SENTINEL

AUSTRALIAN BIOSECURITY CRC FOR EMERGING INFECTIOUS DISEASE

MARCH 2010

MARCH 2010

AUTUMN EDITION

Click on the articles to be taken directly to that page

CEO REPORT

Dr Stephen Prowse, CEO

Global Biosecurity 2010

Many of you will have attended the recent Global Biosecurity 2010 conference held in Brisbane, Queensland, 28 February - 3 March. This is the first time that people from the different agricultural biosecurity sectors have formally come together to exchange information and ideas on biosecurity. The 450 delegates at the conference were often quite surprised at what was happening in the other sectors and appreciated the opportunity to interact and exchange ideas with their colleagues.

Some of the highlights of the conference were the presentation from Johann van der Merwe on the Barrow Island Gorgon project and Tony Martin's presentation *Evidence for absence from absence of evidence*. One of my regrets was that I was unable to attend sessions of great interest in the parallel themes. The meeting was organised by the three Cooperative Research Centres (CRCs) which operate in the biosecurity sector; The National Plant Biosecurity CRC (NPBCRC), the Invasive Animals CRC and the Australian Biosecurity CRC for Emerging Infectious Diseases (AB-CRC). I would like to make a special mention of Kate Scott from the NPBCRC for her untiring efforts in making the conference happen. Most delegates agreed that while each sector does have unique needs and requirements, the common elements warrant research workers and practitioners from the various sectors coming together periodically.

Closing the AB-CRC

This will be the last edition of *Sentinel* so I feel there is value in informing readers of the progress in closing the AB-CRC. We are slowly but steadily closing our operations, with the expectation that most activities will have ceased or been transferred by May. We are in the process of producing a book that captures the major outcomes of the AB-CRC and which I hope will be a useful reference source in the future. Copies of the book will be widely available. Almost all the reports, papers and proceedings produced by the AB-CRC will be provided on a disc that is to be provided with the book. In addition the information will be placed on a static website that will be maintained for five years. AB-CRC information will also be held in the National Archives. In this way we will ensure that the outputs of the AB-CRC will have widespread distribution.

The AB-CRC has been an important part of the emerging infectious diseases scene for the last seven years, and has demonstrated the national benefits flowing from a better coordinated and integrated approach to biosecurity science. I hope that one of the legacies of the AB-CRC is a better understanding of the value of collaborative approaches to biosecurity, and that this will result in the establishment of a structure and process to continue a national collaborative approach to biosecurity science in the national benefit.

NEWS

AB-CRC scientist advises World Organisation for Animal Health

Dr Hume Field, AB-CRC Program Leader for the *Ecology of Emerging Infectious Diseases* research program, and Biosecurity Queensland's Principal Veterinary Epidemiologist, was recently invited by the World Organisation for Animal Health (OIE) to join an expert international working group on rabies and other lyssaviruses.

Hume joined a select panel of experts from around the world at OIE Headquarters in Paris in January to review and revise the *OIE Terrestrial Code and Manual on diagnostic tests and vaccines* for rabies in light of the latest scientific knowledge and concepts.

Minister for Primary Industries, Fisheries and Rural and Regional Queensland, The Hon. Tim Mulherin, said said Hume was a world-renowned expert on emerging infectious diseases related to bats, and was recently awarded the Queensland Primary Industries and Fisheries Australia Day Award.

"Dr Field played a key role in identifying fruit bats as the natural hosts of Hendra virus and has described much of the natural history of Australian bat lyssavirus," said Minister Mulherin. "Part of his current research is to better understand Hendra virus and lyssavirus infections in bats, and identify the factors that cause the viruses to spill from bats to other species." he added.

"The intent of the OIE rabies code is to ensure safe international trade in terrestrial animals and their products, while avoiding unjustified trade barriers," Hume said. "Substantial new knowledge about these viruses in recent years prompted revision of the code."

