

# Farm Animal & Veterinary Public Health

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Research & Postgraduate  
Annual Report

FACULTY OF  
VETERINARY SCIENCE

2006 – 2010



THE UNIVERSITY OF  
SYDNEY

## **FACULTY REPORT**

### **FARM ANIMAL and VETERINARY PUBLIC HEALTH**

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#### **Introduction**

We would like to present this annual report on research and post graduate activity in Farm Animal and Veterinary Public Health on behalf of the Faculty of Veterinary Science, and commend the commitment and activity of the large group of people who have contributed so much during the period 2006 - 2010.

Farm Animal and Veterinary Public Health encompasses both teaching and research for animal, community and industrial benefit. The undergraduate teaching outcomes are to be covered in a separate report from the Learning and Teaching Committee, and this report focuses on the achievements in research, post graduate coursework and post graduate research. It covers a full five years, and our intention is to use this form of reporting so that interested people and prospective students gain a meaningful view of our activities over a reasonable time frame.

Academics and support staff in Farm Animal and Veterinary Public Health provide service to the community across many species, industries and disciplines. We work extensively with collaborators from other institutions, including governments, industry groups and the private sector. We have significant commitments to regional animal health that require us to work through much of Australia and in many overseas countries. We have developed a broad network of contacts in government, industry, academia and business and we strive to ensure that our work is relevant to current and future community needs.

In this report we provide a brief biography for each member of academic staff, and a project outline for each of their research projects. Many staff are funded through external competitive research grants, illustrating the calibre of the projects. We place very high value on our post graduate students as they will be future leaders; a summary of each of their projects is also included. Overall there have been many important discoveries documented in scientific publications and conference proceedings from our work and these are listed in the report.

Our work in the Farm Animal and Veterinary Public Health group includes the disciplines of veterinary medicine, epidemiology, state veterinary medicine, infectious diseases, pathology, public health, food security, animal welfare and disease control and eradication management. Our work supports both the traditional and emerging farm animal industries with expansion of our studies on extensively raised sheep, cattle, buffalo and other ruminants, to the intensive industries of pigs, chickens and aquatic animals. This broad coverage has required the Faculty to make significant investments in staff. The commitment of our group to the production animal industries will ensure our graduates continue to have a key leadership role as animal health, production and welfare professionals. Our staff have the multitude of skills needed to support and strengthen Australia's livestock industries by addressing global problems including food security, disease control, public health and animal welfare concerns in our region.

The Faculty has identified an expanding range of opportunities available for veterinary graduates of the 21<sup>st</sup> century. It has moved strategically to rebuild its core teaching and research expertise and received strong industry support for this. The growth of the research portfolio to include livestock welfare work and international projects has increased our capacity for providing research solutions for the long-term viability and sustainability of the farm animal sector and the protection of public health.

A selection of our significant achievements is outlined here and more details can be found in other sections of the report.

#### **Community Service and Outreach**

The FAVPH group provides advice to animal health agencies. For example, we have undertaken consultancies addressing: arbovirus surveillance needs and the National Arbovirus Monitoring

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Program; the technical merits of introducing mandatory recording for sheep and goat movements; National accreditation of laboratory diagnostic tests, disease spread minimisation in access to farmland for national infrastructure engineering works; risks of disease spread in creation of public water storages; and, risk-based disease surveillance for the United Nation's Food & Agriculture Organisation. Advice and support is also provided to industry organisations including; Meat and Livestock Australia, Dairy Australia, Australian Wool Innovation and Animal Health Australia, including service on industry scientific consultative committees. We also advise governments including the Commonwealth Department of Agriculture, Fisheries and Forestry, the NSW Department of Industry & Investment and the NSW Livestock Health and Pest Authorities and work with veterinary pharmaceutical companies where appropriate to assist research that may lead to product development or evaluate the performance of products such as vaccines that are used in disease control.

### **Regional International Projects**

The FAVPH group has been very successful in obtaining ACIAR (Australian Centre for International Agricultural Research) funding to conduct research projects to inform the development of the livestock and fisheries industries and assist opportunities to address rural poverty in our region. Major projects in cattle and buffalo health and production are current in Laos and Cambodia (pictured below right) and our staff are also involved in projects in livestock in Indonesia, China and Pakistan. Our aquatic focus remains in Indonesia, with diversified projects across the island nation (pictured below left).



### **Livestock Welfare**

In response to the mulesing crisis that divided the sheep industry, in 2007 we obtained ARC Linkage funds to develop practical solutions for delivery of topical anaesthesia and analgesia for improved animal welfare during routine husbandry procedures involving surgery. This approach has been widely adopted for mulesing with an estimated 5 million lambs receiving pain management annually and our research is evaluating its application in other procedures including castration, tail docking, dehorning and ear knotting.

