Environmental Cost vs. Health Benefit of Radioisotope Usage in Medicine

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DOI: 10.31986/issn.2689-0690_rdw.oer.1016

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Recommended Citation
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Environmental Cost vs. Health Benefit of Radioisotope Usage in Medicine

Cultivating the Environmental Humanities
Faculty Working Group (2018-2019)

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Overview

• Radioactive isotopes are used in medicine, from therapy to diagnostics

• Generation, transportation & storage, disposal of radioisotopes have an environmental cost

• How does that weigh against the benefit to quantity/quality of life for the patient?

• Overall theme: comparison of environmental cost vs. human benefit for use of radioisotopes in medicine
Inspiration

• TBS 01370—Advanced Instrumentation of Biomedical Sciences

• Series of lectures that cover nuclear medicine (scintigraphy, SPECT, PET, therapeutics, etc)

• Discuss the potentially harmful effects to human health due to radiation

• Potential to expand this discussion to environmental effects…
Student Goals

i. Examine the environmental impacts from production of radioisotopes

ii. Study the environmental aspects of radioisotope use & disposal

iii. Statistical analysis of improvements to patient outcomes from use

iv. Formation of a debatable opinion regarding environmental cost vs. human health benefit from radioisotope usage
How It Works

• Module should be covered within the context of a class that discusses the use of radioisotopes in medicine

• Students are assigned reading material prior to the module
  • Generation & disposal of radioisotopes

• This material, plus medical implementation, is discussed in class

• Assessment can be handled by an in-class discussion (or debate)
  • Can also implement a short quiz or essay
Materials Under Development

• Collection of reading materials for students prior to the module

• Presentation (30-40 slides) to be delivered in class (can also be posted to Blackboard)

• ‘User guide’ for the instructor

• Example quiz, essay questions, and discussion prompts

• References
Suggested Implementation

• Single 75-min course lecture setting (plus outside reading assignment)
  • Or—two 45-min lectures with additional discussion

• Any upper-level course that discusses the use of radioisotopes in medicine
  • Of interest to medical physics, radiology, pre-med, radiation physics, etc.
Reference & Material Sources

IAEA
International Atomic Energy Agency

NNSA
National Nuclear Security Administration


Radiopharmaceutical Therapy in the Era of Precision Medicine

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