

Smith M, et al. X-ray therapy safety and awareness education for medical trainees and attending physicians

APPENDIX

Demographics and Exposure

1. Your gender:
 - Male
 - Female
 - Other: (open field)

2. What is your field of training?
 - Medical School
 - Vascular Surgery
 - Gastroenterology
 - General Surgery
 - Orthopedic Surgery
 - Urology
 - Radiology
 - Interventional Cardiology

3. Which year of training are you in?
 - Medical student, year 1
 - Medical student, year 2
 - Medical student, year 3
 - Medical student, year 4 and up
 - Junior Resident (PGY 1-2)
 - Senior Resident (PGY 3 and up)
 - Fellow
 - Attending

4. How would you rate your current knowledge of radiation safety?
 - Far above average
 - Above average
 - Average
 - Below average
 - Far below average

5. Have you ever attended training events (lectures, seminars, etc) on radiation protection organized by your training program, workplace, or medical association?
 - Yes
 - No

6. Have you been required to take an exam on radiation safety?
 - Yes
 - No

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7. How much training do you estimate you've received on radiation safety in your CURRENT training program?
 - >5 hours
 - 1 hour – 5 hours
 - 30 minutes – 1 hour
 - ≤30 minutes
 - None

8. Is annual radiation safety training/education required at your institution?
 - Yes
 - No

9. How often are you involved in patient care requiring exposure to radiation/fluoroscopy?
 - Daily
 - At least several times a week
 - Sometimes or several times a month
 - Rarely or less than once a month
 - Never

10. Where do you perform most of your fluoroscopically guided procedures?
 - Office
 - Ambulatory surgery center
 - Hospital
 - I do not perform fluoroscopically guided procedures, or I have not been involved in fluoroscopically guided procedures

11. Are you concerned about the effects of radiation?
 - Yes
 - No

12. How often do you wear radiation protection equipment (e.g., apron, vest, gloves, lead glasses, thyroid protector, leaded cap, etc) when performing fluoroscopically guided procedures?
 - Always
 - Usually
 - Sometimes
 - Rarely
 - Never
 - Not applicable

13. How often do you wear a radiation badge/dosimeter (device that measures radiation)?
 - Always
 - Usually
 - Sometimes
 - Rarely
 - Never

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- Not applicable
14. Where do you wear your radiation badge/dosimeter (device that measures radiation)?
- Head level
 - In front of radiation garment, collar level
 - In front of radiation garment, waist level
 - Behind radiation garment, collar level
 - Behind radiation garment, waist level
 - I do not wear a radiation badge/dosimeter
15. Who monitors your radiation badge/dosimeter?
- Your institution
 - You
 - No one
 - Do not know
 - Not applicable
16. How often do you check your radiation badge/dosimeter readings?
- Monthly
 - Quarterly
 - Semi-annually
 - Yearly
 - Never
 - Not applicable
17. How often are your radiation protection garments checked for cracks or damage?
- Monthly
 - Quarterly
 - Semi-annually
 - Yearly
 - Never
 - Unsure
 - Not applicable
18. Do you record fluoroscopy cumulative dose for each procedure as part of your procedure/operative report?
- Always
 - Usually
 - Sometimes
 - Rarely
 - Never
 - Not applicable
19. Which of these features do you or your department use regularly to reduce radiation exposure (select all that apply):
- Last image hold

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- Auto-swap image functionality
- User/physician operated fluoroscopy
- Pulse images over continuous exposure
- Routinely positioning the image intensifier as close as possible to area of interest
- Routine collimation to the area of interest
- None of the above

Radiation Safety Knowledge

1. Which of the following is LEAST consistent with an As Low as Reasonably Achievable (ALARA) principle?
 - Reducing exposure time
 - Increasing distance from the source of radiation
 - **Increasing the field of view**
 - Shielding
 - Do not know
2. Which of the following is a stochastic effect of radiation?
 - **Cancer**
 - Cataract formation
 - Hair loss
 - Skin erythema
 - Do not know
3. If you double your distance from the source of radiation, the intensity of radiation is reduced by a factor of:
 - 1
 - 2
 - **4**
 - 10
 - Do not know
4. Which of the following diseases may be a result of medical radiation damage?
 - Cataracts
 - Cancer
 - Hereditary diseases
 - **All of the above**
5. Which of the following MOST LIKELY provides the GREATEST source of radiation to occupational staff during fluoroscopy?
 - **Patient**
 - X-ray tube
 - Collimator

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- Image receptor
 - Do not know
6. Which of the following imaging modalities is responsible for the greatest radiation dose for medical staff?
- MRI
 - Ultrasound
 - **Fluoroscopy**
 - CT
7. How can medical imaging using ionizing radiation cause harm?
- **Creates high-energy photons that ionize atoms and produce free radicals**
 - All types of medical imaging do not cause harm
 - Creates alpha particles that penetrate deep into tissues and produce free radicals
 - Creates beta particles that penetrate deep into tissues and produce free radicals
8. In general, what does the International Commission on Radiological Protection (ICRP) suggest as a limit for occupational exposure to radiation?
- **20mSv/year**
 - 20mSv/day
 - 60mSv/year
 - 60mSv/day

Preferred Training Method

1. What type of learning method do you believe is best for delivering radiation safety training?
- Didactic lectures
 - Seminars
 - Online courses
 - Workshops
 - Other: (open field)
2. At what level of training do you believe radiation safety training should be implemented?
- Medical school
 - Residency
 - Attending physician