"We reviewed the recent research developments and made recommendations for changes to the code. The meeting also provided a valuable opportunity to extend international networks in the increasingly important area of infectious disease emergence from wildlife."

A unique set of qualifications has enabled Hume to bring an excellent skill-set to the issue of emerging diseases.

"Having completed a Bachelor of Veterinary Science at the University of Queensland, I went on to study a Master of Environmental Science at Griffith University before completing at PhD in Epidemiology at UQ in 2005," he said.

"Having a veterinary science degree and a Masters in Environmental Science, I had an ability to cross over, if you like, from diseases of livestock to the wildlife world. Wildlife was my passion as a vet student and young vet, and now, not only am I working in an area with wildlife, I'm working in a field of significant public health interest and using epidemiology skills in the process," Hume added. "Disease emergence from wildlife is a complex scenario that requires a big picture 'one-health' approach".

AB-CRC researcher chosen to contribute to Ebola-Reston research in the Philippines

In another example of the AB-CRC using its research outcomes to inform or influence international practices for social, economic and environmental benefit, AB-CRC and Biosecurity Queensland (BQ) scientist Carol De Jong is currently contributing her knowledge to a United Nations (UN) project to investigate Ebola-Reston virus in the Philippines.

The Ebola virus subtype was isolated in 1989 following an outbreak in cynomolgus monkeys (*Macacca fascicularis*) imported from the Philippines and quarantined in a laboratory in

Reston, Virginia, USA. The source of this and subsequent outbreaks was traced to one export facility near Manila in the Philippines, but the mode of contamination at this facility was not determined. More recent evidence of infection in pigs and pig-workers on some farms in the Philippines has re-ignited interest in the origins of the virus.

In Africa, the natural reservoir of Ebola virus and the related Marburg virus remained elusive until recently, when serologic and viral genome evidence indicated that several species of African bats may be involved. Laboratory observation has shown that bats experimentally infected with Ebola do not die, and this has raised speculation that these mammals may play a role in maintaining the virus.

The Philippines project stems from a request made in December by the government of the Philippines to the Food and Agriculture Organization (FAO) of the UN, the OIE, and the World Health Organization (WHO) to send an expert mission to work with human and animal health experts in the Philippines to further investigate Ebola-Reston.

"The project will involve working with a number of groups in the Philippines, including the Bureau of Animal Industry (BAI), and the Protected Areas and Wildlife Bureau (PAWB). Other team members will include colleagues from AB-CRC international associate The Consortium for Conservation Medicine and Wildlife Trust, as well as the FAO's International Wildlife Coordinator Dr Scott Neuman and other FAO personnel," said Carol.

"We will be sampling bat species in the Philippines to identify their possible role as a reservoir of Ebola-Reston. A key component of the project will be providing a training role for BAI/PAWB staff, which includes us developing a training manual, as well as providing practical instruction in the field and laboratory," she added.

Carol came to be involved in the project as a result of her role in research into a range of emerging diseases in bats conducted by the BQ Emerging Diseases Research Group led by Dr Hume Field.

"Carol has field and lab experience that will be invaluable in building bat emerging infectious disease surveillance capacity in the Philippines through the proposed workshops and fieldwork," said Hume.

Carol is currently developing the training manual which focuses on the following areas of bat research:

- History of henipaviruses, Ebola and rabies
- The interface between human health, livestock, wildlife and environmental elements and diseases transmitted by bats
- Bat taxonomy, basic biology including their ecological role and functions
- Bat capture techniques (including proper personal protective equipment)
- Bat handling and sampling techniques
- Proper methods for maintaining cold chain for samples
- Diagnostics and interpretation of results for henipaviruses, Ebola and rabies viruses
- Developing communication messages about bats and diseases to accommodate interests of Ministries of Agriculture, Environment and Health.

