



## Workshop 1.3

# Educating the scientist in animal alternatives

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### Lecture

## Alternatives to the use of laboratory animals in veterinary education

*Vera Baumans*

Dept. Laboratory Animal Science, Utrecht University, Utrecht, The Netherlands

The use of animals in veterinary education is becoming a subject of a moral debate and is often opposed on educational and practical grounds.

However, the experienced discomfort of the animals in relation to the purpose of their use should play a major role in this debate. For example, the grade of discomfort will be different for animals used for practising handling skills or for surgical training.

Many alternatives have been developed and are already in use in veterinary education. However, would it be feasible and

desirable to replace all experimental animal use in veterinary education?

The debate on the use of animals in veterinary education should include the question who benefits:

1. the animal patients.
2. the animal owners.
3. the veterinary students.

When the latter appears to be the case, students should at least have a mandatory training in ethical aspects of the use of experimental animals and in the application of the 3Rs.



## Lecture

# Overcoming conservatism: Educating veterinarians about animal welfare

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<sup>1</sup>World Society for the Protection of Animals (WSPA), London, UK; <sup>2</sup>Research Consultant, Animal Consultants International, Kings Lynn, UK

The veterinary profession has its origins in agriculture, assisting farmers to maximise the production and profitability of their animals. In developed countries increasing social affluence has allowed expenditure on companion animals to the point where the majority of contemporary veterinarians work almost entirely with these species. Social attitudes towards animal welfare have similarly developed and are reflected in the evolving attitudes of veterinarians, assisted by the marked feminisation in the last decade of a previously male-dominated profession. Nevertheless, our surveys of the world's leading national veterinary associations reveal that official veterinary positions lag behind those of the general public on a range of important animal welfare issues, including the close confinement of veal calves in small crates, of laying hens in "battery cages", and of pregnant sows in gestation crates. Formal veterinary education is the factor most responsible for these shortcomings. Although

humane alternatives are being introduced, harmful animal use in surgical and pre-clinical training remains commonplace in veterinary courses world wide, and studies have demonstrated that veterinary students are likely to view animals as being less sentient towards the end of their veterinary education, suggesting a process of desensitisation. Animal welfare, bioethics, critical reasoning and related topics comprise a very small part of most veterinary curricula. The "Concepts in Animal Welfare Syllabus" launched in 2003 by the World Society for the Protection of Animals and the School of Clinical Veterinary Science at the University of Bristol was created to address these shortcomings. It provides training in critical reasoning skills and education about a range of animal welfare issues, including farm and companion animal welfare, wildlife, animals used in experiments, and alternatives, which replace, reduce and refine animal use in research and education.

## Poster

# Invitrotrain: Training courses on alternative test methods for the hazard identification of chemicals

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Freie Universität Berlin, Institute of Pharmacy, Berlin, Germany

The *Invitrotrain* project covers the development, validation and – most importantly – the demonstration of *in vitro* methods for testing of chemicals and prediction of toxicity. In the framework of five training courses established for scientists in the field of toxicology, pharmacology, and chemistry, multiple alternative (non-animal) methods will be educated at the bench and general aspects of the replacement of animal testing by *in vitro* procedures for the identification of hazardous properties of chemicals will be addressed by lectures. Special focus is placed on the performance of scientifically validated *in vitro* methods which are accepted in regulatory toxicology and the statistical evaluation of the test results. The aims of the training courses are to provide the attendees with sufficient experience, so that they may apply

the techniques to their own needs and to disseminate the use of *in vitro* alternative methods.

The training courses will address multiple alternative methods:

- skin corrosivity and phototoxicity
- penetration models
- acute eye toxicity
- reproductive toxicology
- ecotoxicology

The courses will take place biannually (February and July) at the Freie Universität Berlin, Institute of Pharmacy.

