



Presiding Officers' Science Series Note No. 1 - March 2008



Equine Influenza (Horse Flu)

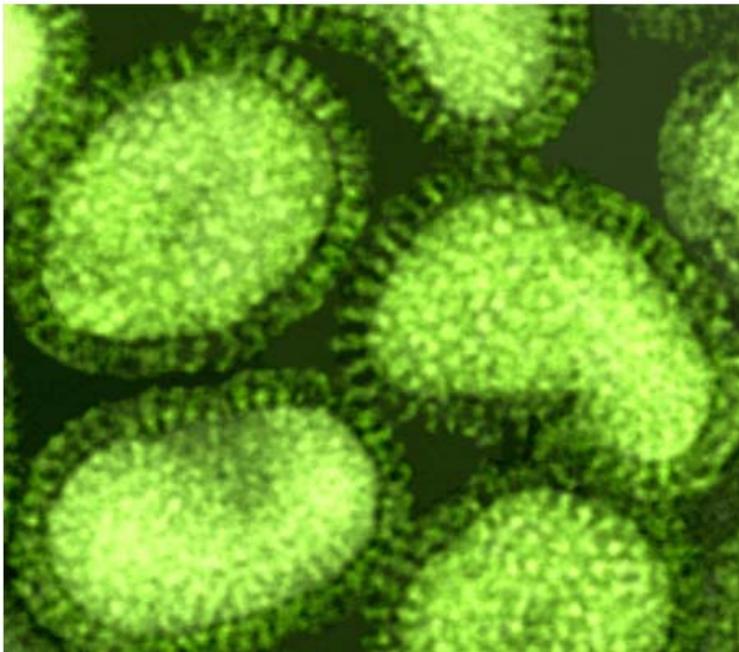
This Note has been prepared under the auspices of the Presiding Officers to provide Parliamentarians and their staff with policy-relevant background material on equine influenza, which affected some Australian states in 2007 for the first time. The Q&A format of the Note is designed to address immediate issues.

This Note considers the following questions:

- What is horse flu?
- What are the effects of horse flu on horses?
- How is horse flu transmitted?
- Can horse flu be transmitted to humans?
- Can horse flu infect other animals?
- How can horse flu be controlled in the future?

What is horse flu?

Horse flu or equine influenza is caused by a virus, which is a sub-microscopic package of genetic material. A virus is essentially inert until it comes in contact with a suitable plant, animal or human cell in which it can reproduce. In order to reproduce itself, a virus takes over the machinery of the host cell and subsequent infection can lead to illness in the host. Influenza viruses cause infectious diseases in birds and mammals.



Electron microscope picture of influenza viruses; each virus has a size of about one ten-millionth of a metre (L.M. Stannard, University of Cape Town)

There are three types of influenza viruses: type A, B and C. Type A viruses can infect many species, and they are the most common causes of influenza in humans. Type B infects only humans. Type C is also restricted mainly to humans but it causes only mild disease.

All type A influenza viruses originally came from water birds (their natural host) in which they cause little disease. Occasionally type A viruses are transmitted from water birds to other species that lack defences against the infection. This process can lead to widespread outbreaks of disease, such as the “bird flu” currently infecting domestic poultry in many countries and the

“Spanish Flu” pandemic of 1918.

Although type A viruses can infect many species, only some have adapted to other animals to the extent that they can undergo sustained transmission between members of the new host species. This process has occurred in humans, horses, pigs, domestic poultry and, most recently, dogs. Two subtypes, H1N1 and H3N2, have been circulating in humans for the past 30 years. The current “bird flu” is caused by H5N1.

Horse flu is caused by a type A virus. There are two main subtypes of horse flu: H7N7 and H3N8. The 2007 outbreak of horse flu in Australia was caused by a H3N8 virus, which is distantly related to the human H3N2 virus. The H3N8 viruses were first isolated from horses in 1963.

What are the effects of horse flu on horses?

Horse flu is endemic in many parts of the world, and in most countries it is accepted as an intermittent nuisance. The symptoms of horse flu include fever, coughing, a runny nose and lethargy in a horse for several days. There is usually a full recovery within a couple of weeks. However, as with flu in humans, horse flu can be fatal for the very young and old.

