

# The role of One Health in understanding and controlling zoonotic diseases in Australia



*Adrian Coghill, Peter Black and Mark Schipp*

Department of Agriculture,  
Fisheries and Forestry  
Canberra, ACT 2601, Australia  
Tel +61 2 6272 4644  
Email OCVO@daff.gov.au

**One Health recognises that the health of humans, animals and ecosystems is intimately connected. One Health involves a coordinated, collaborative, multidisciplinary and cross-sectoral approach to addressing a wide range of potential or existing risks at the animal-human-ecosystem interface<sup>1</sup>. Globally, a surge in emerging infectious diseases and their associated costs to society over the last 15 years has reignited interest in the idea that human health is linked to animals and our shared environment<sup>2</sup>. In 2004 at the meeting *Building Interdisciplinary Bridges to Health in a Globalized World* held in New York, the 12 Manhattan Principles were defined to guide scientists and policy makers to "devise adaptive, forward-looking and multidisciplinary solutions to the challenges that undoubtedly lie ahead"<sup>3</sup>. These principles remain fundamental in defining the role of One Health.**

In Australia, history shows that we have been implementing a One Health approach to understanding and controlling zoonoses. A prominent example from the early 1990s is where scientists and policy makers worked together to unravel the emergence of Hendra virus. This work really started in August 1994 with the initial outbreak of disease in horses and two people in Brisbane and the subsequent isolation of a paramyxovirus<sup>4</sup>. In 1995, a human case of Hendra virus infection was detected in Mackay. Investigations revealed that two horses that died on a property near Mackay in September 1994 were the source of infection<sup>5</sup>. This clearly meant that two outbreaks of disease caused by a novel virus had occurred about 1000 km apart within one month of each other. Extensive epidemiological investigations could

detect no links involving horses and the hypothesis that a wildlife source could be involved quickly gathered momentum<sup>6</sup>. True to the One Health approach, in 1995, a number of scientists from a range of disciplines (epidemiology, virology, pathology, ecology, zoology) and sectors (government, university, private) were invited to a think tank meeting at the Animal Research Institute in Brisbane to discuss the hypothesis and likely wildlife sources. At that meeting, a zoologist from the University of Queensland was the first person to raise flying foxes as a possible source of the virus.

The rest is history. Hendra virus was subsequently isolated from four species of bats belonging to the Suborder *Megachiroptera*<sup>7</sup>. These discoveries influenced the international studies which found bats as the reservoir for Nipah virus and a possible precursor to the severe acute respiratory syndrome (SARS) virus in Asia. The early work on Hendra virus, which raised the profile of bats as a source of zoonotic viruses globally, all started with a meeting that was in essence coordinated, collaborative, multidisciplinary and cross-sectoral. It was One Health in action.

Continuing with the Hendra virus example of One Health, in 2011 the story changed following Queensland and New South Wales experiencing an unprecedented number of new cases in horses. Despite this disease surge, no human cases occurred. The preceding work done in line with One Health principles undoubtedly influenced this outcome. The collaborative efforts between veterinary, environmental and public health scientists had led to greatly improved disease knowledge enabling risk mitigation measures to be communicated to the public. Similar processes were followed in providing public health units with

disease-specific guidelines for assessing and managing at-risk patients. Collaboration extended to the social sciences and humanities in developing the communications strategy. Facebook, mobile messaging and other modern media channels were used to convey biosafety messages to the public, complementing the more traditional techniques.

The 2011 cases led governments in Australia to increase their funding commitment to Hendra virus research, leading to strategies that minimised the impact of the virus. Twelve million dollars of new funding was announced in July 2011 as part of a National Hendra Virus Research Program (NHVRP)<sup>8</sup>. An Intergovernmental Hendra Virus Taskforce<sup>9</sup> was also established to be the main coordinating body for responding to the disease. The taskforce has representation from people with veterinary, health, environmental and other science backgrounds – again true to One Health principles. These representatives were charged with ultimate decision-making responsibilities in deciding which research projects would be granted funding under the open funding program part of the NHVRP.

There are numerous other examples of Australia approaching zoonoses management using One Health principles. These include the successful management of the mosquito-borne flavivirus incidents in horses and humans in 2011<sup>10</sup>, and incidents of avian influenza in poultry and human influenza in pigs. In fact it is influenza, in recognition of its capacity for causing pandemics, which has provided the impetus for the acceptance and development of One Health principles in international organisations such as the WHO, OIE and FAO<sup>11</sup>. Domestically, veterinarians are increasingly represented on public health committees including on the Communicable Diseases Network of Australia and the new Australian Health Protection Principal Committee, Antimicrobial Resistance Subcommittee.

