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Viruses in May

A Morbillivirus That Caused Fatal Disease in Horses and Humans

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A morbillivirus has been isolated and added to an increasing list of emerging viruses. This virus caused an outbreak of fatal respiratory disease in horses and humans. Genetic analyses show it to be only distantly related to the classic morbillus viruses rinderpest, measles, and canine distemper. When seen by electron microscopy, viruses had 10- and 18-nanometer surface projections that gave them a "double fringed" appearance. The virus induced syncytia that developed in the endothelium of blood vessels, particularly the lungs.

Hendra virus: a paramyxovirus

- First identified in the Brisbane suburb of Hendra, 1994
- Responsible for a fatal disease in 102 horses and 4 of 7 infected humans

HeV risk factors

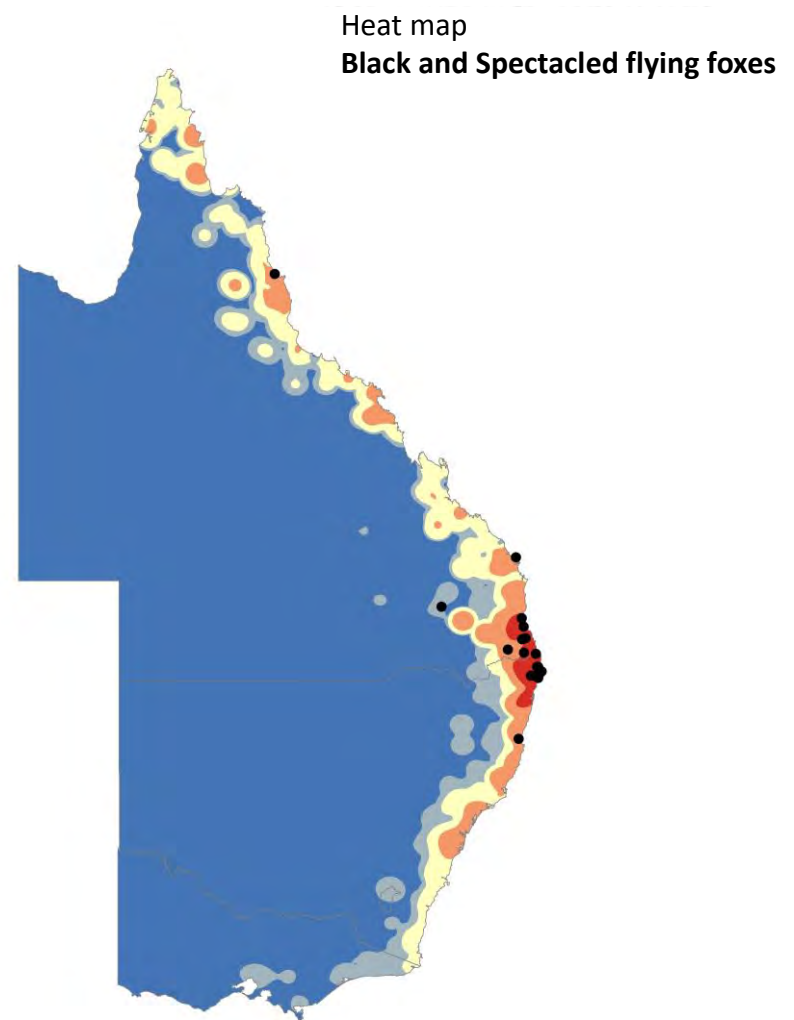
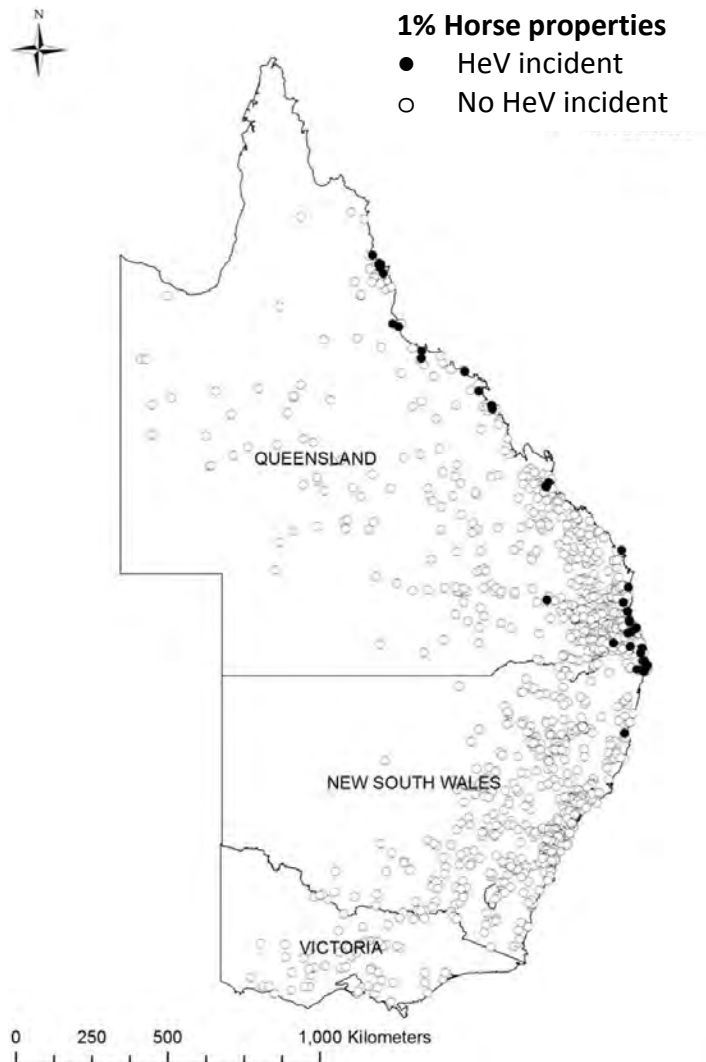
- Presence of **horses**
- Presence of **Black and Spectacled flying foxes**
- Climate (microclimate) that supports **HeV survival in the environment**