The project is sponsored by the European Commission (EFRE 20002006 2/15)



## Poster

# Educating for reduction: Approaches for achieving attitudinal change

*Derek Fry*

UK Home Office, Shrewsbury, Shropshire, UK

Previously the significant reductions that can be obtained by thinking carefully about what a researcher is trying to achieve, and then devising experimental designs to achieve that objective efficiently, have been demonstrated.

This talk will outline some educational strategies that have been used to try and disseminate this message and convince scientists that specifying clear objectives can reduce animal use. It will also discuss how to assess their success.

Educational material has been developed that enables a group of scientists of varying backgrounds to analyse the essential aspects of a research problem. This has been used mainly in group work to improve objective setting through debate, and to enhance the participants' ability to plan a programme of work.

This leads on to consideration of different types of experimental design with a facilitator knowledgeable in this field, and discussion of the most efficient in each circumstance.

Another approach suitable for larger groupings is to give opportunity for the groups to study flawed designs and to provide comments that a publication referee might make on the designs, then in a plenary session give guidance on how the designs could be improved to give better use of animals.

Some skills in reduction by good design may be imparted by these sessions but the main aim (apparently achieved) is to foster a willingness to explore the possibilities for more efficient animal use.

## Poster

# Education for reduction: Editors and referees

*Derek Fry*

UK Home Office, Shrewsbury, Shropshire, UK

In discussion of reduction through good research strategy ECVAM Workshop 29 (*ATLA* 26, 283, 1998) looked at an approach which began with specifying the experimental questions, then making testable hypotheses from these, and distinguished confirmatory experiments which tested hypotheses from exploratory ones which could produce data on which a hypothesis might be constructed. This approach could offer a way of evaluating published work for efficiency in animal use and for referees and editors to comment on scope there may have been for reduction in the experiments presented for publication. However the usual layout of a biomedical paper does not lend

itself to assessment along these lines. In a random selection of papers from quality journals, the experimental question was unclear in over half the experiments reported making it difficult for the reader to criticise the efficiency of the design used, and there were many flaws in analysis or presentation that had escaped editor and referee scrutiny.

This talk will consider how to persuade editors and referees that reduction is worth pursuing and that they could help promote reduced animal use by insisting on presentation in a way that allowed a proper evaluation of the efficiency of the experimental approach used.



## Lecture

# Mainstreaming user-friendly curricula on alternatives for research scientists

*Lynette Hart, Mary Wood and Hsin-Yi Weng*

University of California, UC Center for Animal Alternatives, School of Veterinary Medicine, Davis, USA

Alternatives have the potential to arouse interest and involvement when they are presented within the audience's context of research interests. Targeted presentations designed and presented for specific courses, workshops, or symposia complement other information and profile the practical value of bibliographic searching techniques for accessing information on alternatives. Courses at UC Davis where we routinely offer presentations include: for veterinary students, Mouse Behaviour and Biology (website: [http://www.vetmed.ucdavis.edu/Animal\\_Alternatives/phr408-Mice.html](http://www.vetmed.ucdavis.edu/Animal_Alternatives/phr408-Mice.html)); for graduate students, The Mouse as an Experimental Model for Human and Animal Diseases; for undergraduates, Introductory Companion Animal Biology; and, for junior medical and veterinary faculty, Mentored Clinical Research Training Program. We offer workshops each year for veterinary laboratory animal residents from the California National Primate Research Center and the Center

for Laboratory Animal Science. Workshops also are delivered on a tutorial, hands-on basis for visiting veterinarians and librarians, including USDA Animal and Plant Health Inspection Service Preceptor Veterinary Fellows each year. These small groups are instructed on-site. For symposia on emerging techniques, we developed presentations on new methods of imaging (website: [http://www.vetmed.ucdavis.edu/Animal\\_Alternatives/imaging.html](http://www.vetmed.ucdavis.edu/Animal_Alternatives/imaging.html)) and cell culture and explants (website: [http://www.vetmed.ucdavis.edu/Animal\\_Alternatives/cell.htm](http://www.vetmed.ucdavis.edu/Animal_Alternatives/cell.htm)). Each presentation is targeted to the particular users and their current topics of attention. Special web pages are prepared and configured that users can access. This method of instruction offers support to users in efficient searching within their context of the course material or work setting, such that the alternatives curricula supplement their needs.

