

# EXOTIC Nipah virus

## Fact sheet

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### Introductory statement

**Nipah virus infection has not been reported in Australia.** Nipah virus is, however, present in fruit bat populations in countries to Australia's north. It emerged in the last decade of the twentieth century causing deaths and severe disease in humans and domestic animals in Malaysia and Singapore. Outbreaks now occur annually in humans in Bangladesh and southern India.

### Aetiology

*Nipah virus* is a close relative of Hendra virus. They are the only 2 members of the genus *Henipah* in the family *Paramyxoviridae*.

### Natural hosts

Nipah virus is carried by many species of fruit bats: *Pteropus hyomelanus*, *Pteropus vampyrus*, *Pteropus giganteus*, *Pteropus lylei*, *Cynopterus brachyotis*, *Eonycteris spelaea*, *Hipposideros larvatus* and an insectivorous bat: *Scotophilus kuhlii*. No illness has been recorded in bats. A range of domestic animals is susceptible including: pigs, cats, dogs, horses and humans. Disease has been experimentally transmitted in cats and hamsters. As ferrets are readily infected with Hendra virus they are likely to be susceptible to Nipah virus infection. Susceptibility of Australian wildlife to Nipah virus is unknown, but Australian feral pigs, cats, horses, etc. are thought to be susceptible.

### World distribution

Nipah virus has been isolated from fruit bats in Malaysia, Bangladesh and southern India.

A large outbreak of Nipah virus occurred in Malaysia in 1998/9. The virus killed many thousands of pigs and smaller numbers of other domestic animals and humans. In Bangladesh, Nipah virus outbreaks in humans began in 2001 and are now occurring annually, mostly between December and May. Some can be traced to spill over events from flying foxes. But other outbreaks show human to human spread

There is widespread serological antibody evidence of Henipah viruses in fruit bats wherever they occur – South East Asia, the Indian subcontinent, some Pacific islands, east coast Africa and Australia. Recently, fruit bats (genus *Eidolon*, Family *Pteropidae*) were found in Africa with antibodies to Henipah viruses. However, Henipah serology does not distinguish between Hendra and Nipah viruses – Nipah virus has not been isolated in Australia.

## Occurrences in Australia

No outbreaks of Nipah virus have occurred in Australia. Hendra virus is present in flying foxes in Australia, but Nipah virus has not been detected.

## Epidemiology

It is not known how the virus in Malaysia spread from fruit bats to pigs. However, once started, the outbreak spread through close contact with virus-laden body secretions. Incubation periods were 4 to 14 days. Clinical signs varied between age groups of pigs. Sucking pigs showed sudden death or severe respiratory and nervous signs. Mortality rates were high. Older pigs showed lower mortality rates. Asymptomatic pigs were a significant source of infection. A widespread slaughter policy culled nearly a million pigs on 950 farms, causing catastrophic damage to the pig industry. Natural cases were confirmed in dogs, cats and horses with high case fatality rates. But spread within these species was not recorded. Workers on pig farms and in abattoirs became infected with 105 deaths (40%) in 265 confirmed cases.

Multiple smaller outbreaks in humans have been occurring annually in Bangladesh and nearby southern India since 2001. At least 24 separate outbreaks occurred between 2001 and 2009. Case fatality rates are around 70% of over 200 cases and severe nervous signs in surviving cases are regularly reported. Outbreaks are caused by repeated spill over events from fruit bats. Contamination of raw date palm juice by bat saliva, urine or faeces is thought to be an important mode of infecting humans, where date palms occur. In addition, human to human cases have been recorded, usually in carers and hospital workers. Illness developed 5-15 days after close contact with infected humans.

## Clinical signs

Bats – none

Pigs and other animals – none to sudden death or fever, severe respiratory and nervous signs.

Humans – none to influenza-like signs, often progressing to respiratory failure, nervous signs and death.

## Diagnosis

A range of tests for the virus or antibodies to the virus are available including: serum neutralisation, PCR, ELISA and IFAT. The virus grows readily in tissue culture. Nipah virus is a zoonotic biosafety level 4 pathogen and extreme care must be taken in handling infected animals and collecting and testing samples.

## Pathology

Gross pathology: No significant findings or blood stained exudates from mouth, oedematous lungs.

Microscopic pathology: non-suppurative pneumonia, encephalitis, vasculitis with endothelial syncytia.

## Differential diagnoses

Bats – none

Domestic animals – a wide range of infectious diseases and toxins causing sudden death. Species specific causes of fever, respiratory and nervous signs.

Humans – a range of diseases causing respiratory and or nervous signs. The Malaysian outbreak was first thought to be Japanese Encephalitis virus.

## Laboratory diagnostic specimens

Clotted blood (10 ml), whole blood in EDTA (10 ml), fixed and fresh lung, brain and major organs and tissues. Seek advice on personal protection and inactivating the virus in the environment and in specimens before collecting samples.

## Laboratory procedures

See under “Diagnosis”.

## Treatment

There are no specific treatments although chloroquine and ribavarin have shown some promise in experimental animal studies. Human monoclonal antibody therapy has shown promise *in vitro*.

## Prevention and control

A subunit vaccine to prevent infection is being explored. Control by quarantine, test and slaughter successfully eradicated the disease in Malaysia. Environmental and personal hygiene measures will control spread, as close contact appears to be required. Nipah virus is readily inactivated by a range of disinfectants, detergents, soaps and sodium hypochlorite (bleach). Routine physical cleaning with the use of a commercial disinfectant or bleach will control the virus in the environment.

## Surveillance and management

Nipah virus is a notifiable disease in Australia. There are currently no formal surveillance or national control and eradication plans (AUSVETPLAN) for Nipah virus.

## Statistics

Wildlife disease surveillance in Australia is coordinated by Wildlife Health Australia. The National Wildlife Health Information System (eWHIS) captures information from a variety of sources including Australian government agencies, zoo and wildlife parks, wildlife carers, universities and members of the public. Coordinators in each of Australia's States and Territories report monthly on significant wildlife cases identified in their jurisdictions. NOTE: access to information contained within the National Wildlife Health Information System dataset is by application. Please contact [admin@wildlifehealthaustralia.com.au](mailto:admin@wildlifehealthaustralia.com.au).

## Research

Susceptibility of native wildlife species to Nipah virus is a key research question. CSIRO AAHL has an ongoing research program on Henipah viruses, including development of therapeutic and control agents.

## Human health implications

OIE and Australian health authorities recognise Nipah virus as a very serious zoonosis with a high case fatality rate of 40 to 70 %.

## Conclusions

Nipah virus is a zoonotic disease with a natural reservoir in fruit eating bats. It is closely related to Hendra virus which is carried by Pteropid bats (flying foxes) in Australia and causes small but fatal outbreaks in horses each year. Spill over of Hendra virus from horses to humans has occurred several times in Australia.

Nipah virus has the potential to cause outbreaks in pigs if introduced into Australia, with serious risks to pig industry workers. Wildlife workers handling bats should protect themselves against potential zoonotic infections of bats including Nipah virus.

## References and other information

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## To provide feedback on this fact sheet

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