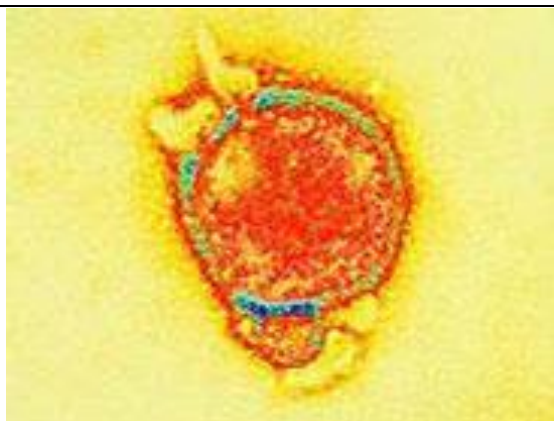


# Hendra Virus

For the first time Australia, the lucky country, is faced with a deadly disease that is completely home grown, and so far, unique to our shores. The fact that this disease can be caught by and kill humans as well, just increases the fear and worry that we all feel. It's no good saying that it's a rare event, because the devastation that it brings has a huge impact on equine owners, carers and industry.

Hendra virus was first isolated in 1994 from an outbreak of disease in a racing stable located in the northern Brisbane suburb of Hendra less than 10km from the city centre. The outbreak resulted in death of a horse trainer and 13 horses and left a stable hand seriously ill. A further seven horses with evidence of exposure to the virus were humanely destroyed to avoid possible further spread of the disease. Since Hendra virus was first isolated, significant progress has been made in understanding the virus, where it originates in nature, and how to detect infection and past exposure. Shortly after the September 1994 outbreak, researchers isolated and characterised the virus, developed laboratory tests to detect infection in both humans and animals, and identified the likely source of the virus.

Hendra virus and its close relation Nipah virus, both belong to a separate category of the Paramyxoviridae family, the Henipaviruses. In addition to a number of unique molecular characteristics, these viruses are distinguished from other members of the family by their ability to infect a broad range of species and fatally infect both animals and humans.



Artificially coloured Hendra virus electron micrograph

Courtesy AAHL Biosecurity Microscopy Facility.

Nipah virus emerged in pigs and humans in Malaysia. Since then, over 470 known human infections and over 240 deaths have been linked to outbreaks of Nipah in Malaysia, Singapore, Bangladesh and India. There have been no reported outbreaks in Australia.

**So what does Hendra do** – in very simple terms it attacks the cells so that they leak blood and fluids. Where it attacks in the body leads to the broad range of symptoms, in the lungs it leads to bleeding and effectively horses drown in their own fluids, in the brain they get neurological symptoms and die of encephalitis. Hendra cases have also exhibited anything from mild depression to colic – we can now say that there are no “classic” Hendra symptoms. All sick horses should be treated with caution.

### Possible symptoms of Hendra Virus

- rapid onset of illness
- increased body temperature/fever
- increased heart rate
- discomfort/weight shifting between legs
- depression
- rapid deterioration

### Respiratory signs that include:

- respiratory distress
- increased respiratory rates
- nasal discharge at death-can be initially clear progressing to stable white froth and/or stable blood-stained froth.

### Neurological signs that include:

- aimless walking in a dazed state
- muscle twitching
- loss of balance, problems getting to feet
- loss of vision in one or both eyes
- head tilting, circling
- muscle twitching
- urinary incontinence
- facial swelling.

**If you see these symptoms call your veterinarian or DPI&F 13 25 23 or Emergency Animal Disease 1800675888 Shower and change clothes if you have handled a sick horse Stay away from other horses**

**If you have a horse that is suspected to have Hendra, do not move any other horses off the property until given the all clear.**

**Biosecurity must be carried out! Hendra is quite hard to catch but it is one of the deadliest viruses known. At this stage there are no effective treatments. Please read our fact sheets on Biosecurity and Hendra – Reducing the Risk**