"Fieldwork can be physically and mentally demanding. Carol has not only the expertise, but the dedication and passion to complete the task at hand and still maintain a sense of humour. The skills she will contribute to this project include organisation and logistics, capturing, identifying and sampling bats, as well as a range of laboratory skills," said Hume. "From a personal development perspective, the project offers Carol the opportunity to participate in a potentially significant regional project under the auspices of a UN agency, and the associated broader professional benefits to her," he added.

For more information about Ebola-Reston virus visit www.who.int/mediacentre/factsheets/fs103/en/

Former AB-CRC Executive Director appointed to Biosecurity Advisory Council

Dr Lisa Adams, foundation Executive Director and former Director of Research Development of the AB-CRC, has been appointed to the Australian Federal Government's new Biosecurity Advisory Council.

The Biosecurity Advisory Council was established on 1 January 2010 as a non-statutory advisory body to the Minister for Agriculture, Fisheries and Forestry. The principal role of the Council is to provide independent advice on matters across the entire biosecurity continuum, including the performance of all agencies operating in the biosecurity field.

Lisa, a veterinarian with experience working in the agriculture and health sciences, has broad knowledge of biosecurity systems and policy, and is currently a member of the Western Australian State Health Research Advisory Council. She has been integral to the development and success of the AB-CRC and has been involved since the Centre's inception when she prepared the bid that secured initial funding.

The creation of the Biosecurity Advisory Council was a key recommendation of the Beale Review as an important step in the overall biosecurity reform process. The Biosecurity Advisory Council will replace the Quarantine and Exports Advisory Council (QEAC).

The Biosecurity Advisory Council will be chaired by Andrew Inglis, formerly Deputy Chairman of the Quarantine and Exports Advisory Council and Chairman of Plant Health Australia, and currently Chairman of the Future Farm Industries Cooperative Research Centre.

Joining Lisa on the membership list are Dr Joanne Daly, Peter Kenny, Dr Elizabeth Mattiske, Claire Penniceard, Dr Bernie Towler and Dr Dennis Witt.

For more information visit www.daff.gov.au/biosecurity-advisory-council

Australian Government launches Australian Biosecurity Intelligence Network

Australia's frontline fight against plant and animal pests and diseases is set to be greatly improved with the recent launch of a new national biosecurity intelligence network.

The Australian Biosecurity Intelligence Network (ABIN) aims to dramatically improve the ability of the biosecurity community of researchers, industry and governments to work together to address common problems or emerging biosecurity issues through real time access to data, information and know-how, and use of leading edge tools and technologies to generate biosecurity intelligence.

The ABIN, supported by $16.1 million from the Government's National Collaborative Research Infrastructure Strategy (NCRIS), will feature Australia's first online workspace linking over 60 different biosecurity agencies and institutions.

It is hoped that the ABIN will also play a vital role in wildlife animal health where the detection and diagnosis of emerging diseases has previously taken many years.

In addition to NCRIS funding, State and Territory Government agencies and other partners will provide in-kind support to the initiative.

For more information visit www.abin.org.au

AB-CRC PhD Scholarship Program evaluated

Addressing the critical shortage of professionals competent to respond to infectious disease threats in Australia and the Asia-Pacific region was a key role the AB-CRC sought to play over its lifetime.

The instigation of the AB-CRC's PhD Scholarship Program, a component of the Centre's Training & Education Program, was a direct response to this shortage and has now been evaluated, in part, to determine its effectiveness over the past seven years.

The Program's key objective was to equip researchers and professionals in Australia and the Asia-Pacific region with appropriate knowledge and skills for responding to infectious disease threats. Recognising that South-East Asia is an epicentre of emerging infectious diseases, the Program has supported, amongst others, selected projects ultimately aimed at enhancing the regional biosecurity of this area.

Elements of the Program have recently been independently evaluated to explore its inputs and processes, and to assess and explain the Program's outputs, outcomes, merits, worth and significance.

