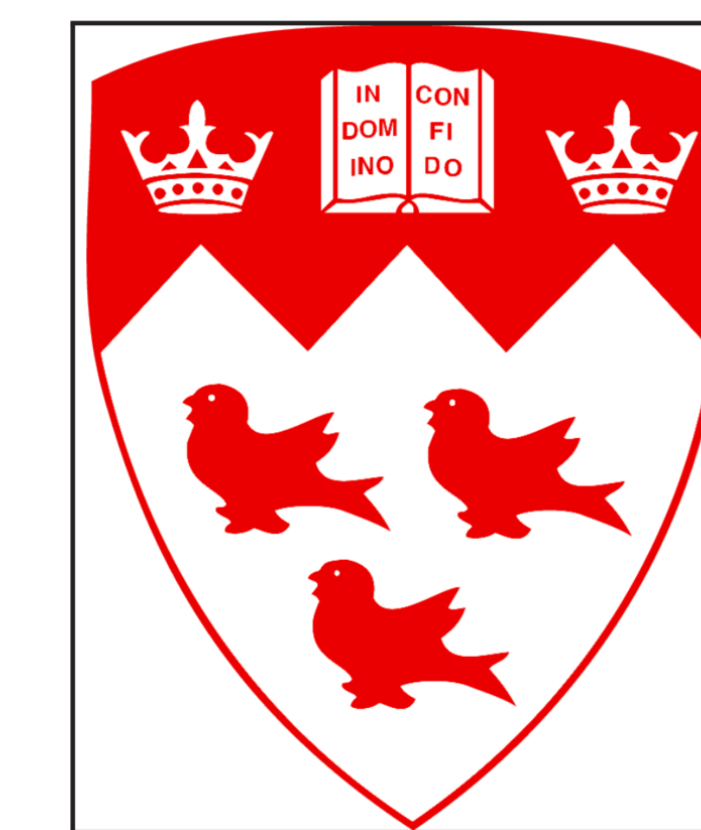




Teaching Professional Ethics in Graduate Medical Physics Program



M. Popovic^a, I.R. Levesque^a, C. Stambaugh^b, D. Wang^c

^aMedical Physics Unit, McGill University, Montreal, QC ^bDept. of Radiation Oncology, Tufts Medical Center, Boston MA,

^cDept of Medical Physics, Memorial Sloan Kettering Cancer Centre, Middletown, NJ

Purpose

- To assess the teaching effectiveness of a case-based approach for teaching professional
- To evaluate strengths and limitations of the approach
- To analyze the effectiveness of the case study method in medical physics education
- To analyze student satisfaction through qualitative analysis of workshop evaluations

Background

- Professional ethics is part of core CAMPEP standards for graduate programs in Medical Physics.
- At McGill, this workshop is one of 3 modules in a mandatory, nil-credit program for all medical physics graduate students.
- Study published cases were developed by AAPM Medical Physics Leadership Academy (MPLA).
- WE teach skills in ethical reasoning and professional conduct outlined in Codes of Ethics (COMP, AAPM).

Part 3 of Workshop: Professional Ethics

Module	Learning Objectives
1. Responsible conduct of research	Discuss ethical issues related to the responsible conduct of research, such as conflict of interest, scientific authorship and peer review
2. Ethical conduct for research involving humans	Describe the fundamental principles of ethics for research involving humans and animals, and understand their practical application in research projects
3. Professional ethics	Discuss the professional & ethical issues related to work as clinical medical physicist

Structured approach to problem analysis

1. The narrative

2. The ethical dilemma

3. The medical physics

4. The law

5. The ethics

6. The formulation

Clinical cases

Developed by the AAPM Medical Physics Leadership Academy, MPLA Cases Subcommittee

- ☒ **MPLA Case 1:** Implementing Cone-Beam CT in a Community Hospital Wang *et al.* J Appl Clin Med Phys 2021 doi: 10.1002/acm2.13185.
- ☒ **MPLA Case 2:** A junior physicist attempts to improve radiotherapy workflow Wang *et al.* J Appl Clin Med Phys 2021 doi: 10.1002/acm2.13188.
- ☒ **MPLA Case 3:** Don't criticize me in public! Hendrickson K *et al.* J Appl Clin Med Phys 2021 doi: 10.1002/acm2.13334.
- ☒ **MPLA Case 4:** A physicist's consult with a patient Xu *et al.* J Appl Clin Med Phys 2021 doi: 10.1002/acm2.13211.

