Digital Download

Information and insights into radiography using your IDEXX Digital Imaging System

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Radiation Safety Guidelines

ALARA principle for minimizing radiation exposure

ALARA (As Low As Reasonably Achievable) is a safety principle designed to minimize radiation doses and releases of radioactive materials. More than merely best practice, ALARA is predicated on legal dose limits for regulatory compliance, and is a requirement for all radiation safety programs.

What is the basis for ALARA?

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. 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. With that in mind, ALARA aims to lower doses received by radiation workers using practical, cost-effective measures.

How is ALARA implemented?

An effective ALARA program requires a commitment from all relevant staff in your clinic or hospital: veterinarians and vet techs as well as any other personnel who work in proximity to your radiology equipment. To maintain doses As Low As Reasonably Achievable, make sure staff follow these three major safety principles:

1. TIME—Minimize the time of exposure.
2. DISTANCE—Double the distance between your body and the radiation source; this reduces the radiation exposure by a factor of 4.
3. SHIELDING—Use absorber materials such as Plexiglas® for beta particles and lead for X-rays and gamma rays.

The pregnant worker and ALARA

Pregnant workers should avoid exposure exceeding ~ 55 millirem during any one month, and large doses between the 8th and 15th weeks of pregnancy, since this is when the fetus is more sensitive to radiation-induced effects.

Adhering to ALARA, and your state's rules and regulations regarding radiation exposure, helps keep your staff healthy and safe. For more details, download the complete article this story was excerpted from at **www.ncsu.edu/ehs/radiation/forms/alara.pdf.**

Annual occupational radiation dose limits

The recommended annual occupational dose limits have been derived from a study of the observed biological effects of radiation on humans and animals during the 20th century.

Maximum annual occupational dose limits

Whole body	5,000 millirem
Extremities	50,000 millirem
Lens of the eye	15,000 millirem
Fetus (during gestation)	500 millirem
Individuals in the general public	100 millirem

What are the ALARA investigation levels?

The ALARA concept imposes operational dose limits—and corresponding investigation levels—that are even more restrictive than the maximum legal dose limits. This ensures an enhanced safety factor for what are already considered to be safe annual doses for radiation workers.

There are two types of ALARA investigation levels for external occupational radiation exposure as indicated by a dosimeter. If a radiation worker's dose for any calendar quarter (3 months) or calendar year (12-month period) exceeds these values, an investigation should be conducted to determine if there are reasonable ways to reduce the dose levels.

- Quarterly Investigation Levels (3 months) *Based on 2.5% of any applicable occupational limit.*
- Annual Investigation Levels (12 months) *Based on 10% of any applicable occupational limit and related to an individual worker's year-to-date cumulative dose.*

The content of this issue of the Digital Download *is based on the article "Radiation Safety and ALARA" published by North Carolina State University.*

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