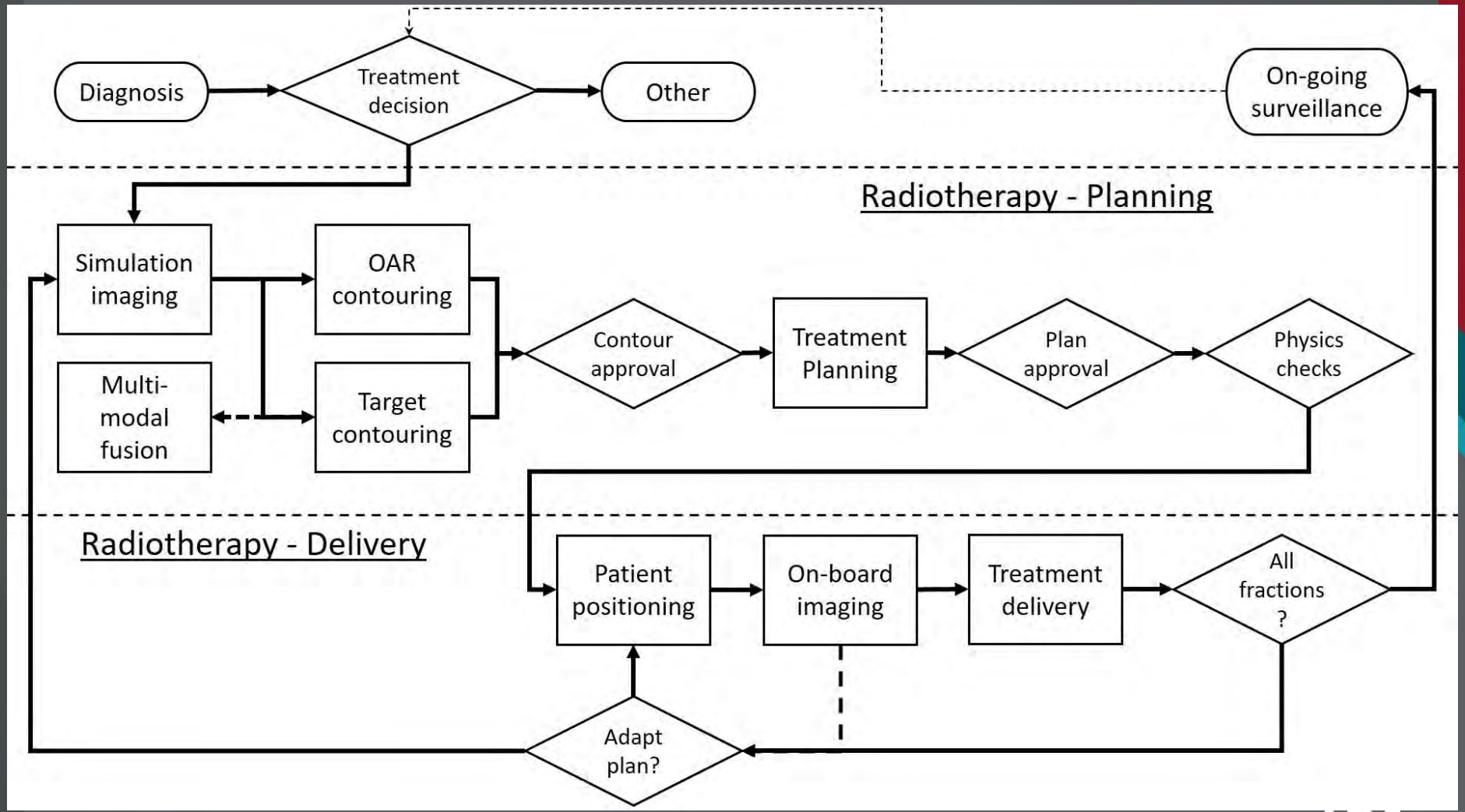
- I have previously received speaker honoraria from Radformation and Varian
- Funding from the UNMC Academic Affairs eLearning Funded Awards Program

What does the future of radiation oncology look like?

