

## Task Group 107: Advice on Radiological Protection of the Patient in Veterinary Medicine

### Mandate

The Task Group was tasked to produce a quick (within six months) report for the ICRP Main Commission on the following issues: the extent to which ionizing radiation is used in veterinary medicine; the international setting in which any specific advice on the radiological protection of the animal as patient is already being provided; the areas that it would be most useful for the ICRP, together with the veterinary profession, to pursue in order to provide further advice; and the broader implications for the ICRP and, indeed, for the radiological community as a whole, should it become involved in this subject.

### Membership

**Jan Pentreath** (Chair) UK;  
**Kimberley Applegate**, USA;  
**Kathy Higley**, USA;  
**Kathelijne Peremans**, Belgium;  
**Masahiro Natsuhori**, Japan;  
**Elissa Randall**, USA;  
**Jennifer Gambino**, USA.

### The general context of the use of radiation in veterinary medicine

- ❖ Radiation is now widely used in veterinary medicine including computed tomography (CT), fluoroscopy, gamma camera imaging, positron emission tomography (PET), and combined single-photon emission computed tomography (SPECT)/CT and PET/CT scanners.
- ❖ Radiotherapy may include superficial or orthovoltage (keV) units,  $^{60}\text{Co}$ , intensity modulated radiation therapy (IMRT), brachytherapy, the use of radioiodine, technetium, or linear accelerators and multi-leaf collimators.
- ❖ Not all radiographic examinations are carried out because the animals are unwell.
- ❖ Animals can be subject to examination in order to assess potential medical conditions prior to sale (particularly in the case of horses); or as part of selective breeding programmes (dogs); or simply to assess their fat and meat content (sheep and pigs).



CT scan of a 12 year old cow  
(Courtesy of J Gambino.)



A portable PET scanner, left hind-leg of a horse  
(Courtesy of Dr Spriet)



Brachytherapy of a horse being treated for sarcoid  
(Courtesy of J. Benoit).

### Current advice for veterinarians

- ❖ Specific advice on the subject of radiation protection in veterinary medicine has been produced in some countries, aimed at the veterinarians and, to a limited extent, to animal owners, but not with respect to care of the animal as patients.
- ❖ The overall conclusion was that there is considerable opportunity for radiation protection guidance and collaboration within the veterinary profession at national, regional, and international level.

### Specific issues

- ❖ Diagnostic doses are always expressed in Sv, not in Gy.
- ❖ There is little or no guidance with regard to optimisation of doses in either diagnostic or therapeutic procedures.
- ❖ There is a lack of proscribed protocols, data bases relating to clinical trials, and other basic approaches to radiation examination and treatment of animals, particularly with regard to the potential risks and benefits of such exposures.



Radiation treatment burns one week following tomotherapy for nasal carcinoma  
(Courtesy of Thomas Loughlin).



Fibrosis in a dog three years after hypofractionated radiotherapy for mast cell tumour of the lip  
(Courtesy of J. Benoit).



Osteosarcoma in a dog 5 years after treatment for mast cell tumour  
(Courtesy of J. Benoit)

### Conclusions and Recommendations

- ❖ The issue of radiological protection of the animal as patient needs urgently to be addressed and thus should be included in the work of the proposed TG 110.
- ❖ Such an inclusion would have considerable implications for the ethical, moral, and practical framework within which 'radiological protection' as a whole currently operates; it is not evident that such an extension of the subject would be universally welcomed.