Top Ten Things To Know
Radiation Safety

1. Technological advances in new procedures and medical imaging in addition to an increase in utilization have resulted in increased radiation exposure for cardiovascular patients.

2. The increased utilization of imaging modalities has raised many questions as to whether the low doses of ionizing radiation exposure may be associated with an increased lifetime risk of cancer.

3. The Radiation Safety Think Tank comprised of clinicians, physicists, regulators, payers, scientists, and other experts met to address issues surrounding radiation exposure and to develop a plan for optimizing radiation safety and reducing patient dose in cardiovascular care.

4. Actionable strategies to improve radiation safety in cardiovascular care include defining projected risks and their measurement, reducing single and cumulative exposures (including but not limited to decreasing inappropriate testing, dose reduction, etc.) through clinical and systems changes, and improving physician and patient understanding of radiation dose used in cardiovascular care.

5. The biological risks of low-dose radiation exposure fall into two categories:
   • Deterministic effects: Skin erythema, epilation, or cataract formation occurring at certain thresholds of absorbed dose to a specific tissue.
   • Stochastic (random effects): Interaction of radiation with cellular molecules and processes causes damage sufficient that a malignancy may result usually much later in the patient’s life.

6. Measuring and reporting radiation dose in cardiovascular imaging and therapeutic procedures require greater standardization across institutions due to the variations that exist in imaging protocols and radiation dose. Professional societies have addressed these challenges through the creation of procedural and safety guidelines.

7. Several ways of expressing potential risks were proposed:
   • The concept of "days of life expectance lost" to express the projected risks of radiation.
   • Stochastic radiation risks should also be examined and addressed not only in terms of mortality, but also in terms of morbidity of cancer, quality of life, cost to society, and (specific to cardiac imaging) compared to the burden of cardiovascular disease.

8. Strategies to minimizing radiation dose are:
   • Education to include mandatory annual online training for basic radiation safety techniques of healthcare providers involved in the ordering or performance of medical testing using ionizing radiation and board certification examinations.
   • Quality Metrics: Public reporting of quality metrics including appropriateness of testing, use of dose minimization strategies, objective image quality.

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assessments, and facility-level radiation exposures for common testing categories by local and national standards.

- Common industry/technology standards: Developing common protocols, definitions, parameter settings, and device settings that ensure basic standards are met, while allowing innovation.

9. Four strategies for communicating the health benefits of cardiovascular imaging balanced against the risks to stakeholders, including patients, physicians, technologists, industry, and the general public, were put forth:
   - Identifying, cataloging, and developing education resources
   - Identifying and disseminating best practices in imaging
   - Heightening the awareness of radiation in imaging
   - Identifying, monitoring, and minimizing unintended consequences

10. Although continued efforts are required, this white paper provides a framework for optimizing radiation safety and reducing patient dose in cardiovascular care.