NRC Public Meeting: Security and Continued Use of Cesium-137 Chloride Sources

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American Association of Physicists in Medicine (AAPM)

- AAPM's mission is to promote the highest quality medical services for patients while advancing the practice of physics in medicine and biology by encouraging innovative research and development, disseminating scientific and technical information, fostering the education and professional development of medical physicists.

- AAPM represents approximately 6,800 medical physicists.

Overview

- The use of radioactive materials in medicine has resulted in many lives being saved that otherwise would not be.
- CsCl irradiators are just one example of the way in which this occurs.
- AAPM is concerned that the prohibition or elimination of the use of CsCl irradiators could result in a decrease in the standard of care that exists in this country.

AAPM Survey

- Conducted a survey in August to assess their experience with irradiators.
- Results of the survey are skewed toward hospital-based or university-based irradiators, but that should not affect the conclusions.

AAPM CsCl Survey Results [1]

- Of the 363 respondents:
  - 297 had irradiators
  - 84.6% of those used Cs-137 as the source
  - 9.3% used conventional x-ray units
  - 6% used medical linear accelerators (linacs).
  - The Cs units represented the major vendors.
  - Only 10% were purchased within the last two years
  - 7% plan on replacing the units within the next 5 years

AAPM CsCl Survey Results [2]

- 25% cesium units had some malfunction but most were repaired in less than 7 days.
- Of the x-ray units, 35% had malfunctions, with 44% being repaired within 7 days.

AAPM CsCl Survey Results [3]

- Cesium units
  - Only 40% used for blood irradiation, with about 25% used for material, 25% for animal irradiations and 10% other.
- X-ray units:
  - ~50% used for blood irradiation
  - 19% were for material irradiation
  - 32% for animals.
- Medical Linacs
  - 40% used predominantly for blood irradiation
  - 11% for animals.

Conclusions [1]

- Conventional X-ray Irradiators
  - Fairly reliable
  - Represent a small minority of the irradiators in the field
  - Have slightly more downtime than cesium units.
- Cesium units
  - Reliable
  - Users, in general, have no plans to replace them.

Conclusions [2]

- Forced removal of the cesium irradiators would result in a very large loss of resources, both radiation sources and funds, not only for medical facilities but research institutions as well.

Conclusion [3]

- The cost of alternative technologies should include:
  - not only the cost of replacement, calibration and maintenance, but also the cost of down-time for critical-use equipment, such as blood irradiators.
- A quantifiable cost for alternative blood sterilization during equipment down-time should be possible, as well as a human cost for patients who need blood.

Conclusion [4]

- It is easily demonstrable that CsCl sources utilized in blood irradiators have a much more reliable performance record than machine-produced technologies, and both the costs of continuity of operation or failure should be considered financially and in possible impact on human life.

Questions?