## Poster

# Focus on alternatives: Recent initiatives in the UK, working together to replace animal experiments

*Michelle Hudson<sup>1</sup>, Jan Creamer<sup>2</sup>, Jane McAllister<sup>3</sup>, Gill Langley<sup>4</sup>, Carol Newman<sup>4</sup>, Barry Phillips<sup>5</sup>, Lynda Korimboccus<sup>6</sup> and Shaun Kingston<sup>7</sup>*

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Focus on Alternatives brings together representatives from British non-profit organisations which fund the development, or promote the acceptance, of methods that replace the use of laboratory animals in research, education and testing. Organisations currently represented on FoA include Dr Hadwen Trust, FRAME (Fund for the Replacement of Animals in Medical Experiments), The Humane Research Trust, Lord Dowding Fund, RSPCA, St Andrew Animal Fund and UK Human Tissue Bank (UKHTB).

The strategy taken by FoA is to work by lobbying, facilitating access to information, educating animal users, and by organising workshops and meetings on specific topics of concern.

Current initiatives include:

1. Human Volunteers for Research Testing
2. Serum-Free Media for Cell Culture
3. Donation of Human Tissue for Research
4. A Workshop on Septic Shock Research

The aim of these initiatives and their current status will be reported.



## Poster

# Rat uterus *in vivo* as an alternative to adult bovine female for the study of pathogenesis of immunological infertility

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**Introduction:** Pathogenesis of immunological infertility in bovines can most appropriately be studied in a bovine female. High procurement and management costs are limiting factors. Thus, suitability of rat to act as a “biological incubator” representing a “simulated repeat breeder cow” harbouring high titres of antisperm antibodies was considered.

**Methods:** Bovine sperm xeno-immunised rats (n=6) were challenged by intrauterine infusion of bovine sperm. Sperm motility, viability, acrosomal integrity in the uterine flushings and tissue reaction were studied in these rats against non-immunised controls (n=6) at 15 and 30 min of incubation.

**Results and Discussion:** In the xeno-immunised rats, sperm motility, viable sperm percentage and sperms with intact acrosomes reduced dramatically. Vigorous phagocytic activity and spermophagy was also evident compared to non-immunised

controls. Macroscopically, xeno-immunised uterine horns showed congestion, turgidity and increased oedema compared to no appreciable changes in the non-immunised rats. Histopathologically, Arthus reaction was observed in the immunised rats evidenced by congestion and degenerative changes in blood vessels with thickening of vascular wall and fibrinoid necrosis whereas, non-immunised rats, showed only occasional erythrocyte clumping and vascular oedema. Thus, a model of the pathogenesis of immunological infertility with respect to events like immobilisation of the sperm, inhibition of sperm migration through the female genital tract, and possibly, inactivation of acrosomal enzymes presumed essential for fertilisation, and inhibition of sperm attachment to and penetration of ova, could be explained.

## Poster

# Norwegian veterinary training based on animal alternatives

Siri Martinsen<sup>1</sup> and Adrian Smith<sup>2</sup>

<sup>1</sup>NOAH for Animal Rights, Oslo, Norway; <sup>2</sup>Norwegian School of Veterinary Science, Laboratory Animal Unit, Oslo, Norway

This presentation describes the steps taken by a Norwegian veterinary student to complete her veterinary education using alternatives to laboratory animals. This included the use of computer simulations, student self-experiments in physiology, dissections on superfluous material from the pathology department and naturally dead animals, and surgical training through beneficial procedures in veterinary clinics.

