Wildlife health surveillance in Australia

Introduction

It is now recognised that those countries which conduct disease surveillance of their wild animal populations are more likely to detect the presence of infectious and zoonotic diseases and to swiftly adopt counter measures. The surveillance and monitoring of disease outbreaks in wildlife populations is particularly relevant in these days of rapid human and animal translocation, when the contact between wild and domestic animals is close and the threat of bioterrorist attack is very real. A major advantage of an efficient disease monitoring program for wildlife is the early detection of new and emerging diseases, some of which may have serious zoonotic and economic implications. A clear understanding of disease agents present in wildlife, and their effects on wildlife, domestic animals and humans is thus of paramount importance for management.

This paper briefly introduces some of the recent developments in wildlife health surveillance occurring in Australia, and discusses some of Australia’s future needs. We conclude that Australia must continue: 1) to integrate wildlife health surveillance activities into national frameworks; 2) better coordinate activities between agencies and; 3) recognise the mutual need for sustained direction and focus. These steps are of benefit in protecting Australia’s trade, human health and biodiversity interests and in assisting other countries in the region.

Current developments in wildlife surveillance

Despite Australia’s tight border quarantine capabilities, an increasing awareness of the risks of emerging disease and the role of wildlife is prompting the development of a more integrated approach to surveillance activities in Australia. Key initiatives and organisations include the National Animal Health Information System (NAHIS), Northern Australia Quarantine Strategy (NAQS), Australian Wildlife Health Network (AWHN), Australian Registry of Wildlife Health (ARWH), two new cooperative research centres, a variety of other activities (primarily aimed at bat viral diseases), and development of other networks, which have the potential to assist with wildlife disease surveillance.

The National Animal Health Surveillance System (NAHSS)

The NAHSS Steering Committee was established by the Australian Department of Agriculture, Fisheries and Forestry in 2004 to review all animal surveillance activities in Australia and develop and implement a new national surveillance system, which is to include wildlife. A key component of this system is the National Animal Health Information System (NAHIS), Australia’s focus for animal disease surveillance (see http://www.aahc.com.au and Figure 1), which has recognised the need for information on wildlife diseases.

The Northern Australia Quarantine Strategy (NAQS)

The Northern Australia Quarantine Strategy (NAQS) of the Australian Quarantine and Inspection Service supports the NAHIS and conducts ongoing surveillance for disease in animals in Northern Australia and offshore islands. Native birds are sampled and released. Target list diseases include foot and mouth disease (on clinical signs), screwworm fly (by myiasis monitoring and adult trapping), classical swine fever, porcine reproductive and respiratory syndrome, surra, Japanese encephalitis, Nipah virus diseases, Aujeszky’s disease, West Nile fever, avian influenza, infectious bursal disease and Newcastle disease (by serology). NAQS surveillance in 2004 detected Japanese encephalitis on Badu Island again and on the mainland for the first time since 1998.

Australian Wildlife Health Network (AWHN)

A new government initiative, the AWHN promotes and facilitates collaborative links in the investigation and management of wildlife health in support of human and animal health, biodiversity and trade. Its vision is for a nationally integrated wildlife health system for Australia. It was launched in August 2002 at the direction of Australia’s Animal Health Committee and Primary Industries Standing Committee. Core business is to facilitate effective wildlife disease surveillance. It manages a recently launched database of wildlife disease surveillance information (the Wildlife Health Information System, eWHIS) and website, which allows access to information on wildlife health information relevant to Australia (www.wildlifehealth.org.au). In an effort to improve cross discipline knowledge exchange, members from all different agencies, disciplines and backgrounds are encouraged to join.

A system of State and Territory coordinators capture and report wildlife disease events and information primarily to support the NAHIS, but also to support human health and biodiversity agencies. Currently six disease categories form the basis for reporting and include: 1) OIE (Office International des Epizooties) list...
diseases; 2) bat viral diseases; 3) mass, or unusual mortality events; 4) Salmonella cases; 5) Arbovirus cases; 6) diseases State/Territory co-ordinators think are interesting or unusual.

A brief summary of the occurrence of some diseases of significance that were seen in 2004 is available at http://www.wildlifehealth.org.au, and moderated reports are generated quarterly for the NAHIS, Wildlife Diseases Association, National Enteric Pathogen Surveillance Scheme and the World Conservation Union Species Survival Commission. Reports are produced yearly for the Office of the Chief Veterinary Officer and the Australian Animal Health Council.

