

Cite as: Beiko D. Radiation safety, awareness, and education: Exposing the silent killer.
Can Urol Assoc J 2023;17(2):32-3. <http://dx.doi.org/10.5489/cuaj.8253>

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Radiation safety, awareness, and education: Exposing the silent killer

Smith et al are to be congratulated for (pardon the pun) *exposing* our collective lack of awareness and education regarding the silent killer known as ionizing radiation.¹ Admittedly, the risks of ionizing radiation were simply not in the forefront of my mind when I was a trainee. But with each passing endourologic case over the years, my awareness and concern regarding the deleterious effects of ionizing radiation has grown. Perhaps in part because my wife is also exposed to ionizing radiation in her profession, I find the risks of ionizing radiation to be particularly unsavoury. I might even go so far as to say that these unsavoury risks have somewhat of a negative impact on my own personal well-being. The risks of ionizing radiation are now top of mind. These risks should concern us.

Why is this? For starters, the risks of ionizing radiation are real. Radiation-induced malignancy is real. Our patients are at risk. Our OR nurses and nursing students are at risk. Our medical radiation technologists and their students are at risk. Our anesthesiologists and their residents are at risk. Our urology residents are at risk. Us urologists are at risk. None of these stakeholder groups are invulnerable. This should concern us.

The findings of Smith et al's study should concern us. Their study showed that 87%, 65%, and 48% of medical students, residents, and attending physicians, respectively, did not attend training sessions on radiation safety. Although most respondents in their study wore radiation protection equipment, 95% of medical students, 56% of residents, and 56% of attending physicians reported *never* wearing a dosimeter. In other words, for more than half of the study subjects it would be impossible to track their cumulative effective dose of ionizing radiation. These findings should concern us. Online courses, workshops, and lectures/seminars were suggested for training, but there was no clear consensus as to which approach is preferred. Furthermore, when asked about the optimal timing of such training, respondents were evenly split between medical school and residency.

The findings of Smith et al are fully aligned with the published literature to date. Figure 1 shows specific concluding quotes from studies assessing the knowledge and awareness of radiation safety among urologists,² urology residents in Europe,³ and urology residents in the U.S.⁴ These quotes should concern us. And in case you were wondering, a study by Alshabi et al focused on orthopedic surgeons and confirmed that the lack of knowledge and awareness of radiation safety is not limited to our specialty.⁵

Despite these findings and quotes, there is hope. Weld et al studied the effect of safety, minimization and awareness radiation training (SMART) in urology residents performing ureteroscopy, finding that SMART decreased fluoroscopy times by 56%.⁶ Hein et al replicated these results in urologists, demonstrating that their "awareness effect" (briefing surgeons preoperatively on fluoroscopy time) resulted in a 41% reduction in fluoroscopy times.⁷ Finally, Kumar et al showed that their structured educational program produced more than a four-fold increase (from 22.5% to 95%) in the use of thyroid shields and doubled (47.5% to 95%) the knowledge and awareness of the ALARA (as low as reasonably achievable) principle.⁸

OK, so we should be concerned about the deficiencies regarding radiation safety training and practices. But what can we do about it? First, there are the little day-to-day things we can readily do. We can create an "awareness effect" among our trainees preoperatively for all cases requiring fluoroscopy. We can introduce ourselves and trainees to our institutions' radiation safety officers for dosimeters and maintenance/testing of our radiation protection equipment. We can lead by example by consistently wearing, using, and testing our own radiation protection equipment (including eyewear) and dosimeters. And since we are ultimately responsible for the administration of fluoroscopy during endourologic cases, is it not fair to ask ourselves if we are doing everything we can to ensure proper radiation safety practices are followed to reduce the equivalent dose



Figure 1. Quotes from studies exposing a lack of knowledge and awareness of radiation safety.

of ionizing radiation energy absorbed by the bodies — and the attendant effective doses and biologic risks, most notably malignancy — of all the above-mentioned stakeholders? We can and should employ intraoperative strategies to reduce/eliminate ionizing radiation exposure and scatter radiation by (where possible) substituting fluoroscopy with ultrasound, shielding, limiting exposure time, using low-dose and pulsed fluoroscopic settings, maximizing the distance from radiation source, collimating to the smallest fluoroscopy field possible, and positioning the image intensifier as close to the patient's body as possible.

Smith et al point out that we lack a standardized approach to radiation safety training in Canada and

conclude that more research is needed to evaluate and improve radiation safety training. So, in addition to doing the little day-to-day things to reduce the impact of this silent killer, we may want to pursue higher-level opportunities to achieve a bigger impact nationally through the development of optimal radiation safety training and, ultimately, evidence-based radiation safety practices in Canada.

COMPETING INTERESTS: The author does not report any competing personal or financial interests related to this work.

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