Objectives

1. List recent advancements in automation in radiation therapy
2. Overview evidence supporting physics-patient consultations
3. Describe the development of a new training program for effective physicist-patient communication

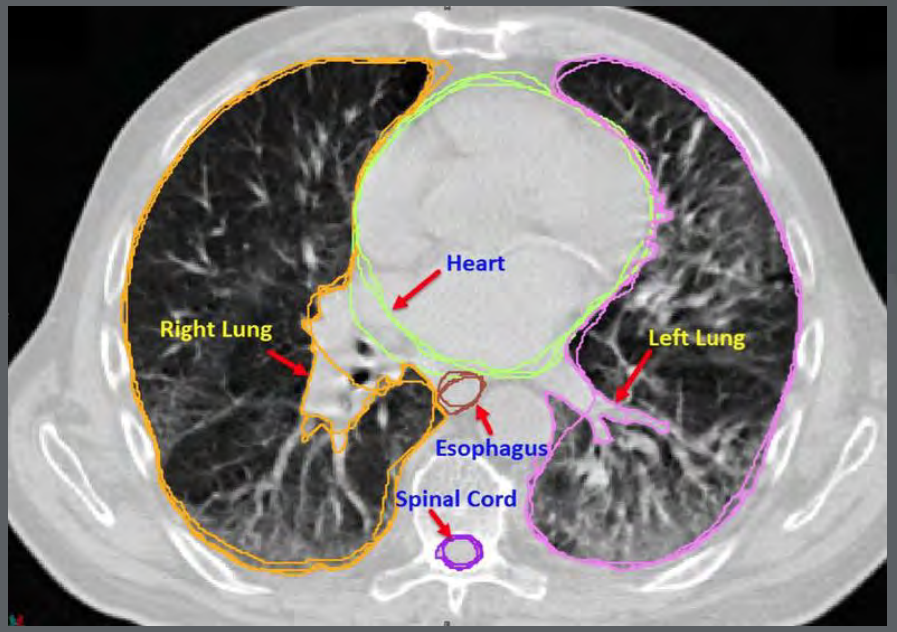
Advancements in Automation and AI



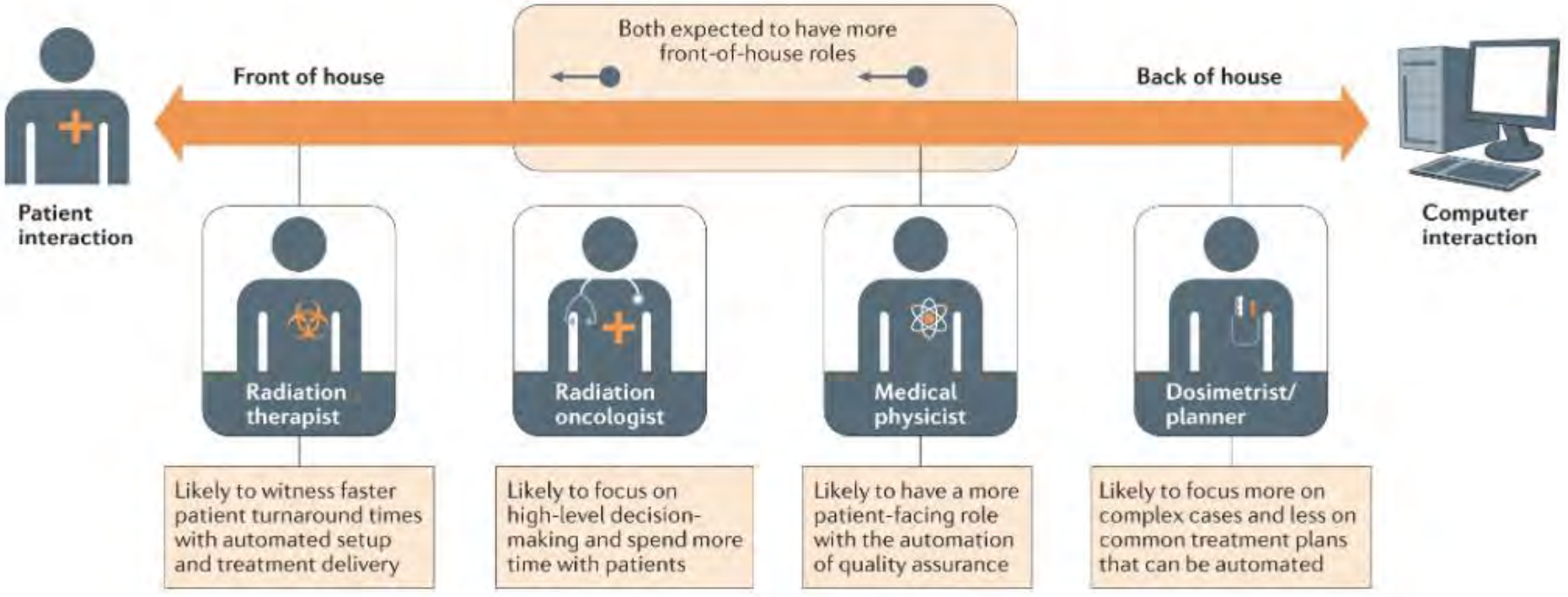
Advancements in Automation and AI

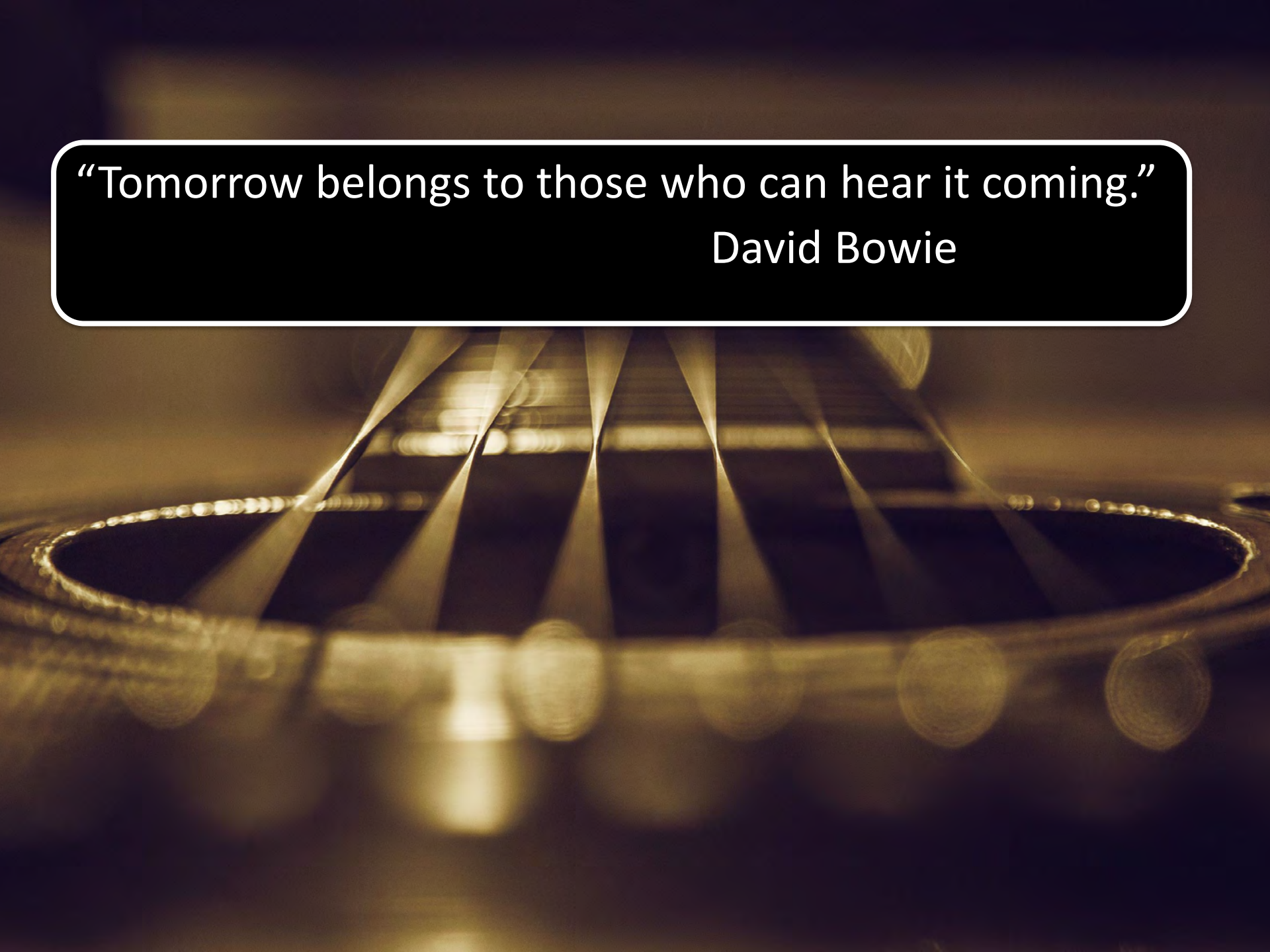
Established or emerging applications for automation and AI:

