

Lowering radiation exposure in your veterinary practice

Radiography is vital to the best practice of veterinary medicine because it enables the understanding and diagnosis of—and informs the treatment of—a variety of health issues. Accompanying these benefits, however, are risk factors associated with radiation exposure, which every veterinary professional should take seriously.

Veterinary technicians are particularly at risk, as they are typically responsible for capturing X-ray images, or radiographs, of patients. They need to carefully position the animal to obtain an accurate image, often needing to secure a squirming patient to get the correct angle. Lead gloves don't protect the technician from the primary X-ray beam; they only protect from scatter radiation at the edges of the image.¹ Even when an animal is sedated and positioning devices are used, X-rays still scatter in all directions.²

Effective radiation safety requires a commitment from veterinarians and veterinary technicians, as well as any other personnel who work in proximity to radiology equipment.

Even small doses add up

For a veterinary technician, obtaining a radiograph is a routine assignment, and the cumulative effects of daily exposure to small amounts of radiation are a serious concern.³ No one really knows just how much radiation is tolerable, and there is no safe threshold for radiation exposure—response of cells to radiation is not totally predictable, and cellular repair to even a one-time exposure cannot be ensured.^{2,4}

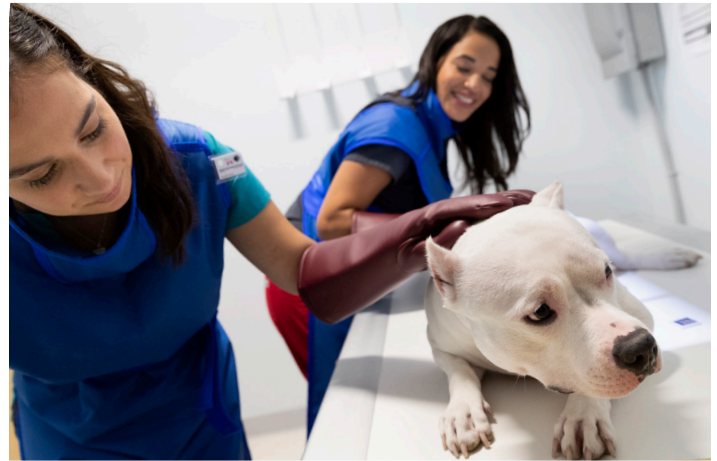
Radiation safety philosophy is based on the conservative assumption that radiation dose and its biological effects on living tissues are modeled by a relationship known as the linear hypothesis.⁵ Simply put, every radiation dose of any magnitude can produce some level of detrimental effects that may include increased risk of genetic mutations and cancer.

Radiation exposure poses risk to veterinary staff

Well-documented evidence states that radiation exposure has long-term health consequences. Female veterinary staff of childbearing age should be particularly aware of the risks of radiation exposure if they plan to become pregnant or already are pregnant. The result of radiation exposure can cause an increased risk of cancer as well as genetic damage to reproductive cells,³ potentially causing birth defects.⁶ Exposure precautions are always the best defense.

Lower the dose with the ALARA principle

Steps can be taken to ensure that doses are as low as reasonably achievable. The ALARA (as low as reasonably achievable) principle aims to lower radiation doses in the workplace by leveraging practical, cost-effective measures. To maintain doses as low as reasonably achievable, veterinary staff should follow three simple safety principles:¹



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- Time: Use the shortest exposure time possible, limit time in the X-ray suite, and avoid retakes by using your technique chart.
- Distance: Stay as far away from the radiation source as practical by using sedation to allow for the use of sandbags and other nonmanual restraints as well as hands-free methods.
- Shielding: Use absorber materials like lead aprons, gloves, and thyroid shields, as well as permanent barriers to capture X-rays.

Consider lower-dose digital imaging

One way to reduce radiation exposure is to replace older, film-based X-ray equipment with a digital radiography system. Compared to conventional X-ray equipment, digital imaging provides sharper, higher-resolution images with less radiation exposure.

Digital radiography isn't new, but it has advanced considerably in recent years. Manufacturers are working to lower the radiation dose veterinary professionals and patients receive through solutions such as new lower-dose veterinary radiography systems. These systems enable low-dose radiation image capture without sacrificing clear, high-quality images.

When choosing a digital radiography system, look for a lower-dose system that also simplifies workflow from capture to storage, with the flexibility to view images on any device—at home, on the road, or in the office.

References

1. Wright M. Treat radiation with respect, not anxiety. *Veterinary Practice News*. bit.ly/2Lpzbkz. Published 08-10-10. Accessed 08-24-18.
2. Shaw LK, Henry JE. Radiographic positioning: Head, shoulders, knees, and toes, part 1. *Today's Vet Nurse*. 2016;1(6). bit.ly/2PAu3gA. Accessed 08-24-18.
3. Radiation Safety Relating to Veterinary Medicine and Animal Health Technology in California. Sacramento, CA: California Veterinary Medical Board; 2012. bit.ly/2BLGTWN. Accessed 08-24-18.
4. Little MP. Risks associated with ionizing radiation: Environmental pollution and health. *Br Med Bull*. 2003;68(1):259-275.
5. Upton AC. Radiobiological effects of low doses: Implications for radiological protection. *Radiat Res*. 1977;71(1):51-74.
6. Madsen LM. Pregnancy in the workplace. *Veterinary Technician*. 2005.