The presentation will also discuss the various ethical issues involved and the range of attitudes that students, teachers and veterinary schools in general must tackle when planning clinical teaching and training that may involve animals or animal material. The merits of providing courses without animal material for

conscientious objectors, or alternatively phasing out animal use for an entire student class regardless of individual views, will be discussed.

Possible alternatives to laboratory animal use, and beneficial or neutral work with animals, will be described, building upon the authors experiences with databases such as NORINA (<http://oslovet.veths.no>) and organisations such as InterNICHE (<http://www.interniche.org>).

The Veterinary School in Oslo has a standing committee on the use of animals in teaching. The work of this committee will also be described.



## Poster

# Mouse passports to refinement

David Morton<sup>1</sup> and Karen Helliwell<sup>2</sup>

<sup>1</sup>Birmingham, UK; <sup>2</sup>University of Birmingham, BMSU, Birmingham, UK

With the rapid increase of transgenic mice, there has come an increase in their exchange between laboratories. In one sense this welfare concern is no different from the welfare of any mouse no matter whether or how it has been modified, e.g. by genetic engineering, or natural or artificial mutation processes. This movement of animals has meant that receiving laboratories are very likely to be inexperienced in looking after a particular “strain”, its performance and its phenotype. We started to develop mouse “passports” in 1998 so that receiving laboratories could be provided with some form of benchmarking in order to help them make better welfare assessments of the animals. These passports built on our existing “score sheets” we normally use for animals undergoing experiments that are based on clinical

signs that an animal may show. However, these sheets go further than that inasmuch as they provide photographs and videos (when useful) of the phenotype and also any abnormal post-mortem changes. They record factors such as a description of the strain its origin, and benchmarking of its reproductive performance. They record any defect, its incidence, prevalence, age of occurrence, any treatment or alleviation or strategies to avoid or ameliorate. The details are for scientific staff but more importantly for the animal care staff who need to know what to expect in terms of clinical signs, performance, when to expect it, the number of animals likely to be affected, what to do about it, how to prevent it, and so on.

## Poster

# Enhancing humane science: Improving animal welfare

James R. Owiny and Alan Goldberg

Johns Hopkins University, Comparative Medicine, Baltimore, USA

In the spirit of the Three Rs we developed a web based self paced course that will provide the tools to practice the most humane science. The course demonstrates that humane science is the best science, and raises the question – “if one is not practicing humane science, is their research compromised?” This course, available at <http://caat.jhsph.edu>, comprising 12 lectures, each about 30 minutes long will change the way the most fundamental aspects of animal-based research are practiced. The lectures are supported by discussions of the content with faculty. Some examples of what course participants learn include: Using the wrong experimental design wastes resources, time and animal lives; humane endpoints allow achievement of experimental endpoints while minimising or eliminating pain, distress and discomfort to animals; non invasive technologies minimise ani-

mal pain and distress and allow collection of high quality data from fewer animals; and enrichment addresses the question when is enrichment not appropriate? The course is designed to enhance ones research contributions and help identify replacement alternatives when possible, or allow implementation of reduction and/or refinement alternatives when replacement is not possible. Thus, the course encourages the practice of the most humane science. We envision that the course will help internalise the Three Rs and the ethic of preventing harm as guiding principles in the conduct of animal-based studies. Further, it will demonstrate that taking appropriate care of research animals is both a benefit to the broader public attitudes towards animal research and to individual scientific aims.



## Poster

# New strategies for experimental zoology

*Santi G. Pal*

Dept. of Zoology, University of Calcutta, India

For years many designs of experimental zoology were utilised to record and to repeat observational data, using many different forms of small-sized invertebrate organisms. Often the latter were processed or treated in a destructive manner.