### Horse with Hendra Virus - Biosecurity is Essential



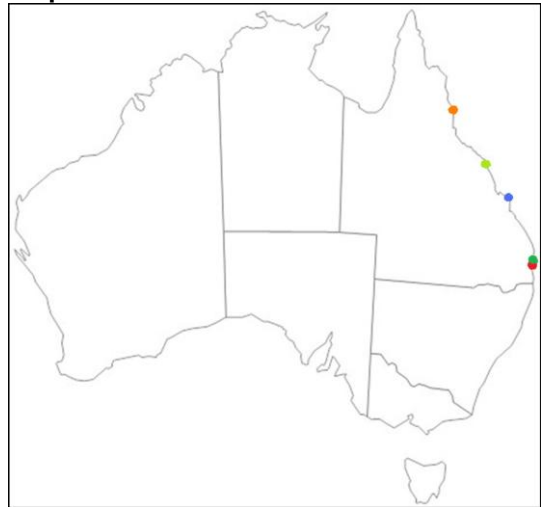
The following points when combined with the symptoms already listed could also support suspicion of HeV:

- Where there are multiple cases, a high case fatality rate occurs within 48 hours.
- Some cases have initially been reported as colic, or even depression – there are no “classic” Hendra symptoms.
- Bats in the area, though a lack of bat sightings does not rule out HeV.
- The animals live in or near paddocks that attract bats. These include trees with soft fruits, figs, stone fruits such as peaches, loquats, and mangos. High risk native trees include Moreton Bay Figs, Palms, Lilly Pillies, Eucalypts, Melaleuca, Callistemon and Grevilleas.

Hendra virus is carried by flying foxes. Under unknown but rare circumstances, the virus spills over from these bats to equines (horses/donkeys etc), killing over 70% of the horses it infects. Under even rarer circumstances, the virus spreads to humans who have had very close contact with Hendra infected horses. While there is strong evidence to support this mode of transmission (bat-to-horse-to-human) there is no evidence of bat-to-human or human-to-human. Human to horse transmission would only be possible in the case of biosecurity breaches, where people have transferred the virus on contaminated gear or clothing.

Though there have been significant gains in knowledge about Hendra, a great deal remains to be learnt. The incubation period (time from exposure to the appearance of the first clinical signs of infection) of Hendra virus in horses is five to 16 days. Fatally infected horses died on average two days after the first sign of infection. While approximately 25% of horses are thought to survive acute infection, the current national policy requires these horses to be euthanased. The incubation period in humans is believed to be five to 16 days, and the current human case fatality rate is more than 50%.

### Map of all Human Hendra Virus Infections



#### Incident 1:

**Mackay, August 1994.** Not recognised until the death of the farmer who had assisted his veterinarian wife with an autopsy of two horses that died of unknown causes. The farmer appeared fully recovered after hospitalisation but relapsed and died 13 months later. Retrospective testing showed the horses were infected with Hendra.

#### Incident 2:

**Hendra, September 1994.** Resulted in the death of a horse trainer, 13 of his horses, and caused severe febrile illness in a stable-hand. The trainer had very close physical contact sick horses, as did the stable hand.

#### Incident 3:

**Gordonvale, October 2004.** A veterinarian tested positive for Hendra virus after performing a post mortem on a horse that died suddenly. While no samples were available from the horse for testing, the clinical and post mortem signs were consistent with Hendra virus infection.

#### Incident 4:

**Redlands, June 2008.** A veterinarian and veterinary nurse at the Redlands Veterinary Clinic were infected after close direct contact with infected horses. The veterinarian tested positive for Hendra virus and died in August after spending several weeks in intensive care. The veterinary nurse also spent several weeks in intensive care but was later discharged.

#### Incident 5:

**Cawarral, August 2009.** A Queensland veterinarian died in September after being exposed to Hendra. Infection has been confirmed in two horses that died and another had to be destroyed after returning a positive test. The incident was discovered after a property manager and a local veterinarian alerted Biosecurity Queensland with the death of a horse suffering from respiratory distress.

**Since 1994 there have been 52 horse (known) and 4 human deaths directly related to Hendra virus infections.**

The detection of viral genetic material in the blood, nasal secretions and a wide range of body tissues of infected horses indicates that by the time a horse shows clinical signs of infection the virus is widespread throughout the body. Most virus is shed from these horses when they are sickest, suggesting that this is the most likely time for transmission to humans. However, studies have also shown that a horse can potentially excrete the virus through nasal/naso-pharyngeal secretions at least two days prior to the appearance of clinical signs.

