



important in providing advice to a range of agencies on 'white powders' that required management as possible chemical warfare agent hazards.

Fortunately all of the 'white powder' incidents in Australia were either hoaxes or false alarms; however, the expertise and resources required to provide scientific support to deal with these materials approached those that would

be required for a real incident.

Understanding the capabilities of the broad range of agencies that may be involved in CBR incident management and their individual responsibilities during crisis and consequence management of an incident is a critical element in the coordination and development of an Australian response capability for bioterrorism.

DSTO provides input into a number of national committees responsible for developing barriers to bioterrorism and planning for the crisis and consequence management of bioterrorism incidents. These include close interactions with the Attorney General's Department, Protective Security Coordination Centre and Emergency Management Australia.

Australian Biosecurity CRC for Emerging Infectious Diseases (AB-CRC)

The Australian Biosecurity Cooperative Research Centre for Emerging Infectious Disease (AB-CRC) was a successful applicant under the Federal Government's 2002 CRC programme, and will be formally established from July 2003.

The aim of the AB-CRC is to protect Australia's health, livestock, wildlife and economic resources by developing new capabilities to monitor, assess, predict and respond to emerging and exotic disease threats which impact on national and regional biosecurity. Emerging diseases are defined as those which are novel, previously unrecognised diseases, or those which are increasing in incidence or geographic range. The threats may be natural, accidental (such as an infected traveller) or deliberate (as in bioterrorism).

The concept and concerns raised about disease emergence has grown substantially since the seminal 1992 publication from the Institute of Medicine¹ first focussed world attention on the realisation that infectious diseases were posing a major and increasing threat to international health. It described the major factors that contribute to disease emergence,

John S Mackenzie
Interim CEO
AB-CRC
C/- School of Molecular and Microbial
Sciences, University of Queensland,
Brisbane, Qld 4072

Lisa Adams
Executive Director
AB-CRC
C/- Lisa Adams and Associates
PO Box 7178,
Shenton Park, WA 6008

including societal changes and the ability of microbes to evolve and adapt. Most instances of disease emergence were due to human activities or ecological interventions. The report has engendered many responses and strategies for prevention in most countries, and from the World Health Organization (WHO).

Emergent diseases in Australia are, with a few exceptions, not dissimilar in their identity, occurrence and patterns of incidence to those described in industrialised countries elsewhere. Most of the exceptions are either zoonotic or vector-borne viral diseases^{2,6}.

In addition, Australia is at increasing risk of exotic disease incursions. Our quarantine efforts have been spectacularly successful for many decades in keeping out exotic diseases which threaten our livestock industries. However, the Council of Australian Governments has identified that further work is required to improve national prevention, preparedness and response capability⁷.

Fundamental to this objective is more coordinated national research and development (R&D) efforts. It is these two areas, increasing risks from emergent and exotic disease threats, and the need to reduce fragmentation in R&D and establish a critical mass of multidisciplinary research expertise, that form the basis for the new CRC.

The AB-CRC will develop three research programmes which will focus on more cost effective tools and methods for disease detection and surveillance, and expand our knowledge and understanding of the potential for emerging and exotic disease threats to establish and spread within Australia.



The first research programme will focus on developing new and improved detection methods for selected diseases. These will include hand-held devices to detect pathogens on-site, and new platform technologies to enhance the speed, sensitivity and specificity of laboratory and on-site tests. Thus it is proposed that the AB-CRC will develop hand-held, on-site, immunological and nucleic acid-based devices for disease detection, and develop new test methodologies such as rapid multiplex systems and novel biosensors for real-time, remote surveillance.

The second research programme will focus on disease emergence and the importance of understanding the ecologies of wildlife reservoirs and vector biology. An increasing proportion of emerging diseases in humans and livestock are spill-overs from wildlife reservoirs, a phenomenon that is widely attributed to increased exposure associated with man-made ecological changes. The AB-CRC will target specific disease agents as models, particularly emerging bat-borne and vector-borne diseases, and explore the dynamics of these diseases in wildlife populations. An understanding of the ecologies of the diseases will be essential in developing appropriate surveillance and detection strategies.