There is evidence to suggest that many different kinds of experiments have resorted to using invertebrate organisms which carry the eggs, eggmass or young offspring in their abdomens. For instance, isopod land crustaceans carry their young in their marsupium. These life stages require careful manipulation during the execution of a detailed and rigorous destructive experiment, particularly when soil pollution is involved soil pollution. There are similar other examples, in which insects or molluscs undergoing vitellogenesis or in a state of mating and copulation are treated with chemicals, hormones or other interferences. Such operations should be ratio-

nalised and unnecessary handicaps on the insects or molluscs should be avoided as far as practicable. Smaller invertebrates are exceedingly important models for studies in genetics, cell biology, developmental biology, neurobiology, ethnology and other new emerging areas. The former would likely provide enormous data to such segments of science if experimentators seriously adhered to the principles of welfare and wellbeing of such important and key organisms.

Conceptually, each biological species represents an icon of evolutionary adaptation against an environmental pattern. This includes insults from nature as well as from human interference. Now, finally, more prudence should be exercised while planning zoological experiments for the collection of data for a variety of disciplines. The state of the art needs pruning and dissection.

## Lecture

# Animals and alternatives in biomedical education in Baltics

*Osvaldas Ruksenas*

Vilnius University, Biochemistry-Biophysics, Vilnius, Lithuania

Scientific environment in all three Baltic countries – Estonia, Latvia and Lithuania – during post-soviet period is comparable therefore review of situation with use of alternatives in biomedical education is based on data from Lithuania.

Use of animals for various biomedical purposes has decreased substantially during the last decade in Lithuania – from 21,000 animals in 1996 to 8,000 in 2004 in total and from 7,000 to 1,400 for teaching particularly. There are several reasons for this decrease: I) Introduction of legislation regulating use and care on laboratory animals; II) demand from students for the use of alternatives in teaching; III) increasing number of available

alternative methods and equipment; IV) increasing economy enabling purchase of alternative teaching materials. However, there are some factors limiting more rapid increase in the use of alternatives in education – most of them are relatively expensive, in many institutions of higher education there is lack of computers and modern audio/video equipment necessary for implementation of alternatives, relatively large number of students still have difficulties with foreign languages and this restricts their access to materials in these languages. One of the most attractive and acceptable alternatives to the use of animals is self-experimentation.



## Poster

# Reporting animal experiments in the scientific literature

*Adrian Smith*

Norwegian School of Veterinary Science, Laboratory Animal Unit, Oslo, Norway

Scientific papers are published in a wide range of journals that do not necessarily focus primarily on the Three Rs. The purpose of publishing is not only to report scientific results, but also to enable others to evaluate both the scientific and ethical validity of the work conducted. Advances within the Three Rs made during the course of research should be easily detectable for those searching the scientific literature. This imposes clear responsibilities on authors and journals alike, since they are often operating under pressures of time and space. These pressures must not, however, prejudice the dissemination of new knowledge

within the Three Rs which other research groups expect to find when using the scientific literature to plan their own experiments. This presentation describes ways to promote the spread of advances within the Three Rs, highlights the pitfalls to avoid when publishing, gives links to guidelines that may be of help when writing scientific papers, and illustrates using specific examples how animal experiments have in fact been reported in recent years. A comparison between papers reporting experiments on traditional mammalian species and those using fish species will also be presented.

## Poster

# Animal alternative-based curricula for youth: Research and applications

*Martin Smith*

University of California, Veterinary Medicine Extension, Davis, USA

Educational experiences with pets and wildlife can facilitate the development of positive attitudes toward animals, as well as help children learn about themselves and their place in the world. Unfortunately, the use of live animals in schools is unregulated and lacks standardised guidelines; in non-formal education programs such as 4-H, oversight policies for live animal projects are highly variable and difficult to enforce. Furthermore, logistical, ethical, and economic restrictions limit opportunities for many youth to interact with live animals. Therefore, educational interventions that utilise alternatives to live animals present an important resource for educators in schools and community-based programs. This paper presents innovative, research-based interventions that utilise alternative approaches to teaching elementary school-aged children about animals. One curriculum, Animal Ambassadors, uses no live ani-