All this work in Australia to understand and control zoonoses using One Health principles requires "devising adaptive, holistic, and forward looking approaches to the prevention, surveillance, monitoring, control and mitigation of emerging and resurging diseases ..."<sup>12</sup>. This means looking beyond the traditional epidemic zoonotic disease threats like influenza, to emerging disease threats from, for example, endemic diseases, the trans-boundary movements of multiple-antimicrobial resistance bacteria, and diseases impacting on food safety or security. Australian Government scientists continue to develop the use of strategic foreseeing methodologies and technologies to assist in looking forward to where the risks may lie in the future and how to best prepare for them<sup>13</sup>.

Overall, One Health approaches to understanding and controlling zoonotic diseases have served Australia well to date. Challenges

remain to coordinate and include all relevant disciplines, and levels of government and industry, under the Australian One Health umbrella. Developing networks and collaborating with environmental scientists is a recognised area for improvement<sup>14</sup>. Numerous conferences, workshops and forums have been held over the past few years dedicated to improving the role of One Health and there are more planned. We encourage more Australians as members of the global health community to join in these activities and share their insights in the true spirit of One Health.

## References

1. One Health Global Network Webportal. [http://www.onehealthglobal.net/?page\\_id=131](http://www.onehealthglobal.net/?page_id=131) (accessed 2 August 2012).
2. One World, One Health Organization. <http://www.oneworldonehealth.org/> (accessed 2 August 2012).
3. Building Interdisciplinary Bridges to Health in a Globalized World, New York, 29 September 2004. [http://www.cdc.gov/onehealth/pdf/manhattan/twelve\\_manhattan\\_principles.pdf](http://www.cdc.gov/onehealth/pdf/manhattan/twelve_manhattan_principles.pdf) (accessed 2 August 2012).
4. Murray, P. *et al.* (1995) A morbillivirus that caused fatal disease in horses and humans. *Science* 268, 94–97.
5. Rogers, R.J. *et al.* (1996) Investigation of a second focus of equine morbillivirus infection in coastal Queensland. *Australian Vet. J.* 74, 243–244.
6. Young, P.L. *et al.* (1996) Serologic evidence for the presence in Pteropus bats of a paramyxovirus related to equine morbillivirus. *Emerg. Infect. Dis.* 2, 239–240.
7. Halpin, K. *et al.* (2000) Isolation of Hendra virus from pteropid bats: a natural reservoir of Hendra virus. *J. Gen. Virol.* 81, 1927–1932.
8. Queensland Government Department of Agriculture, Fisheries and Forestry Website for the National Hendra Virus Research Program. [www.daff.qld.gov.au/4790\\_21026.htm](http://www.daff.qld.gov.au/4790_21026.htm) (accessed 2 August 2012).
9. Queensland Government Department of Agriculture, Fisheries and Forestry Website for the Intergovernmental Hendra Virus Taskforce. [http://www.daff.qld.gov.au/4790\\_20725.htm](http://www.daff.qld.gov.au/4790_20725.htm) (accessed 2 August 2012).
10. Holmes, J. M. *et al.* (2012) Murray Valley encephalomyelitis in a horse. *Australian Vet. J.* 90, 252–254.
11. The FAO-OIE-WHO Collaboration (2010) Sharing responsibilities and coordinating global activities to address health risks at the animal-human-ecosystems interfaces – A tripartite concept note. <http://www.fao.org/docrep/012/ak736e/ak736e00.pdf> (accessed 2 August 2012).
12. Manhattan Principle number 5, as defined during the meeting Building Interdisciplinary Bridges to Health in a Globalized World, New York, 29 September 2004.
13. Australian Government Department of Agriculture, Fisheries and Forestry Website for Strategic Foresight. <http://www.daff.gov.au/animal-plant-health/animal/strategy> (accessed 2 August 2012).
14. Zinsstag, J. *et al.* (2012) Mainstreaming One Health, *Eco Healthb.* (epub ahead of print) <http://rd.springer.com/article/10.1007/s10393-012-0772-8> (accessed 2 August 2012).

## Biographies

**Adrian Coghill** is a Senior Veterinary Officer in the One Health section in the Animal Health Policy Branch of the Australian Government Department of Agriculture, Fisheries and Forestry.

**Peter Black** is the Director of the Emergency Animal Disease Preparedness Section in the Animal Health Policy Branch of the Australian Government Department of Agriculture, Fisheries and Forestry.

**Mark Schipp** is the Australian Chief Veterinary Officer and Australian delegate to the World Organization for Animal Health (OIE).