The third research programme will integrate the outcomes of the first two programmes by developing new methodologies for the systematic and

Field autopsy – Nipah.



efficient capture of data, and for linking data from different sources, and will develop new decision support tools and systems. Efficient data collection will include developing habitat maps for target hosts and pathogens, enhancing classical population estimation and modelling methods by the application of spatial modelling techniques, developing a system for automatic monitoring of livestock transport patterns, developing an expanded disease surveillance network into south-eastern Asia, developing tools to support Australia's national animal health information system, and epidemiological modelling of infectious diseases.

The AB-CRC will have a strong education focus, with a series of training initiatives at different levels. A basic premise of the education programme is that professional development is crucial to the early recognition of an emergent or exotic disease incursion. Thus the AB-CRC will address the need for skilled animal and public health professionals in regional laboratories and in State and Territory departments. The AB-CRC will also contribute to the development of Masters coursework programmes in the areas of applied veterinary epidemiology, international health and tropical infectious diseases. In addition, 45 PhD studentships will be offered during the first 5 years of the AB-CRC.

The AB-CRC has a major strategy for ensuring the effective utilisation and commercialisation of the research outputs. A key initiative is to develop and implement a strategy to facilitate knowledge exchange, placing knowledge brokers directly with key industry and government end users. The AB-CRC will also provide resources and information to increase public awareness and to enhance capacity for national and regional biosecurity.

The AB-CRC has seven core members and 13 supporting members. The core members are: the University of Queensland; Curtin University of

Technology; the Australian Animal Health Laboratory – CSIRO; Department of Agriculture, Fisheries and Forestry Australia; Department of Health and Ageing; Animal Health Australia; and Australian Pork Limited.

Supporting members are the University of Sydney; Queensland Department of Primary Industries; Western Australian Department of Agriculture; Northern Territory Department of Business, Industry and Resource Development; Queensland Health; Western Australian Centre for Pathology and Medical Research; Western Australian State Government; AusVet Animal Health Services; Meat and Livestock Australia; Ambri Ltd; Panbio Ltd; Innovation Partners Australia; OIE Southeast Asian Foot-and-Mouth Campaign; United States Consortium for Conservation Medicine; and National Centre for Foreign Animal Disease, Winnipeg.

References

1. Institute of Medicine. *Emerging Infections: Microbial Threats to Health in the United States*. National Academy Press, Washington DC, 1992.
2. Mackenzie JS, Bolton W, Cunningham AL, Frazer IH, Gowans EJ, Grohmann GS *et al*. Emerging viral diseases of humans: an Australian and New Zealand perspective. In: Asche V (Ed). *Recent Advances in Microbiology* (Vol 5). Australian Society for Microbiology Inc, Melbourne, 1997, p.13-130.
3. Della-Porta AJ. Emerging and re-emerging diseases of animals in Australia. In: Asche V (Ed). *Recent Advances in Microbiology* (Vol 5). Australian Society for Microbiology Inc, Melbourne, 1997, p.131-201
4. Mackenzie JS. Emerging viral diseases: an Australian perspective. *Emerging Infectious Diseases* 1999; 5:1-8.
5. Mackenzie JS, Chua KB, Daniels PW, Eaton BT, Field HE, Hall RA *et al*. Emerging viral diseases of South-East Asia and the Western Pacific: a brief review. *Emerging Infectious Diseases* 2001; 7(3 Suppl):497-504.
6. Daniels PW. Arboviruses of veterinary significance in the Asia-Western Pacific region such as Japanese encephalitis virus. In: 22nd Conference of the OIE Regional Commission for Asia, the Far East and Oceania. Office International des Epizooties, Paris, France, 2003.
7. Council of Australian Governments Meeting, Canberra, 9 April 2002 (<http://www.dpmc.gov.au/docs/DisplayContents1.cfm?&ID=138>).