mals in its instruction; hands-on materials, including rubber foot molds, plaster tooth casts, and imitation animal coats are organised into learning kits that accompany printed materials. Animal Ambassadors supports state and national science standards and is applicable for schools and community-based programs. Data will be presented that demonstrate the positive effect of the Animal Ambassadors curriculum on children's knowledge of, and attitudes toward animals, as well as on science process skills. Other interventions to be discussed include Animal Science curricula for common agricultural species (sheep, swine and rabbits) that have been designed to be effective with or without the accompanying use of live animals. These curricula also support state and national science standards and were designed principally for use by 4-H Youth Development Programs.



## Lecture

# Education system in Japanese research laboratories for animal experimentation in a global pharmaceutical company

*Makoto Suzuki*

Comparative Medicine and Biology Support, Pfizer Nagoya Laboratories, WWSS, Chita-gun, Aichi, Japan

Research laboratories of pharmaceutical companies have their original education systems for the researchers involved in animal experimentation as a global base. Depending on relevant laws and/or regulations, there are some inconsistencies or variations in each system among countries. We, Pfizer have several laboratories in the USA, UK, France, Belgium and Japan, which would lead to enable continuous exposure to the cutting edge sciences in the world. On the other hand, this causes some complexities in terms of unifying a scientific/technical education system for animal experimentations under the different situation in each country. In the case of Japan, there is the law/regulation concerning animal welfare and protection, which focused the care and use of laboratory animals from the scientific and humanitarian standpoints. Since it is not clearly presented about

the practical implementation in the Japanese regulation, it is difficult to clearly make an interpretation and to practically indicate what kind of education system should be set up in each animal experimentation facility. Therefore, many laboratories in Japan including our Pfizer Nagoya laboratories have been investigating the appropriate system based on the self-imposed restraint manner complying with the governmental guidance/notification. The creation of an "Institutional Animal Care and Use Committee", which mainly takes charge of education, would be the first approach in each facility, and it would come to the surface as an ideal model in time. This presentation refers to our present education system and future plan of Japanese laboratories as a global company, reviewing the difference of Japan's laws/regulations.

## Poster

# An international course on alternatives to animal use

*Marc Teunis<sup>1</sup>, Henny De Vos Burchart-Lodewijks<sup>1</sup>, Jan Van Laake<sup>1</sup> and Coenraad Hendriksen<sup>2</sup>*

<sup>1</sup>Utrecht University of Professional Education, Institute of Life Sciences and Chemistry, Utrecht, The Netherlands;

<sup>2</sup>The Netherlands Centre for Alternatives to Animal Use, Faculty of Veterinary Medicine, Utrecht, The Netherlands

With the intensifying demand for suitable replacements for animal experiments in the laboratory, the need for qualified technical and scientific personnel is steadily growing. Furthermore, it will become increasingly important to have specialised technicians to develop better and simpler models than animals for addressing fundamental scientific questions. In order to address this need we are developing a course on alternatives to animal use in life sciences research. EU and USA students engaged in bachelor-level education in life sciences can participate in this course.

The up to date program of this 6 month course includes many aspects of reduction, replacement and refinement. During the course, students will get acquainted with theoretical and practical aspects of physiology of the laboratory animal and with various Three Rs research areas such as: Risk assessment in

toxicology and vaccine testing; humane endpoints; telemetry; databases, bioinformatics and computer modeling; animal welfare and housing; law issues; validation; genomics and proteomics; surgery and the use of models and simulators; cell culture models, and alternatives in education.

One important feature of the course will be the project Mission Alternative. Throughout the course participants will work together with institutions or industry to solve an existing problem or answer a scientific question, regarding alternatives to animal use. Currently, we are attracting lecturers from abroad to enhance the international character of the course. To facilitate participation for international students this course will be developed in close collaboration with the international office of our university and foreign contacts.



