

The Importance of Radiation Protection Compliance in Clinical Settings

“Primum non nocere”

Health issues and side effects:

- X-rays collide with body cells causing damage or cell death
- Cell can become mutated then replicated in future cell generations
- Mutations can become cancer cells
- Affects both patient and x-ray tech

STATS:

- 2004: 5,695 new cases of cancer attributable to diagnostic x-ray
- Fluoro operators exposure translated to lifetime chance of 1 in 7000 to develop fatal cancer
- Interventional cardiology personnel more likely to develop cataracts
- No radiation dose can be considered safe

Table 1

Radiation Doses for Interventional Radiology Operators²²

Body Part	Radiation Dose (mSv)	
	Single Dose ^a	Annual Dose ^b
Eye	2.4	49.3
Wrist	2.1	107.9
Finger	1.8	90.4
Leg	0.6	21.6

^aMaximum during a single procedure.

^bEstimated doses for the highest workload operator.

Dewar, C. (2013). Occupational radiation safety. *Radiologic Technology*, 84(5), 467-484.

Research:

- CT pulmonary angiography of fetus phantom showed 35% dose reduction with lead shielding
- CT chest image of lead shielded phantom showed 71.7% dose reduction to testes, 42.1% dose reduction to uterus, and 33.2% dose reduction to colon
- CT head imaging of breasts, thyroid, and eyes, after shielding reduced dose by 57%, 45%, and 44% respectively
- Scatter radiation study of portable radiography proved enough scatter radiation to warrant lead shielding

Knowledge and Compliance:

- Trauma center and children's hospital study showed overestimation of knowledge
- Only 65% of knowledge questions were answered correctly
- Other studies showed insufficient knowledge of ionizing radiation among workers
- 80.4% of participants showed interest in more education on radiation protection

Education:

- Standard 4, objective 4.3 states that programs must assure students employ proper radiation safety practices
- Limited college-based and in-service education contributed to limited knowledge
- Catheterization nurses, among other workers, were proven to be constantly exposed and underestimate risks of ionizing radiation



X-rays | National Institute of Biomedical Imaging and Bioengineering [Image of a boy getting an xray]. (n.d.). Retrieved from <https://www.nibib.nih.gov/science-education/science-topics/x-rays>

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