Teaching Methods

Pre-workshop

- Assigned readings (AAPM Code of Ethics, MPLA Cases)
- Video recorded lecture
- Pre-workshop quiz

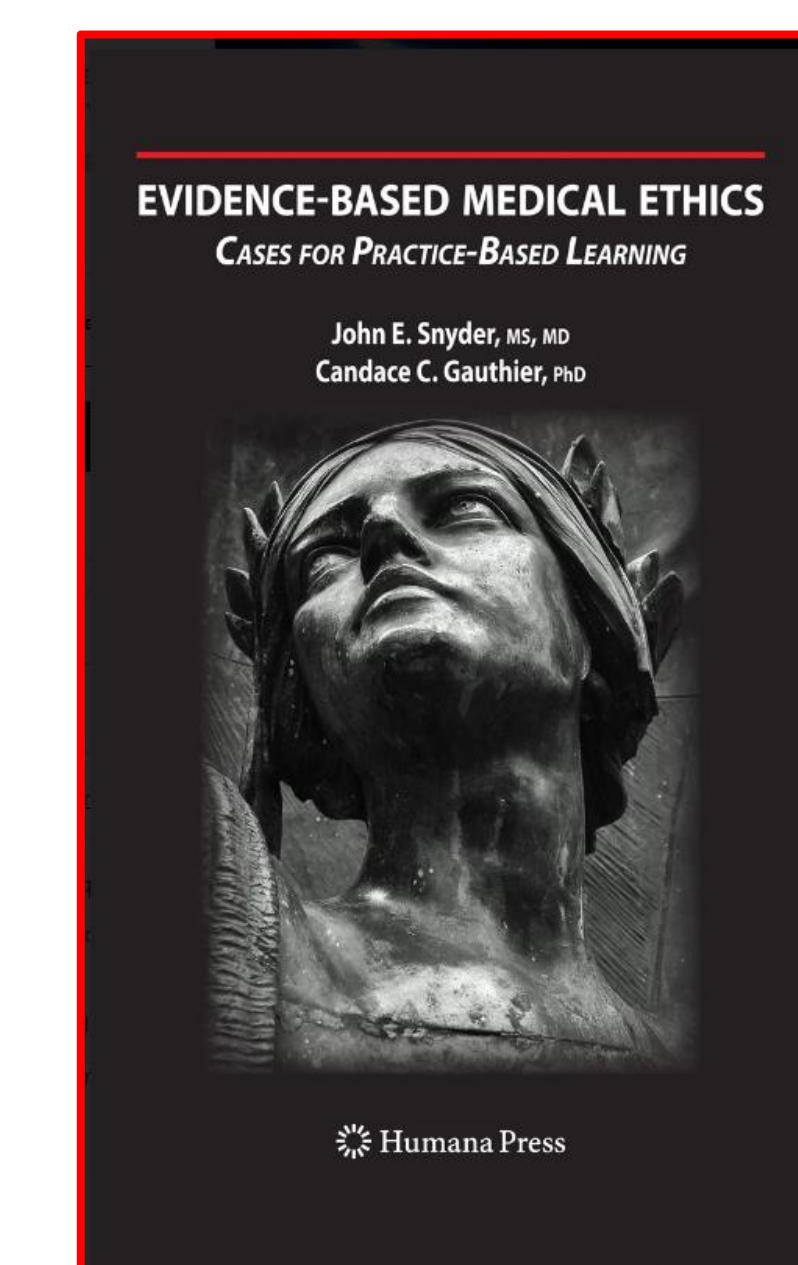
Workshop

- Small-group, facilitator-led discussions (6 groups, 3 facilitators)
- 2 MPLA cases per group
- Whole class wrap up & summary

Post-workshop

- Post-workshop quiz
- Post-workshop questionnaire

Primary Reference Documents



Results

Learning outcomes:

- Average scores on pre- and post-intervention tests were 60% and 63%, respectively (difference not statistically significant)

Student satisfaction:

- Overwhelmingly positive, reflective of positive learning experience. Two students commented on a large breadth of preparatory materials.

Discussion and Conclusions

Outcomes:

- Direct application of Medical Physics Code of Ethics to common clinical scenarios
- Framework for approaching workplace dilemmas
- Core competencies: Practice-based learning, Medical knowledge, Patient care, Interpersonal skills, Communication, Professionalism

For fruitful group discussion:

- Expectations must be clearly set
- Facilitation by experienced faculty
- Prepared questions to aid in discussion
- Graduate students require time to learn about technology and workflows of the clinic

Future work:

- Pre- and post-workshop knowledge assessments will be re-designed to be a more effective measure of learning outcomes
- Alternative formats for case study delivery will be explored (video recordings and role playing)

Student Cohort and Data Collection

- Thirty graduate students (MSc and PhD) attended in June 2022
 - 6 MSc 1st year
 - 11 MSc 2nd year
 - 13 PhD
- Exclusion: 2 students with previous training
- Students completed pre- and post- workshop quizzes through the institution's Learning Management System
- Course evaluation questionnaires completed via email
- Data were analyzed in aggregate and student identifiers were removed
- Ethics review board approval for secondary use of data, to analyze and report on the outcomes