- Treatment response prediction
- Image registration
- Auto-segmentation
- Treatment planning
- Quality assurance
- Image guidance
- Motion management
- Treatment delivery
- Adaptive RT



Changing roles in the AI era



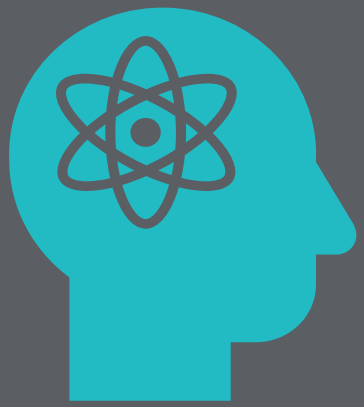

“Tomorrow belongs to those who can hear it coming.”
David Bowie

MEDPHYS 3.0

Medical physicists have a unique calling and expertise to be scientific agents of precision and innovation in the development and practice of medicine.

Charge: To integrate MP3.0 activities to enact, express, and enhance the full value of physics towards human health into the council working space of the AAPM. That includes practice, administrative, scientific, and educational goals. To identify and explore other areas besides radiotherapy and imaging where medical physicists can work in healthcare.

https://mp30.aapm.org/
https://aapm.org/org/structure/default.asp?committee_code=MP30C



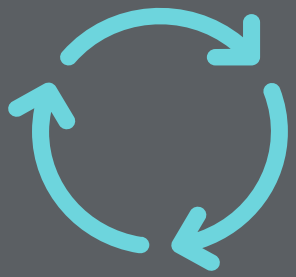
Expertise

- Global definitions of excellence
- Advancing clinical practice
- Modeling leadership
- Scientific innovation and collaboration
- Enhanced teaching

Visibility

Developing tools and skills to articulate the value of medical physics

- Marketing
- Advocacy
- Communication



Sustainability

- Model practices that can be achieved and sustained
- Encourage pragmatic resources

https://mp30.aapm.org/

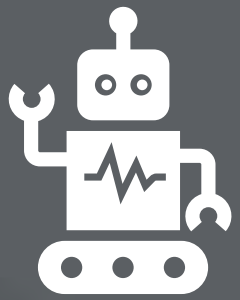
Expansion

- Clinical growth, new pathways
- Scientific opportunities in all areas of medicine
- Enhanced educational opportunities

Picture a physicist

Nerd?

Geek?



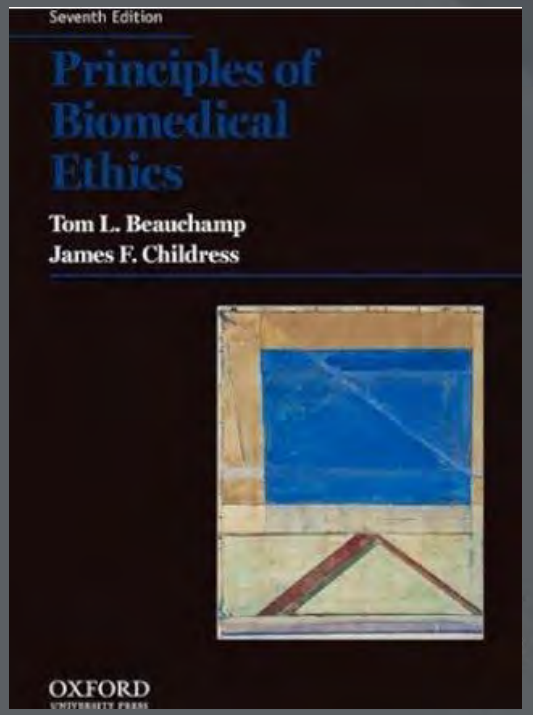
Emotionless robot?