## Lecture

# Educating scientists on alternatives: A continuous process

*Jan van der Valk*

Netherlands Centre for Alternatives to Animal Use, Dept. A. S. & S, Fac. Vet. Med., Utrecht University, Utrecht, The Netherlands

Already from the start of their study in one of the biomedical sciences should students become aware of the fact that animal experimentation is no more a matter of such and that in several instances Three Rs models can and should be used. During laboratory classes, whenever possible, animal free teaching models should be considered and used. Also, when it is regarded essential to have the students work with experimental animals, they should be aware of the consequences and the concerns of the society.

By Dutch law, every scientist designing animal experiments should be qualified. The Laboratory Animal Science course, where replacement, reduction and refinement (Three Rs) are the main themes, offers this qualification.

During the scientist's career there should be continuous pressure to consider the Three Rs when animal experiments are

planned. The most important one is the animal ethics committee requesting that Three Rs models have been considered before an animal experiments proposal is approved. This requirement and subsequent verification of an expert on alternatives ensures that scientists are (made) aware of possible Three Rs models in their field of interest.

Several journals now require a statement that the Three Rs have been considered and applied before a manuscript discussing animal experiments is accepted. Furthermore, several scientific organisations focus on the development, acceptance and information exchange of Three Rs models.

Education on Three Rs models should not be a one-time event, but a continuous process that makes scientists also aware of new developments that can be applied to replace, reduce and refine animal experimentation.

## Lecture

# The use of animals in research, testing and teaching in New Zealand – a legal perspective

*Neil Wells*

Unitec New Zealand, School of Natural Sciences, Auckland, New Zealand

Part 6 of the Animal Welfare Act 1999 (New Zealand) provides that a person may only use an animal for the purposes of research, testing or teaching if the person is a code holder or is authorised by a code holder through an animal ethics committee.

Legal provisions such as the Animal Welfare Act are not intended to be, nor should they be used as, an insurance policy. The concept of submitting animal use protocols through an animal ethics committee "just in case" is an abuse of legal process and involves both the applicant and the animal ethics committee in misuse of time and expense.

Part 6 of the Animal Welfare Act 1999 embodies the legal provisions of the 1984 amendment to the Animals Protection Act 1984 and practices that developed until 1998. Where Part 6 of the Act does not apply to a particular animal use Part 1 will apply. This paper focuses on determining which part of the Act applies to specific animal use in research, testing and teaching and provides a guide to determining when low level (in terms of suffering) use of animals in research, testing or teaching must or may not require animal ethics committee approval.

**Poster****A survey of U.S. veterinary schools for alternatives to the use of live animals in teaching***Robert A. Willems and Diane Biederman*

United States Department of Agriculture, Animal Care, Raleigh, North Carolina, USA

The purpose of this study is to survey the veterinary schools in the United States to determine how those schools are currently using live animals for teaching their students. Veterinary schools in the U.S. are registered as research facilities with the United States Department of Agriculture (USDA) as required by the federal Animal Welfare Act (AWA). Federal rules promulgated under the AWA require the schools to consider alternatives to painful procedures on animals used in teaching, employing the principle of the “Three Rs” of Russell and Burch (replacement, reduction and refinement). The surveys for this study were conducted by USDA veterinarians responsible for inspecting those schools for compliance with the AWA in their use of ani-

mals. The surveys cover the 5 year period from 2000 to 2004. Using data from the surveys, this study will attempt to determine how U.S. veterinary schools have replaced the use of live animals with alternatives in the various courses in their veterinary curricula. The study will show the types of veterinary courses in which live animals are being used for teaching, the teaching procedures in which these animals are used, the number and species of animals being used, and what alternatives to the use of live animals the veterinary schools in the U.S. have employed over the past 5 years. The study will also attempt to identify current trends in the use of live animals for teaching veterinary students.