Black flying fox



Spectacled flying fox



The density of two related species of flying-fox, *P. alecto* (Black) and *P. conspicillatus* (spectacled), has a strong positive correlation with equine case locations (Smith *et al* 2014)

How to catch a flying fox







Satellite telemetry

Black flying foxes – Boonah, Gayndah, Charters Towers

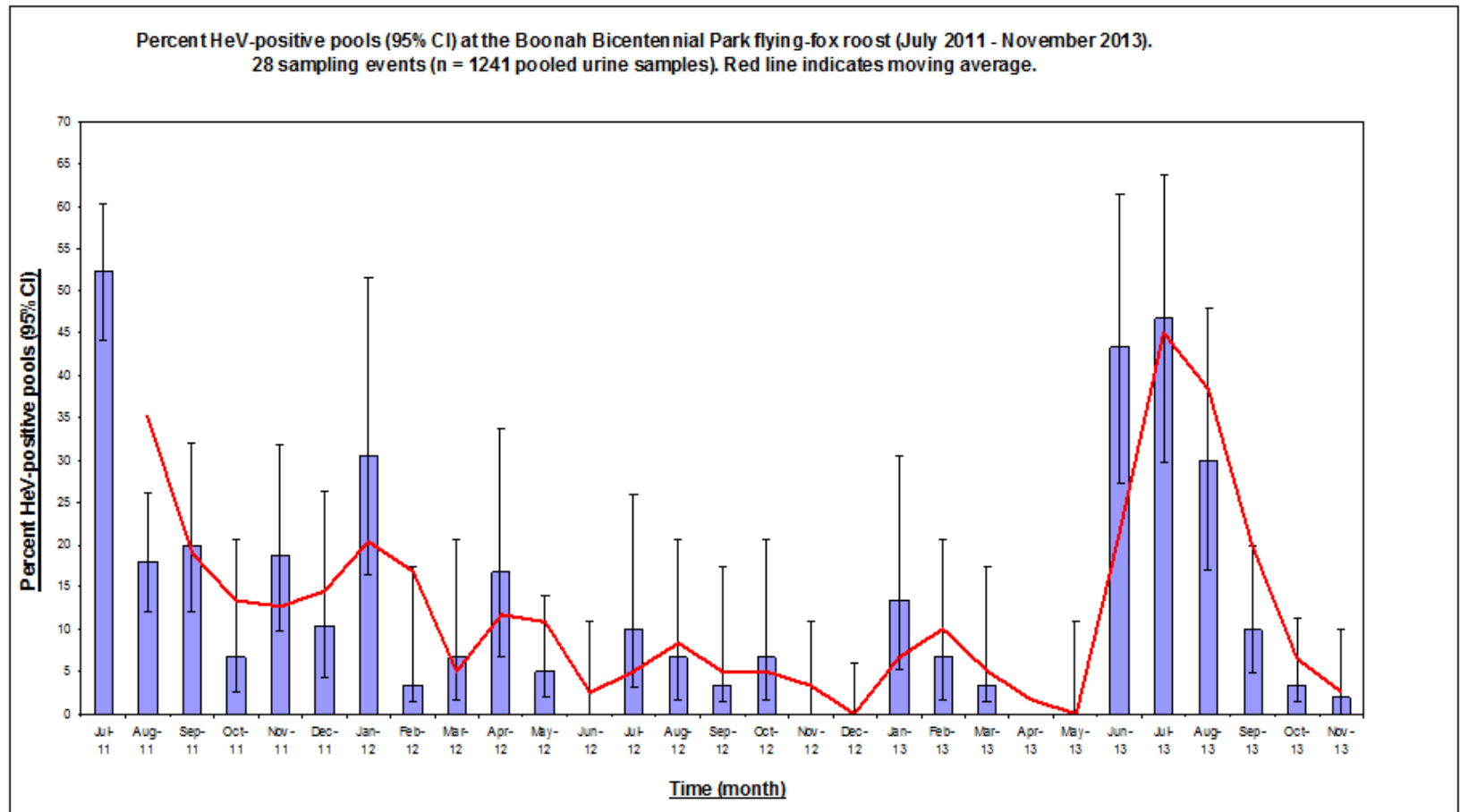
Little red flying foxes – Duaringa, Gayndah



Under (day) roost sampling



Boonah – under roost % positive pools





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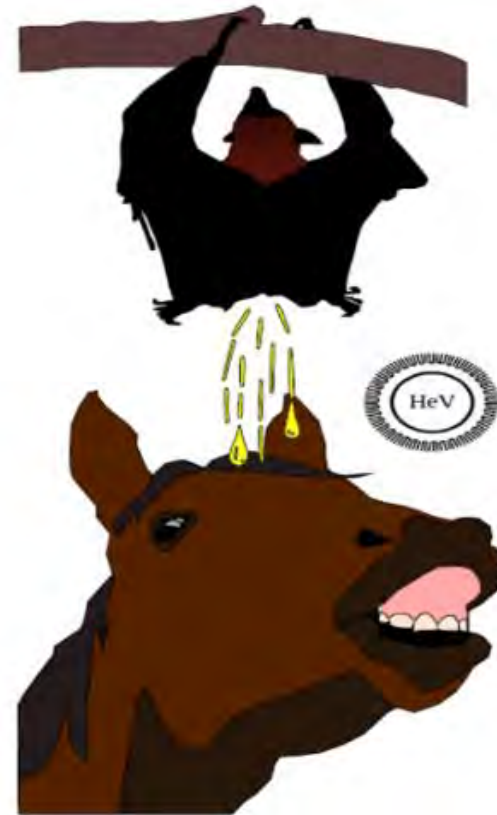




How are horses infected?



Horse ingests bat excreta - indirect



Direct exposure to bat excreta

Menangle virus

- One incident – NSW piggery 1997
- Stillbirths and neonatal deformities in pigs
- Flu-like illness in 2 piggery workers
- Maintenance host believed to be flying foxes
- No further incidents



Nipah Virus – two stories

1. Malaysia and Singapore – **pigs as intermediate amplifying hosts**
 - cull of 1 million pigs
 - death of over 100 people





Dr Craig Smith and friend



Nipah Virus – two stories

2. India and Bangladesh – **indirect transmission between bats and humans**

- inadvertent ingestion of bat urine/excreta
- death of over 140 people in >10 incidents