**Table of ALL known incidents of Hendra Virus**

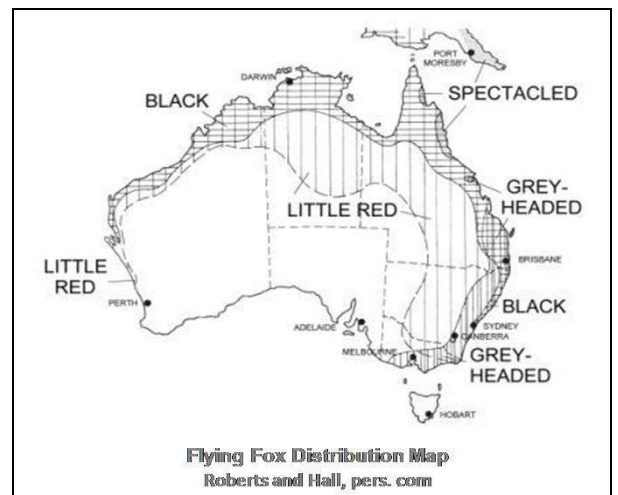
Location	Month	Year	Horse Deaths	Human Cases	Human Deaths
Mackay	August	1994	2	1	1
Hendra	September	1994	20	2	1
Cairns	January	1999	1	0	0
Cairns	November	2004	1	1	0
Townsville	December	2004	1	0	0
Peachester	June	2006	1	0	0
Murwillumbah	October	2006	1	0	0
Peachester	June	2007	1	0	0
Clifton Beach	July	2007	1	0	0
Redlands	June-July	2008	5	2	1
Proserpine	July	2008	3	0	0
Cawarral	August	2009	4	1	1
Bowen	September	2009	2	0	0
Tewantin	May	2010	1	0	0
Boonah	June/July	2011	1 dog 3	0	0
Beaudesert	June	2011	1	0	0
Wollongbar	June	2011	1	0	0
Parkridge	June	2011	1	0	0
Logan	June	2011	1	0	0
Macksville	July	2011	1	0	0
Kuranda	July	2011	1	0	0
Boondall	July	2011	1	0	0
Hervey Bay	July	2011	1	0	0
Lismore	July	2011	1	0	0
Chinchilla	July	2011	1	0	0
Mullumbimby	July	2011	1	0	0
Ballina	August	2011	1	0	0
South Ballina	August	2011	2	0	0
Mullumbimby	August	2011	1	0	0
Gold Coast	August	2011	1	0	0
Ballina	August	2011	1	0	0
Beachmere	September	2011	2	0	0
<b>Total</b>			<b>66</b>	<b>7</b>	<b>4</b>

The exact mechanics of Hendra virus transmission from flying foxes to horses is not known. However transmission is thought to be through the ingestion of grass, feed or partially eaten fruit contaminated with bat urine, saliva or other bodily fluids. It does not appear to involve other domestic animals or wildlife. Horse-to-horse transmission of the virus is likely, as a proportion of incidents involved infection of both the index case and companion horses. In these incidents, transmission of

the virus appears to have been more efficient in horses housed in stables or stalls, but it is also possible that companion horses were infected as a result of separate bat-to-horse transmission. When a Hendra incident occurs other animals are tested on the Infected Properties, including all companion animals such as cats and dogs. To date there has only been one case of a dog showing antibodies but no signs of infection or disease. This mirrors work done in laboratories which showed that dogs were not susceptible but did develop antibodies.

**The migratory and feeding areas of flying foxes**

The Qld Horse Council stresses the need to be aware that Hendra virus can occur wherever there are flying foxes and horses, and because of the large area that flying foxes travel over, can occur across a large proportion of the state. The timing of Hendra virus infection in horses may be linked to the pattern of pulsing infection in flying foxes. A period of the peak virus excretion may follow the introduction of infection to a susceptible bat colony, perhaps due to unknown stress factors. This period is likely to correspond to increased risk of infection of susceptible horses in the vicinity.



Despite the recent emergence of Hendra virus and the difficulties associated with researching a virus carried by flying foxes, there have been significant advances in understanding this virus and the disease it causes. The virus has been fully characterised and monitoring sequence changes in isolates is ongoing. The species that are susceptible to infection have been determined and how the virus infects the cells of these species (and the symptoms it causes) has been well documented. A suite of laboratory tests have been developed for detection of the virus during incidents and for surveillance, and these tests can now be performed in a number of national and international laboratories. And the analysis of experimental infections continues, yielding new data to be used to improve management of the disease. Hendra virus research, however, is challenging, complicated and much remains to be learnt.