

HERCA-FEEVA statement regarding the principles of radiation protection during radiographic imaging at equine prepurchase examinations

The Federation of European Equine Veterinary Associations (FEEVA) and Heads of the European Radiological Protection Competent Authorities (HERCA) have separately evaluated the practice of radiographic imaging as part of equine pre-purchase examinations. This practice has become more common over recent years due to the increasing requirements of reducing potential financial losses for the prospective owner, and it is expected that this trend will continue. Currently there is considerable variation within European countries regarding radiographic protocols, including the number of exposures.

In order to avoid unnecessary exposure of workers and members of the public during radiographic examinations, FEEVA and HERCA wish to underline the importance of applying the ICRPⁱ principles of radiation protection: *justification*, *optimisation* and *dose limitation*, to the radiographic protocols used during these prepurchase examinations. These principles are defined as follows:

- *Justification* – Justification means that X-ray exposure should only be considered if the benefit to the exposed individuals, or society, exceeds the radiation detriment it causes.
- *Optimisation* – Optimisation means that X-ray exposures should be performed in such a manner that unnecessary exposure is reduced to a minimum.
- *Dose limitation* – *Different international standards such as the EURATOM Directiveⁱⁱ* state upper limits for the dose that workers and members of the public are allowed to receive from work activities involving ionizing radiation.

The general principles of justification are stated in different international standards for radiation protection, and are transposed directly to national legislation of individual countries, or via EU directives^{1,4} which EU member states have to implement. Most countries give no further description on how to apply these principles to radiographic protocols used during prepurchase examinations. Justification is a complex question, particularly in this setting, where large numbers of exposures of the animals are considered. The rationale for undertaking radiographic examinations during prepurchase examinations often goes beyond a direct impact on animal welfare. It is frequently undertaken to predict potential financial losses for a prospective purchaser. Veterinary practitioners are usually required to make judgements about justification in each individual case, weighing the benefits against the risks for the workers and members of the public. The veterinarian should consider other examination modalities as appropriate and only consider X-ray studies that could provide additional relevant clinical information. To ensure the veterinarians' right to select the correct modality, including the number of radiographs, at an individual level, claims from insurance companies and other parties related to prepurchase of horses should be discouraged when these examinations would not give any additional relevant clinical information.

When an X-ray examination is judged to be justified by the attending veterinary practitioner, the principle of optimisation should be considered. The first step involves rationalising which X-ray projections are necessary within the overall examination. This is particularly relevant when considering larger exposures, where there is a large anatomical region to be examined, for example as may be required for spinal radiography, since this will result in considerable doses of scattered radiation³, thus increasing the exposure of personnel present in the working area. The second step is to ensure that the minimum number of people are present during the X-ray examination, and for as brief a duration as possible. Consequently, good planning is essential. For example, chemical restraint of the horse may reduce the occurrence of movement artefact in the acquired images thus reducing the need to repeat exposures. Thirdly, protective equipment and maximum possible distances from the radiation field should be maintained. Protective equipment may include lead aprons, thyroid protection, gloves and

goggles. The use of a stand for both the generator and detector will reduce the need for personnel to be within the radiation field. Finally, radiation exposure parameters should be as low as possible and the primary field should be minimized in order to expose only the part of the horse that is being examined.

When the principles of justification and optimisation are applied properly in veterinary practices, the resulting doses to workers and members of the public should be kept well below the annual dose limits. Nevertheless, it is a good practice to regularly measure the dose to workers using dosimeters in order to be able to discover abnormalities during procedures or in pieces of equipment. In some countries, this is even a requirement.

ⁱ *The 2007 Recommendations of the International Commission on Radiological Protection*. ICRP Publication 103, 2007.

ⁱⁱ Council Directive 2013/59/Euratom. Official Journal of the European Union, 2013.

³ FEEVA Position Statement of pre-purchase radiography on dorsal spinous processes 2018.

http://feeve.fve.org/working_documents/ppe_rx/

⁴ European Framework Directive 1989/391/EEC on safety and health of workers.