### **Training Programs**

Our group has developed a collaborative training programme in Epidemiology and Public Health. Short course training opportunities have been presented at the Camden Campus on disease mapping, logistic regression models for animal diseases, import risk analysis, application of Bayesian methods in animal health and most recently in network analysis. Besides our own Faculty, instructors also came from the United Kingdom, United States and New Zealand. In total, over 30 participants from Federal and State Government agencies, universities and private consultancy received training in 2010.

Intensive training has also been provided by short-term programs of study. In October/November 2008, FAVPH hosted three veterinarians from the Government of Bangladesh for training in epidemiology methods, funded by the United Nations Food and Agriculture Organisation's avian influenza response strategy. On-site training in animal health has also been delivered recently at locations in Laos, Cambodia, Indonesia and Chile. In June 2009, a group of 14 Indonesian veterinarians received training in disease mapping and surveillance as part of an Australian Leadership Award Fellowships program, funded by AusAID (training group pictured →).



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In 2008 we received Crawford funding to conduct a series of 7 training modules in 2008 through 2010 on large ruminant health and production for local livestock officers involved in a major livestock development project aimed at alleviation of rural poverty in northern Laos. Similar training has also been provided in livestock projects in Cambodia, China and Pakistan. We also obtained AusAID funds to support leadership training for out in-country project leaders in Indonesia, Laos and Cambodia.

In 2009 and 2010 we commenced a series of training programs in pathology and disease investigation for field veterinarians with the NSW Department of Industry and Investment and the NSW Livestock Health and Pest Authorities (formerly the Rural Lands Protection Boards). This initiative is a collaboration with Charles Sturt University and aims to improve the capacities of the new recruits to this important component of our animal disease surveillance system. The



The training has proven to be very successful and (2010 participants pictured) and with support from the NSW Department of Industry and Investment will continue in 2011.

### **Veterinary Public Health Management Post Graduate Program**

The Veterinary Public Health Management program was conceived in 2002, planned and developed to meet the needs of post graduate students, employers and the community. By 2007 there were 63 postgraduate students in the new program. This program is designed to equip animal health professionals with technical and other skills to become leaders and support the livestock sector. Leadership and project management are key components of the program. The program also covers epidemiology, food safety, risk analysis, surveillance, hazards to human and animal health, wildlife epidemiology and much more. International students enrich the program and extend the network of animal health professionals for the benefit of our industries. A unique feature of the program is its on-line classroom that enables students from remote areas to participate, and short residential workshops ensure that an academic community is established and students participate in a traditional face-to-face environment for key units of study in leadership and project management. Feedback from both students and employers has been very encouraging, and we are confident that the community is receiving long term benefits from the program. The program won a prestigious national education award in 2006. In 2010, the program was reviewed by an expert in veterinary public health from the University of Minnesota. There have been 47 graduates of the Program since 2005.

### **Investment in infrastructure**

The University of Sydney has made a strategic investment in infectious diseases laboratories at Camden to accommodate the growing research portfolio in Farm Animal and Veterinary Public Health together with researchers in technologies that underpin animal health and production. State of the art laboratories, including immunology and molecular biology facilities were supplemented by further investments in new PC2 laboratories in 2007. Technology available includes flow cytometry, mass spectrometry and other proteomics technologies, quantitative real time PCR, laser capture microdissection, and fluorescence microscopy.



### **Major research program in Johne's Disease**

In the most concerted effort yet to come to grips with a complex and frustrating disease, the Faculty has joined with Meat and Livestock Australia (MLA) to undertake intensive research into Johne's Disease (JD), a devastating and ultimately fatal disease of ruminants already entrenched in south eastern Australia. MLA provided a large grant to support research focused on the early diagnosis of infection

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in sheep. This was extended in 2007 and will also now address bovine Johne's disease. This complemented other grants to enable a comprehensive on-farm and laboratory-based research program. As this is such a complex and difficult disease, quarantine restrictions have failed to halt its spread, industry has been polarised in its views on control options and the newly released vaccine does not fully prevent infection in sheep.



The lack of basic knowledge about the disease is hindering the design of improved tests, treatment and vaccines. The MLA grant has enabled a team of four leading post doctoral scientists and additional research students to be established to study the basics of Johne's infection. The latest genomics and proteomics technology were applied to the problem, and over three years discoveries were made leading to new tests capable of detecting the infection much sooner; three patents are pending on new technologies as well. In addition, our group has a number of projects evaluating disease control options for OJD and in particular, establishing the efficacy of

Gudair® vaccine. Introduction of the vaccine in 2002 has had a major impact on reducing mortality from the disease. However our current research has identified that the disease persists in a majority of infected flocks, particularly where unvaccinated sheep exist, with important disease control policy implications.