This evaluation ibased on the case studies of five scholars within the Program. It was not designed as a comprehensive assessment of the program, nor was it intended to determine the extent to which the objectives of the Program had been met. Moreover it should also be recognised that there is a limit to which a PhD Program can help transform a region described as the epicentre of emerging infections.

What the evaluation does discover is that PhD research activities provide a "journey that is wondrous and productive where scholars are accompanied by experienced guides and co-travellers who are together creating a common destination – a more biosecure South-East Asia".

Although too early to evaluate the outcomes of the research as none of the scholars had completed their PhD studies, the defining strength of the Program is the way highly motivated scholars and their supervisors are tapping into the synergies provided by the combined strengths of academia, the AB-CRC partnership, government sectors and international agencies. By providing the PhD scholarships and opportunities for collaborative learning, Australia demonstrates its commitment to the region, and in this way, earns the trust, respect and confidence of its neighbours. This virtuous circle provides fertile grounds for extending regional cooperation to help mitigate the risks of pre-border, border and post-border threats for Australians and for the nations of South-East Asia.

To read Mahomed Patel's *The PhD Scholarship Program for Research Training in South-East Asia: A Program of the Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease: An evaluation based on case studies of selected PhD scholars* visit http://www.abcrc.org.au/uploads/2e09bd8a-5c92-4d8a-8783-dfe2b175f642/docs/AB-CRC_International__PhD_Program__Assessment.pdf

AWARDS, PRIZES AND FUNDING OPPORTUNITIES

Call for proposals for South-East Asia research initiative

The International Development Research Centre (IDRC), in collaboration with Canadian International Development Agency (CIDA) and Australian Agency for International Development (AusAID) has pre-announced a call for proposals for the Ecohealth Emerging Infectious Diseases Research Initiative (Eco EID) for South-East Asia. Funding opportunities exist for multi-country ecohealth research projects to a value of CA$5 million and duration of four years. This is an open competition where funding will be subject to merit review.

Research funded through the Eco EID initiative will apply an ecohealth approach, namely one that investigates how social, political, economic and ecological conditions mediate the dynamics of health-environment relationships and their interactions with external processes. The aim is to identify and address the pressures and impacts on sub-systems and human health.

For more information visit www.idrc.ca/en/ev-151369-201-1-DO_TOPIC.html or contact EcoEID@idrc.ca

L'Oréal Australia For Women in Science Fellowships

Nominations open in April

Each year three $20,000 L'Oréal Australia For Women in Science Fellowships are awarded for scientific excellence in early career researchers. The Fellowships are open to female scientists no more than five years past their PhD, excluding periods of maternity leave. These are one of the few fellowships which allow part of the funding to be spent on child care.

For more information, visit www.scienceinpublic.com/loreal/

International Fulbright Science & Technology Scholarships

Applications close 1 May

The Australian–American Fulbright Commission is offering an International Science & Technology Scholarship opportunity for an Australian graduate to study for a PhD at a United States university. The scholarship is fully funded for up to three years and covers full tuition, return airfare, monthly stipend, allowances for books, health and accident insurance, support and enrichment seminars to a value of $300,000.

For more information visit www.fulbright.com.au/scholarships/InternationalFulbrightScienceandTechnologyAwards.html

The Australian Museum Eureka Prizes

Nominations close Friday 7 May

The Eureka Prizes reward excellence in the fields of research & innovation, science leadership, school science and science journalism & communication.

For more information, visit www.eureka.australianmuseum.net.au/

Prime Minister's Prizes for Science

Nominations close Friday 21 May

Each year the Australian Government awards five prizes for outstanding scientific achievements and excellence in science teaching. The prizes are: The $300,000 Prime Minister's Prize for Science, the $50,000 Malcolm McIntosh Prize for Physical Scientist of the Year, the $50,000 Science Minister's Prize for Life Scientist of the Year and two science teaching prizes.