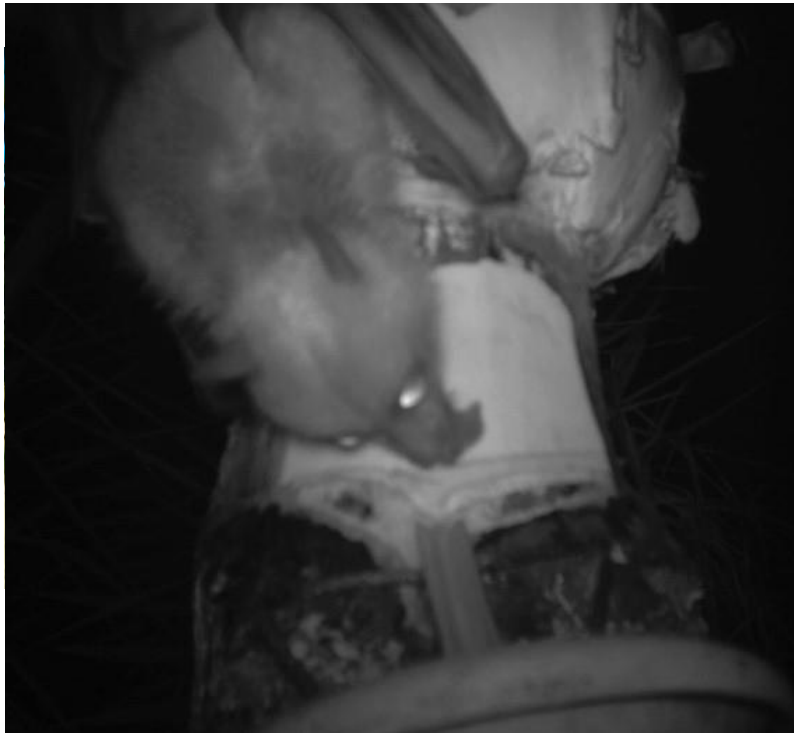
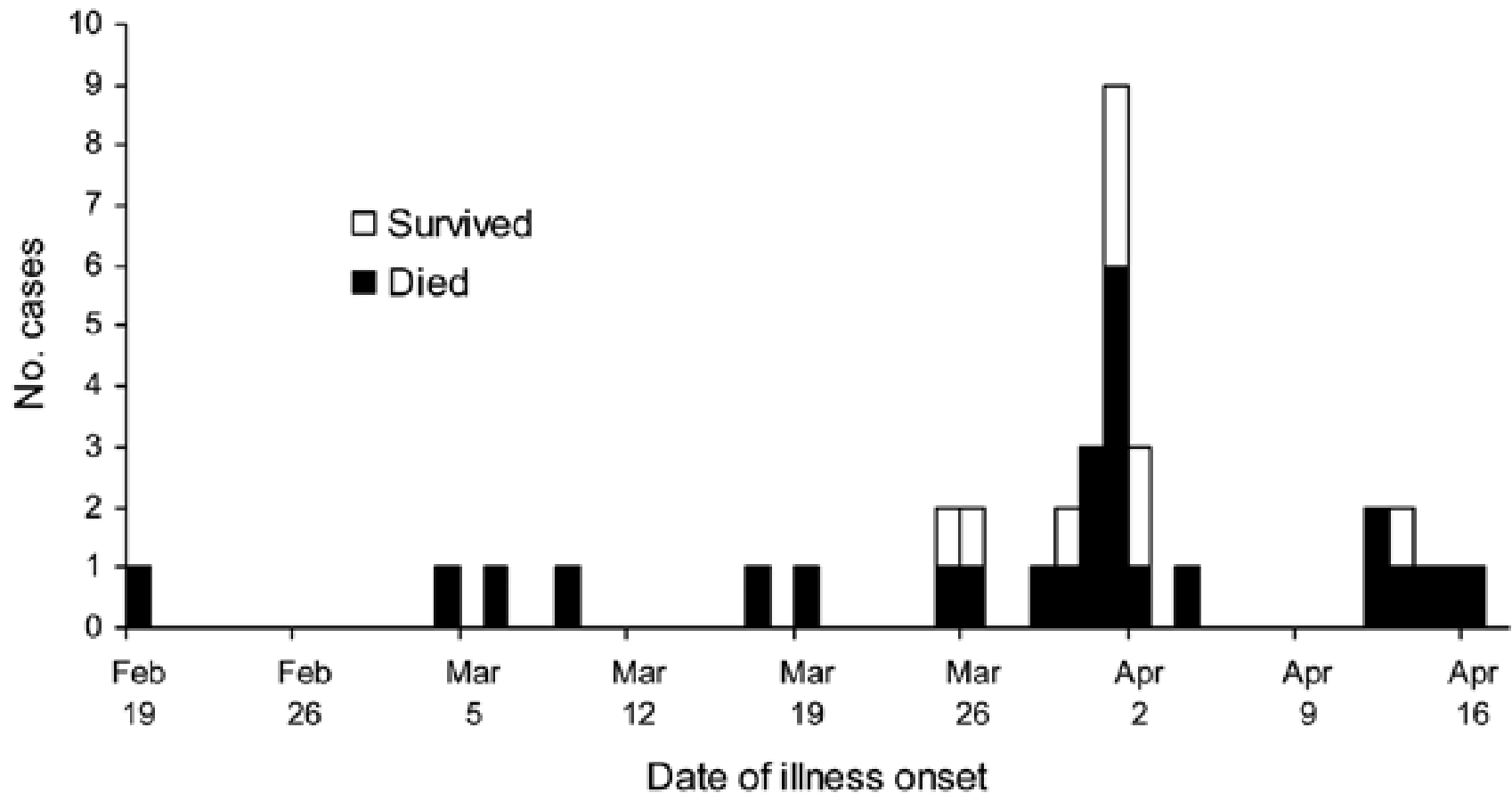