Patient Applications Transfer Edit View Image Tools Scroll Evaluation Options System Help
0 Worklist Item(s) received

- Physicists can be trained in patient communication[1-2]
- Physics consults may benefit patients[3-4]

A widely accepted framework of ethical norms:

1. Respect for autonomy
   Respect and support autonomous decisions
2. Nonmaleficence
   Avoid causing harm
3. Beneficence
   Balance benefit and risk
4. Justice
   Distribute benefits/risks fairly



Hyun & Hyun, Chapter 7 of *Ethics & Error in Medicine*, Routledge 2019

Ethical justification

In contemporary biomedical ethics, it is widely accepted that healthcare providers have a strong moral reason to respect patient autonomy

Because autonomy comes in degrees, providers have a strong moral reason to *increase* patients' level of autonomy

Because autonomy relates directly to *understanding*, physicians have a strong moral reason to increase patients' level of understanding

Patient understanding and therefore autonomy in radiation oncology is currently limited, so our community has a strong moral reason to **change the status quo**

Hyun & Hyun, Chapter 7 of *Ethics & Error in Medicine*, Routledge 2019

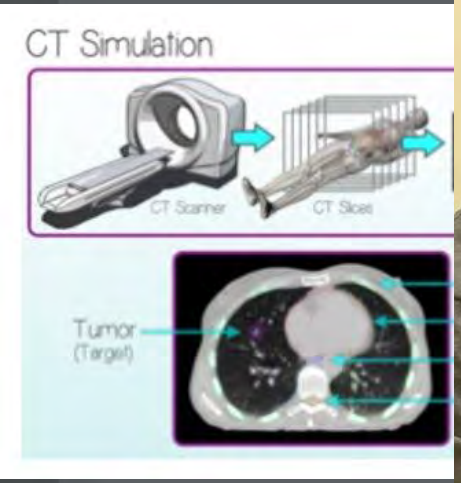
Ethical justification

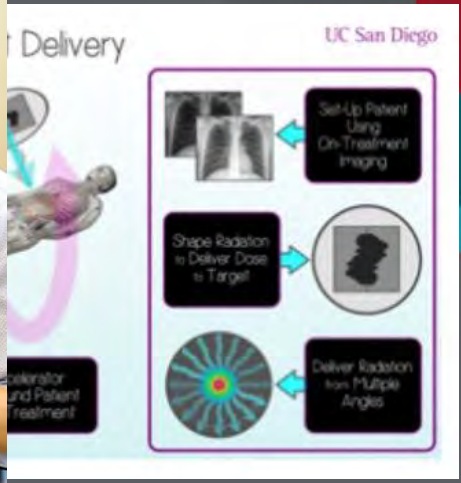
Medical physicists have

1. The technical expertise
2. The communication skills
3. The time (increasingly)
4. The movement (MedPhys3.0)

Hyun & Hyun, Chapter 7 of *Ethics & Error in Medicine*, Routledge 2019

Clinical justification



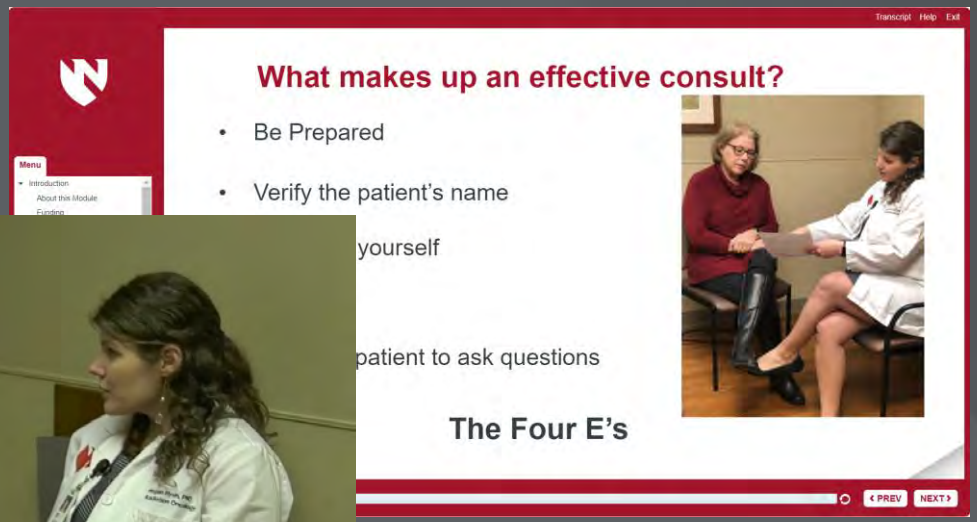


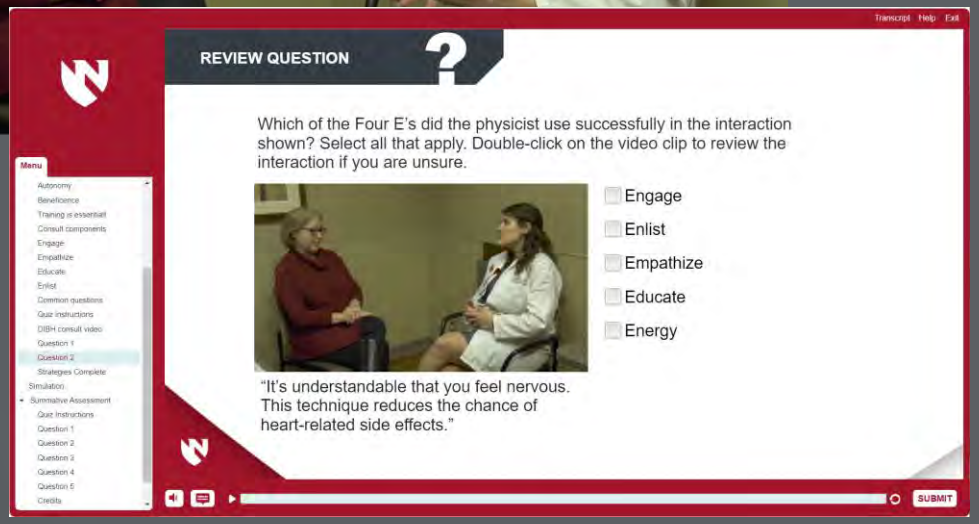
Brown, Atwood, Moore, et al., JACMP, 2018
Atwood, Brown, Murphy et al., Int J Rad Onc Bio Phys, 2018
https://medschool.ucsd.edu/som/radiation-medicine/research/Pages/PDPCI.aspx