For more information, visit https://grants.innovation.gov.au/SciencePrize/Pages/Home.aspx and for expressions of interest contact pmprize@innovation.gov.au

REPORTS

AB-CRC Vacation Scholarship Report

By Nyasha Clive Jena and Ritesh Patel
BSc Actuarial Science Undergraduate Students, Curtin University

Having been awarded vacation scholarships by the AB-CRC in December 2009 for the 2009-2010 summer vacation period, we were given an amazing opportunity to apply our knowledge into practical work. Our scholarship program, unlike most AB-CRC student placements, was focussed on the mathematical and statistical side of analysing diseases. As undergraduate Actuarial Science students this provided a great opportunity to apply our studies, which have focussed upon these areas, concentrating a lot on calculus and statistical data analysis.

The objective of the main project that we took part in was to identify a simplified mathematical expression to describe the posterior probability of freedom from poliomyelitis (commonly known as polio) using *Freedom from Poliovirus Infection in Australia* as a case study. We managed to determine the required mathematical expression and compile a report which summarised the derivation process and implications of the results.

In addition to our main polio project we also assisted with other projects on infectious diseases. Mathematically modelling infectious diseases was a novel challenge which brought about the use of software packages we had never utilised before. We were introduced to R, SatScan and @Risk, which are now being used widely in the statistical world, and provided invaluable knowledge about these programs which we will always treasure and no doubt fall back on as we progress in our professional lives.

It was a pleasure working under Dr Rochelle Watkins, Senior Research Fellow, AB-CRC. We were encouraged to come up with our own ideas and constantly provided with much appreciated support and assistance. We are vastly grateful to Dr Watkins and the rest of the AB-CRC team for the opportunity they awarded us. It was a grand experience which enriched both our mathematical intellect and professionalism.

AB-CRC Vacation Scholarship Report

By Charmaine Chew
Bachelor Biomedical Science Undergraduate Student, University of Queensland

For two months last summer I was really happy to be given the opportunity to be attached to Dr Roy Hall's virology laboratory, co-supervised by Dr Natalie Prow, in the Molecular Bioscience Building at the University of Queensland. The hands-on training and experience I received during this stint are both extremely valuable, and I believe will serve me well in my future career. I was imparted with crucial techniques like enzyme-linked immunosorbent assay (ELISA) which can be utilised in many forms for detection of antibodies or an antigen dependent on the question of the experiment. In this instance, it was used as a blocking technique to hopefully differentiate flavivirus West Nile virus New York 99 strain from Kunjin, a naturally attenuated strain found mainly in Australia.

During my placement I had many new experiences with the members in the laboratory. I was exposed to public speaking, communicating ideas, and possible ideologies which would have a great impact on the way people look at viruses. I had always wondered what it would be like to be able to apply the skills and knowledge I had learnt from my various modules and this was an excellent place to do so. Initially, I was a little apprehensive as I was really keen to make a positive contribution and at the same time all that anticipation made me rather nervous about whether I would be able to complete the tasks assigned and whether I would find the work environment difficult to adjust to.

Fortunately for me, those worries turned out to be unfounded as my supervisors Roy and Natalie, along with the lab members, were extremely nice

and welcoming and always ready to guide me along if I encountered any issues. With their help I was able to accomplish what I set out to conduct - differentiating the different strains of virus - and thoroughly enjoyed the process. I hope this can contribute in a small way to a greater project in finding possible diagnostics tools. I am also grateful to receive the scholarship assistance as this has helped to defray some of my living expenses.

As a result of my exposure to such cutting edge research and highly professional co-workers I have been inspired to consider expanding on what I learnt - perhaps it is something I can consider working on for my final year project.

I would like to take the opportunity to thank those at the AB-CRC and my supervisors Roy and Natalie for their generosity to give me this chance to contribute to the Centre's research efforts. I am proud to be part of the team and hope that we can all work hand-in-hand to achieve the mission of benefiting the community and improving people's lives.