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

International Atomic Energy Agency (IAEA)

Medical Isotope Production Without Highly Enriched Uranium

Molybdenum-99 for Medical Imaging


Radiopharmaceutical Therapy in the Era of Precision Medicine*

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