Australia has not had horse flu in the past, and so the recent outbreak was more serious as our horses had no immunity to the virus. In unvaccinated horses, the infection rate is essentially 100%, with an incubation period of a few days.

How is horse flu transmitted?

Horse flu is highly contagious among horses, donkeys, mules and other equine species. Influenza viruses are very fragile when not infecting a host, but they can be sustained in mucus or other secretions from an infected animal. Thus horse flu is generally transmitted through contact



between horses or by humans transporting infected droplets from one horse to another. It is therefore essential for precautions to be taken when humans interact with infected horses.

Precautions must be taken when people interact with infected horses in order to prevent the transmission of the virus to other horses (NSW Department of Primary Industries)

As well as being fragile when outside a host, viruses are susceptible to ultra-violet (UV) radiation from the sun. It is therefore very unlikely that horse flu can be transmitted by the wind from one region to another.

Can horse flu be transmitted to humans?

There have been no reported cases of the transmission of horse flu to humans under natural conditions. However, in an experiment in the USA in 1965, five humans were deliberately inoculated with a H3N8 horse flu virus. All of them were infected by the virus, and one of them became ill. It is therefore theoretically possible (but statistically unlikely) that horse flu could be transmitted to humans.

Can horse flu be transmitted to other animals?

Influenza viruses can from time to time be transmitted from one type of animal to another. Indeed the horse flu virus came originally from birds. However, the transmission of a virus to another type of animal is rare. It was not until 2004 that the transmission of horse flu to another domesticated animal was detected. Horse flu virus (H3N8) was found in greyhounds that had died from a respiratory illness at a racetrack in Florida. It emerged that the virus had probably jumped species into dogs in about 2000 and was spreading to racetracks and to various breeds of dogs in other states of the USA.

Australia has strict quarantine laws on all imported animals. Moreover, the 2007 outbreak of horse flu has been contained. It is therefore expected that horse flu will not become endemic in Australian horses and that it will not be transmitted from horses to other animals such as domestic dogs in the future.

How can horse flu be controlled in the future?

Because horse flu is endemic in most of the world, vaccination of horses is used to control outbreaks in many countries, such as in Britain. However, vaccines do not fully prevent either infection or transmission of the disease. The viruses are continually changing in an evolutionary process termed antigenic drift, so that vaccines need to be changed as the prevalent strain of virus evolves.



Quarantine is the primary method for controlling an outbreak of horse flu (NSW Department of Primary Industries)

Moreover, there can be side effects from vaccines, and regular boosters are necessary to maintain protection. Owing to the emergence of new strains or to inadequate vaccine coverage, outbreaks of horse flu still occur in countries where vaccination is practised. Because Australia had been free of horse flu until 2007 and because the 2007 outbreak has been contained, a judicious strategy is being

developed for any future use of vaccination in Australia.

The most effective control of horse flu in Australia will be the continuation of our strict quarantine

laws to prevent the importation of the virus again. With the control of the 2007 outbreak, Australia can again be regarded to be free of the virus and so quarantine will be vital in eliminating future outbreaks.

If, by some mishap, there is another outbreak of horse flu in the future, then the lessons learned from 2007 will be important in controlling the event. In particular, rapid and complete isolation of any infected animals has been demonstrated to be effective and efficient.

Acknowledgements

This Note has been prepared by the Academy of Technological Sciences & Engineering under the auspices of the Presiding Officers of the Parliament of Victoria. The time and expertise of Prof. Anne Kelso (World Health Organization Collaborating Centre for Reference & Research on Influenza, Parkville) in preparing the Note is especially appreciated. Preparation of the Note was coordinated by Prof. Michael Manton (Monash University). Proofing assistance provided by Rachel Macreadie, Research Officer, Parliamentary Library.

For more information please contact:

Dr Greg Gardiner

Senior Research Officer

Parliamentary Library

Department of Parliamentary Services

Telephone: 8682 2785 or 9651 8232

gregory.gardiner@parliament.vic.gov.au