Other priorities for the AWHN are:

1. A mechanism for notification and response to emerging and emergency wildlife disease.
2. A series of specific workshops to identify current level of knowledge, prioritise research questions and identify policy shortfalls.
3. Specific projects exploring ecology, epidemiology and management for selected diseases that include wildlife as part of their ecology (eg avian influenza, West Nile virus, Australian bat Lyssavirus).
4. Development and provision of wildlife health communication and education packages.

**Australian Registry of Wildlife Pathology**

The Australian Registry of Wildlife Pathology is based at Sydney’s Taronga Zoo and maintains a collection of approximately 18,000 glass slides and images, case reports and teaching material relating to diseases of Australian native wildlife. It acts as a centre of national and international excellence in the diagnosis of diseases of Australian native animals. Priorities for the ARWH include production of a wildlife post mortem and investigation manual, and digitisation, web-enablement and dissemination of Registry material.

- A manual is due for release in 2005.
- The Registry has built a website (www.arwh.org) that is due to go live in 2005. The site will allow submission and review of case reports pertaining to diseases with Australian wildlife as part of their ecology (including access to high quality electronic gross and histological images).

Other priorities supporting surveillance activities include a research Masters and quality assurance program in wildlife pathology, wildlife necropsy and investigation course, and wildlife exotic disease recognition/identification and management course.

**Cooperative research centres**

Two recently formed Cooperative research centres provide research programs that support surveillance activities in Australia: the Australian Biosecurity Cooperative Research Centre.
Two projects involving bat viral diseases are currently underway in Australia - an international collaboration funded by the US National Institutes of Health Fogarty International Centre, focused on risk factors for the emergence of henipaviruses; and an AB-CRC funded project assessing the risk of introduction of Nipah virus to Australia by flying foxes. The former incorporates data to develop and test alternative models for the maintenance of Hendra virus infection in flying foxes and, thus, predictive models for spillover events. The second project incorporates serologic, virologic, genetic and satellite telemetry studies to quantify contact between flying foxes pre- and post-border, and thus assess the risk of introduction of Nipah virus to Australia by flying foxes. In addition, an Australian bat Lyssavirus/ rabies focus group acts as a focus for identifying areas for research, and facilitates collaboration, communication and coordination of Australian bat Lyssavirus and rabies issues for the region. Surveillance is a key issue being addressed.

Other networks

A national marine mammal stranding network is being considered by the Commonwealth Department of Environment and Heritage. If supported, a major interest would be to improve understanding and management of marine mammal strandings, it would also provide an operational framework, which could be used for surveillance of infectious and toxicological diseases.

Attempts are also underway to organise the many wildlife carer groups in Australia into a national network. These individuals and organisations represent a significant resource for surveillance at the wildlife-human interface.

Future needs

The management of diseases with wildlife as part of their ecology is an important part of Australia’s emergency disease preparedness. These diseases impact on trade, human health and biodiversity. It is now recognised in Australia that management decisions can only be based on a thorough knowledge and understanding of the ecology of disease and the host-pathogen relationship. Classical models of general and targeted surveillance are difficult to fit to wildlife populations which are spatially and temporally fluid. Denominators are large, laboratory tests are often not validated, expensive, or not immediately available. Long-term longitudinal surveys, pooled prevalence approach, syndromic reporting, use of the internet for data capture and interrogation in close-to-real time, and array technologies now offer very real solutions to the problems of wildlife disease surveillance.

The time when the world will manage disease (including diseases with wildlife as part of their ecology) at a global level, is rapidly approaching. We see a future Australia where health issues are integrated across disciplines. Information is shared through common platforms. Issues addressed at an interdepartmental level and a series of multidisciplinary nodes incorporating animal and human health and conservation agencies, feeds information into national management systems and responds in a collective, efficient and effective way.

It is, however, only through integration and communication between those agencies and individuals with an interest in health that these solutions will be realised. Encouraging and enterprising research and policy initiatives are happening in wildlife health in Australia, however such activities, taking into account Australia’s unique wildlife and organisational structure, could benefit from improved co-ordination, better commitment to collaboration and to integration of wildlife surveillance into the existing national animal health surveillance system. To be forewarned is to be forearmed

Acknowledgements


References