Photo: Emily Gurley



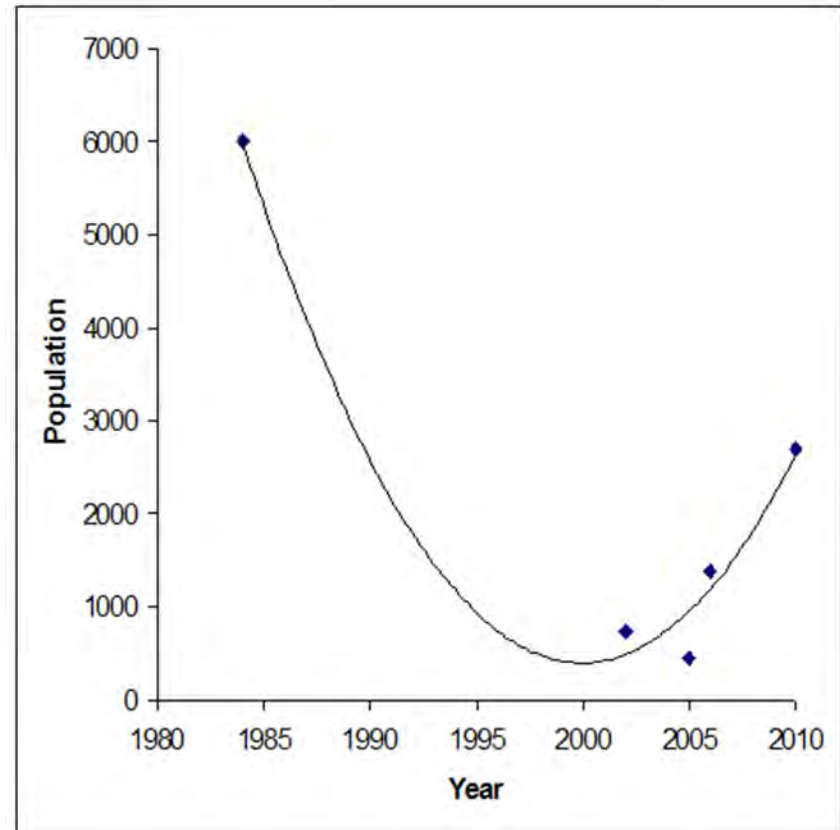
Person-to-person transmission of Nipah virus in a Bangladeshi community, 2004 (Gurley et al 2007)







Christmas island flying fox







Thank You