Training with eLearning

Methods

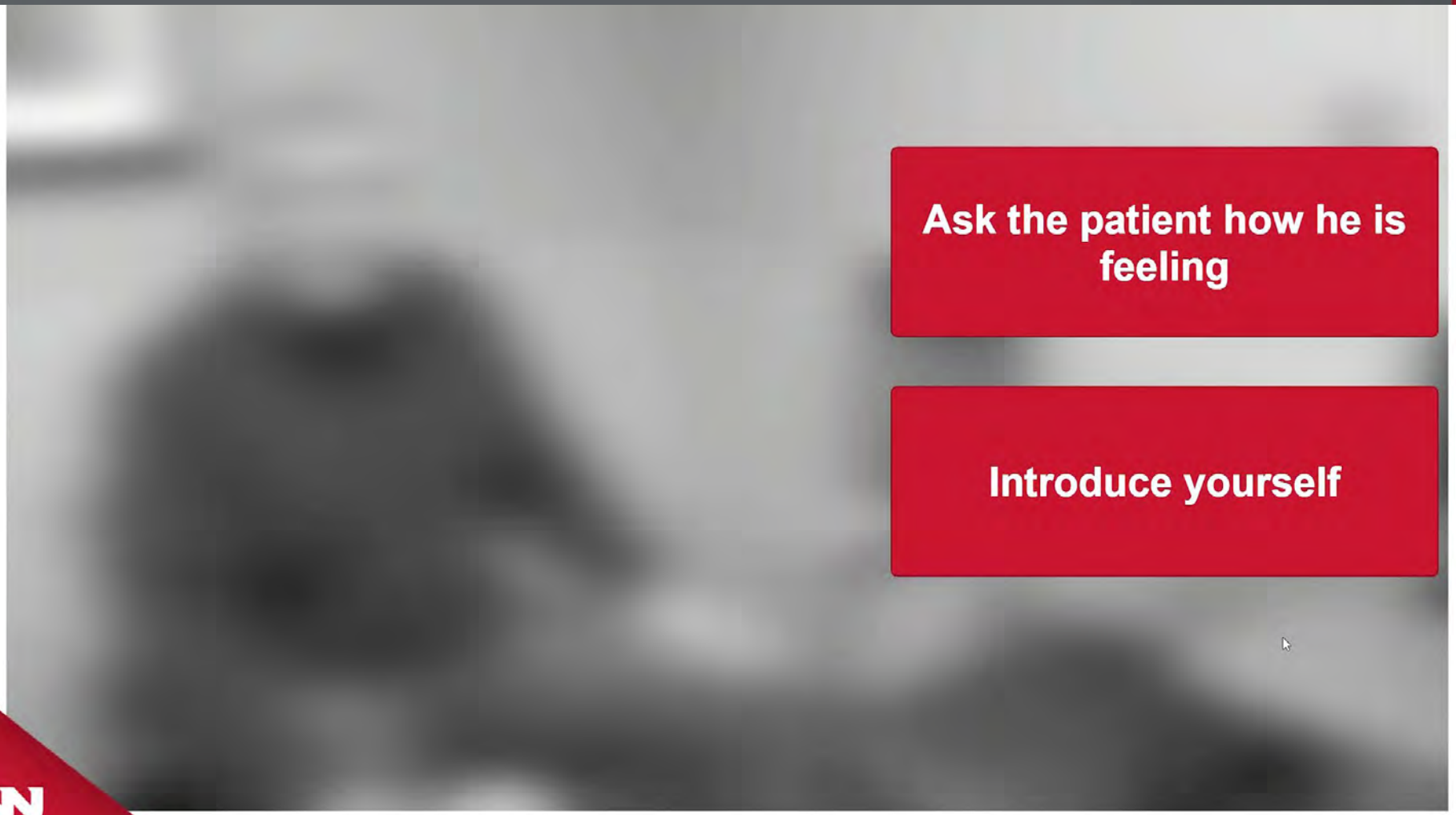
Module design





Methods

Module design



Preliminary results

Prompt	Averages		
	Pre	Post	Change
How important is it to train medical physicists in patient communication, generally?	8	9	1
How important is it to offer physicist-patient consultations in the clinic?	6.5	8	1.5
I am confident in my ability to speak to patients about their treatments	6.5	8	1.5
I am confident that I can use empathy during patient interactions	9	8.5	-0.5
I am confident that I can engage the patient during patient interactions	7.5	9.5	2
I am confident that I can enlist the patient during patient interactions	6.5	7.5	1
I am confident that I can educate the patient during patient interactions	7.5	9.5	2

Future directions

This module will be integrated into a larger training program

eLearning

- Effective strategies
- Virtual simulations
- Assessments and feedback

Simulation

- Simulated patient interaction
- Discussion and assessment

Observation

- Recording or observation of initial patient interactions
- Discussion and assessment

Conclusions

- Advancements in Radiation Oncology may change future clinical roles
- One area physicists can contribute is in patient communication
- We are developing a novel training program that shows promise in its early stages

Many thanks to our physics group, especially those involved in eLearning development, as well as our supportive clinical team at UNMC/Nebraska Medicine

UNMC[SM]

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