

The Role of Veterinarians in the Care and Use of Animals in Research and Teaching

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Fact Sheet

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Introduction

Relative to the use of animals for scientific purposes, veterinarians play a central role in biomedical (including veterinary), wildlife and farm animal research. In Australia, on a numerical basis they are principally involved with biomedical research. The comprehensive nature of veterinary training equips veterinary graduates to handle a diverse range of professional responsibilities relevant to the use of animals for scientific purposes and animal welfare. In the Australian context, veterinarians in scientific institutions may be divided into two main categories: those involved in the production, medicine and surgery of animals used for scientific purposes; and those involved on Institutional Animal Ethics Committees and of course, there are many veterinarians whose duties involve elements of both categories.

The broad range of duties in the first category includes:

- management of laboratory animal production and maintenance colonies
- operation of preventative medicine programs
- clinical medicine
- provision of research support including experimental design, animal models, research participation and post procedural monitoring of experimental animal
- maintenance of quarantine facilities

- operation of in-house pathology programs
- experimental surgery
- involvement in animal house design
- regulatory compliance including OHS, OGTR, Ethics, Animal Welfare and Research
- human and facilities resources management
- financial management
- marketing and promotion
- staff training

For those veterinarians involved with Institutional Animal Ethics Committees their role includes:

- the promotion of animal welfare and regulatory compliance including review of proposals to use animals for scientific purposes
- the minimisation of pain and distress
- the monitoring of the housing, care and use of animals used for scientific purposes
- the administration of animal ethics committees
- investigation of complaints and grievances associated with use of animals for scientific purposes
- provision of advice to the institution, and to researchers
- provision of consultation and advice concerning compliance with relevant legislation and *The Australian Code of Practice for the Care and Use of Animals*

for Scientific Purposes

- training of research and technical personnel
- the development of institutional and regulatory policy, codes of practice, regulation and monitoring
- media and community liaison

Although principally outside the scope of this article, qualification as a veterinarian also provides a strong base for veterinary graduates to embark upon a scientific research career. A research career path may lead into a range of diverse fields such as immunology, molecular biology, physiology, biochemistry, virology, pathology, bacteriology, parasitology, animal management, wildlife research, agricultural animal research or exotic disease research. There are Australian veterinary graduates currently working as investigators in all these fields. One Australian veterinarian of particular note is Nobel Laureate Professor Peter Doherty, a graduate from the University of Queensland who clearly went on to bigger and brighter things, winning the 2006 Nobel Prize for medicine.

Management of Laboratory Animal Production and Maintenance Colonies

A veterinarian who is responsible for the management of laboratory animals, uses the strong scientific knowledge provided by a veterinary degree but must still acquire a number of additional special skills and wide ranging experience in order to fulfil the duties involved in this role. Veterinary graduates are well trained in the general principles of preventative and clinical medicine, surgery, genetics, animal welfare, scientific process, the principles of animal management, animal behaviour, pathology, quarantine and nutrition. The laboratory animal veterinarian needs to apply this knowledge to a range of less familiar species. The focus of undergraduate training is on the domestic and farm animal species with some attention given to “pocket pets” such as mice, rats, guinea pigs, rabbits, birds, fish, amphibia, native animals and reptiles. The

laboratory animal veterinarian therefore embarks early on a steep learning curve, having to master anatomy, physiology and medicine of rodents, rabbits and other less common species. This will obviously need to include diagnosis, treatment and management of diseases that most Veterinarians will not have encountered before, some of which may well be experimentally induced disease models. In some situations, more familiar species, in which he or she has received considerable training, may be encountered, but the circumstances of their housing may be vastly different in the research environment. Many additional responsibilities such as personnel management of a team of animal technicians, financial management and environmental control are part of the role of these veterinarians. It is apparent that, in addition to the experience and training of a veterinarian, it is necessary to acquire some of the skills of a production engineer and human resources manager.

The ultimate aim of the laboratory animal veterinarian is to provide the researcher with an experimental animal in a timely and efficient manner. Each animal must also be provided in a state that is appropriate for the intended scientific use in terms of biological characteristics, genetic constitution and microbiological as well as general health status. In recent years, this has had to include genetic definition. Targeting specific genes, particularly in laboratory mice, has allowed investigators to more accurately define the biological roles of genes and the genetic components of disease processes. As the complexity of the breeding methodologies is critical to the preservation of animals produced and the effects of genetic manipulation cannot be fully known in advance, this has placed more demands on veterinarians who are involved with the production and monitoring of these animals.

While monitoring aspects will be discussed in the next section, from a production viewpoint these animals may require special care. They may be more susceptible to disease and reproductive efficiency may also be impaired.

Any veterinarian with experimental surgery commitments performs surgery to assist investigators in their research and this may extend to the development of surgical techniques for specific protocols as well as training and providing advice in surgical techniques to investigators and animal technicians in some procedures as well as post-operative monitoring of experimental animals.