### **Aquatic Animal Health**

Leadership in teaching and research in aquatic animal health is a key program in the Faculty with a vertically integrated program of study in the BVSc curriculum and a 6 cp unit in the BAnVetBioSc degree. This provides the background and motivation for students to continue in higher degree research pathways. Aquatic animal epidemiology is included as a unit of study in the Veterinary Public Health Management post graduate program and aquatic disease research was made available for the first time in 2004 to students in the BSc(vet) program, a one year full-time research stream within the BVSc curriculum. The Faculty is well-connected to the aquatic animal industries through national and international research projects, participation in the National Subcommittee on Aquatic



Animal Health which advises the federal government and the Fisheries Research and Development Corporation Scientific Advisory Committee. New research projects funded by Fisheries Research and Development Corporation and ACIAR commenced in 2009 and cover topics as diverse as pre-border surveillance for viruses in ornamental fish to diversification of smallholder aquaculture in Indonesia.

### **International reference laboratories for OIE**

The Faculty has an internationally-recognised role in epidemiology and diagnosis of the notifiable viral disease of finfish, epizootic haematopoietic necrosis virus. The Faculty and the Australian Animal Health Laboratory host the World Organisation for Animal Health (Office International des Epizooties, OIE) Reference Laboratory for EHN. This Laboratory provides research and a diagnostic referral service to the Australian industry, and ensures international diagnostic capabilities by providing technical advice, protocols and immunological and molecular biological reagents to laboratories worldwide. This supports international trade in aquatic animal products. Diseases such as EHN present real challenges to both commercial fisheries and to the management of ecosystems worldwide. In 2009 we were asked to lead a second international reference laboratory for ranavirus. This group of pathogens is one of the causes of global amphibian declines. This reference laboratory will underpin conservation efforts for amphibians.

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### **University of Sydney Biosecurity Group and Centre for Emerging Infectious Diseases**

We commenced a new alliance in 2004 to address public health issues from both veterinary and human disciplines. An Interdisciplinary Network in Public Health grew out of the realisation that the Faculty of Veterinary Science and the School of Public Health in the Faculty of Medicine needed to build linkages, especially in the area of emerging infectious diseases. This idea extended to the creation of the University of Sydney Biosecurity Program in 2008, with funding support from the Vice Chancellor. In 2009, the concept was extended to a University institute to focus on emerging infectious diseases. On May 19, 2010 the Sydney Institute for Emerging Infections and Biosecurity (SEIB) was officially launched by the Deputy Premier and Minister for Health Carmel Tebbutt. The Institute brings together a wide range of expertise in public health from associated faculties and groups, ranging from the biological sciences including medicine, veterinary science, nursing and midwifery, science and pharmacy to the social sciences including arts, communications, political science, ethics and law. The breadth of groups involved is a novel component of the new Institute, so is its capacity to contribute across all levels of the public health spectrum. The Centre is broadly dedicated to research, education and capacity building, and advocacy and the provision of expert advice on infectious diseases, with a particular focus on the Asia-Pacific region. The Faculty of Veterinary Science is a key contributor to the SEIB.

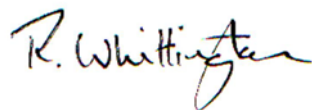
### **Capacity building in animal disease diagnosis**

Australia faces an imminent shortage of expertise in animal health. In one project we found that 70% of experts in aquatic animal health in Australia are aged more than 50 years. There is a similar situation in terrestrial animal pathology. Furthermore, there is a shortage of people who can train the next generation. The Faculty of Veterinary Science is making an important contribution by establishing this strong program in Farm Animal and Veterinary Public Health to build scientific capacity. In addition, we are assisting Animal Health Australia by providing leadership through the National Animal Health Laboratory Strategy to develop a national training program in animal disease diagnosis. By the end of 2007 there was a commitment from all seven veterinary schools in Australia to form a consortium to meet this training need. The Australian Consortium for Animal Disease Diagnosis (ACADD) is now seeking Commonwealth funding to commence its activities.

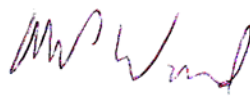
### **Rural and regional communities**

The benefits of the research and post graduate activity covered in this five year report will accrue directly to rural communities and the wider community. The statistics on agricultural production are impressive: 17% of working Australians are employed directly and indirectly in farming, 50% of these in capital cities; farming contributes 12% of gross domestic product (\$72 billion), 24% of goods and services exports (\$26 billion), utilises 60% of the Australian landmass, and there have been productivity increases of 3 to 4% annually for 20 years.

We welcome feedback on any aspects of our program in Farm Animal and Veterinary Public Health.



Professor Richard Whittington  
Chair Farm Animal Health



Professor Michael Ward  
Chair Veterinary Public Health  
& Food Safety



Professor Peter Windsor  
Chair Livestock Health  
& Production

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