Veterinarians are renowned for being able to function effectively in a wide range of disciplines and this is certainly true of Laboratory Animal Veterinarians. This is a highly regulated and demanding field that has a strong bias towards preventative medicine but also a need for clinical, medical, pathology and surgical expertise. Skills in people management are critical in terms of animal facility staff and researchers and the successful operation of a key research resource. For anyone looking for a challenging position with varied and often unusual species, laboratory animal medicine is definitely a field to consider.

Veterinarians and Institutional Animal Ethics Committees

Institutions using animals for scientific purposes within Australia must establish one or more Animal Ethics Committees directly responsible to the institution. There are four essential categories of membership of Animal Ethics Committees defined in *The Australian Code of Practice for the Care and Use of Animals for Scientific Purposes* (this code is incorporated into the legislation of the various states and territories in Australia). The Category A member is a person with qualifications in veterinary science and with experience relevant to the activities of the institution. Veterinarians who lack this experience must familiarise themselves with the biology and clinical characteristics of the species of animal used. Veterinary membership of such committees may be in a voluntary capacity, or as a full or part-time employee of the institution, usually dependent on the size, and sometimes on the location of the institution. In larger institutions,

veterinarians may be employed as the institutional Animal Welfare Officer or the Executive Officer of the Animal Ethics Committee and may or may not act as a Category A member of the AEC. The principal role of the veterinarian is to provide expert advice to the committee, animal ethics proposal applicants and the institution. Such advice may include the use of appropriate anaesthetics and analgesics, animal housing standards, effects of experimental manipulations on the health and welfare of the animals, implications of genetic modifications, animal models, the appropriate use and methods of euthanasia and possible alternatives to animal use. The veterinarian has an important role to fill in the minimisation of pain and distress thereby significantly contributing to animal welfare and the refinement of the investigative process. In the absence of a statistician and by the nature of their training, veterinarians may contribute to statistical evaluation, which is essential to the minimisation of the number of animals used whilst obtaining a statistically valid result. In some institutions, the veterinarian may also bear a large part of the often quite substantial administrative load relevant to the operation of the Animal Ethics Committee.

The role of veterinarians within the Animal Ethics Committee's sphere of activities and the institutional animal welfare processes extends well beyond the formal ethics committee meetings. Training of investigators and technical staff is an important function carried out by veterinarians in many institutions using animals. This training usually includes formal instruction on compliance with the Code and relevant legislation. It may also extend to practical workshops in animal handling techniques, routine research procedures, anaesthetic methods, euthanasia techniques and general or specific surgical skills. This may be done in conjunction with training provided by research group leaders. The ongoing monitoring of animals, including their housing, care and use, as well as compliance with AEC approvals and decisions, is another essential role.

The veterinarian is the ideal person to monitor for signs of pain and distress in laboratory animals and instigate alleviation measures when necessary. As the Animal Ethics Committee is required to provide comment on the building or modification of animal facilities, the veterinarian also has a central role to play in assisting the committee to determine the appropriateness of the housing environment within the institution.

The concept of genetic modification of animals, while enabling scientists to concentrate on specific genes essential to the disease process, has brought with it a whole new set of potential welfare issues that must be considered by those entrusted with the monitoring of research using animals. Veterinarians, conversant with this discipline, acting in conjunction with animal technical staff and investigators, are well-positioned to assess the welfare and genetic stability of newly created genetically modified animals. They are also best able to institute special care when necessary and to implement protective measures in cases where increased susceptibility to disease may be involved.

Given the sometimes sensitive nature of particular research protocols and the unique role of veterinarians within institutions and their Animal Ethics Committees, veterinarians are often required to act as *de facto* "information or publicity officers" with potential for interaction with the media and the general community in public forums. The veterinarian's role may also include that of an independent complaints officer for concerns and issues raised by staff, students and members of the general community relating to the care and use of animals for scientific purposes.

The veterinarian who is a member of, or is involved with, an Institutional Animal Ethics Committee has, by nature of his or her training and experience, a unique and significant role that allows them to provide beneficial advice to the Animal Ethics Committee, the investigators and/or teachers and the institution itself whilst facilitating the accumulation of scientific

knowledge in the most humane manner.

Conclusion

The question that is often asked is why veterinarians become involved with animals used for scientific purposes. There are two main reasons. First, the animal research branch of the profession is intellectually stimulating and encourages scientific curiosity. It encourages use of all of the primary disciplines of veterinary science and adds unique skills not often used in other veterinary pursuits including care of a wide variety of often unusual species, facility design for intensive animal production and experimental holding, infection control and zoonoses, scientific principles, ethics, philosophy, policy formation, animal research compliance, gene technology and OHS. Second, the desire to become a veterinarian usually stems from empathy for animals and it is that empathy that is critical for veterinarians who fulfil a role in the monitoring and care of animals used for scientific purposes. The recognition that these animals are sentient beings, whose welfare is paramount, is imperative and the veterinarian plays a key role in ensuring that everyone involved with the use of these animals understands this principle. The adverse effects of stress on the immune system, for example, are well documented and it is the interface between the researchers and the veterinarians that promotes the reality that good animal welfare leads to good science!