

# Zoonoses in Australian bats

## Fact sheet

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### Introductory statement

Worldwide, bats have been identified as reservoir hosts for several emerging zoonotic diseases. Although bats harbour less than 2% of human pathogens globally, the taxon has gained attention because of the potentially high human mortality rates associated with some of the diseases carried by bats (Dobson 2005). Some of these diseases are exotic to Australia e.g. severe acute respiratory syndrome (SARS), Nipah virus and Ebola virus. This fact sheet summarises information on zoonotic diseases found in Australian bats, including Australian bat lyssavirus (ABLV), Hendra virus (HeV), Menangle virus (MenPV) and *Leptospira* bacteria (see Table 1). More detail on ABLV, HeV, MenPV, leptospirosis, bat coronaviruses and exotic pathogens of bats such as Tioman virus and Nipah virus, is provided in specific WHA fact sheets.

### Aetiology, natural hosts and occurrence in Australia

Table 1 provides a summary of the more important zoonotic diseases of Australian bats.

### World distribution

Evidence of HeV infection and the related Nipah virus have been found in bats outside Australia. *Leptospira* spp. are widespread globally. ABLV and MenPV have not been found outside Australia. Outside Australia, bats have been found to be carriers of a range of zoonotic viruses, enteropathogenic bacteria, arthropod-borne bacteria and *Pasteurella* spp. (Luis et al. 2013; Mühldorfer 2013; Smith and Wang 2013).

**Table 1:** Summary information on zoonotic diseases of Australian bats

Pathogen	Bat species involved	Occurrences in Australia	Main routes of infection to humans	Clinical signs in bats	Clinical signs in humans and other animals	Prevention in humans <sup>1</sup>
Australian bat lyssavirus (rhabdovirus)	Infection found in all four mainland species of flying-fox ( <i>Pteropus</i> spp.) and yellow-bellied sheath-tailed bat; serological evidence in other bat species; assume all Australian bat species are potential hosts	Widespread, assume all areas of the country	Bite or scratch from an infected bat, or saliva contamination of mucous membranes/broken skin	Acute, fatal neurological disease	Acute, fatal neurological disease in humans	Only rabies-vaccinated people, experienced in handling bats and wearing appropriate personal protective equipment (PPE) should handle, rescue or examine a bat. <b>IMMEDIATE first aid</b> and medical attention in the event of bite, scratch or other significant contact with a bat <sup>2</sup>
Hendra virus	All four mainland species of Australian flying-fox. Black ( <i>P. alecto</i> ) and spectacled ( <i>P. conspicillatus</i> ) are believed to be the reservoir hosts and source of HeV infection in horses	Widespread evidence of infection in flying-foxes  Disease in horses only reported in Qld and northern NSW	Humans only acquire infection from diseased horses through close contact. Horses infected via flying-fox urine, body fluids or excretions	No evidence of clinical disease	Severe neurological or respiratory signs (frequently fatal) in humans and horses	Vaccination of horses; limiting exposure of horses and their feed to flying-fox contamination; appropriate personal protective equipment, particularly when dealing with sick horses

<sup>1</sup> Readers should seek further advice from their local medical professional.

<sup>2</sup> Department of Health. Rabies Virus and Other Lyssavirus (Including Australian Bat Lyssavirus) Exposures and Infections. CDNA National Guidelines for Public Health Units. Canberra. 2014. Available from [www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-abvl-rabies.htm](http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-abvl-rabies.htm).

Pathogen	Bat species involved	Occurrences in Australia	Main routes of infection to humans	Clinical signs in bats	Clinical signs in humans and other animals	Prevention in humans
Menangle virus	Antibodies (but not virus) found in all four mainland species of Australian flying-fox.	Appears widespread in flying-foxes; evidence of infection in NSW, Qld and WA. Disease in pigs and humans only reported in single outbreak in NSW.	Humans only acquire infection from diseased pigs. Bat to pig transmission hypothesised as faecal-oral.	No evidence of clinical disease.	Flu-like symptoms in humans; reproductive failure and foetal malformation in pigs.	Manage contact between flying-foxes and pigs. Investigate illness in pigs. Appropriate PPE when working with pigs.
<i>Leptospira</i> spp.	Evidence of infection found in all four mainland species of Australian flying-fox.	Evidence of infection in NSW, Qld, WA and NT.	Urine contamination of mucous membranes, contact with contaminated water, soil or food.	No evidence of clinical disease.	Generally mild illness, may progress to serious multi-organ disease in humans.	Hygiene; avoid direct contact of mucous membranes and wounds, with urine, contaminated water, soil or food. Infection is treated with systemic antibiotics.

## Significance, prevention and management of human infection

**ABLV** is of significant public health concern because infection causes an acute, fatal, neurological disease in humans. All Australian flying-foxes and microbats, regardless of their clinical state, should be handled as if potentially infected with ABLV. **Immediate action is required if people (or domestic animals) have been potentially exposed to ABLV (e.g. via a bat bite, scratch or other significant contact). Only rabies-vaccinated people who are experienced in handling bats and wearing appropriate personal protective equipment (PPE) should handle, rescue or examine a bat. ABLV is a notifiable human disease.** See ABLV fact sheet and your jurisdictional human health agency website for more information.

**Hendra virus (HeV)** causes a potentially fatal disease of horses and humans. Horses are infected directly from flying-foxes or via their secretions and excretions. All human cases have resulted from direct contact with infected horses. Infection in humans results in fever, and neurological or respiratory signs. Of seven reported human cases, four have resulted in death (Queensland Health 2011). Prevention of HeV infection in horses and humans is aided by use of vaccination in horses, limiting exposure of horses and their feed to flying-fox contamination, and by use of appropriate personal protective equipment, particularly when dealing with sick horses and undertaking post mortem examination of suspect horse cases. To manage risk of transmission, domestic animals, in particular horses and dogs, should be denied access to flying-fox colonies and any material such as fruit that could be contaminated with flying-fox urine, faeces or birthing fluids. Appropriate personal protective equipment is required for anyone investigating suspicious cases in horses.

**MenPV** infection appears to cause a flu-like illness with affected people experiencing malaise, fever, chills, headaches, myalgia and a red rash on the torso. Duration of symptoms is approximately 10 days (Chant et al. 1998). Direct and indirect contact between flying-foxes and pigs should be managed and signs of illness or reproductive disease in pigs should be investigated.

**Leptospirosis** infection in humans may result in mild or inapparent disease, occasionally severe disease results in significant health issues. Vaccination of domestic animals is recommended, but is not practical for wildlife and feral species. Good hygiene should be exercised by those people who handle animals likely to carry the disease. This includes washing hands, and ensuring cuts and abrasions are well covered by bandages before handling the animals. Where appropriate other personal protective equipment should also be used to protect against exposure.

## Conclusions

It is likely that these diseases are emerging, at least partly, because of factors which bring bats into closer proximity with humans and domestic animals. Bats play an important ecological role as plant pollinators and consume vast quantities of potentially damaging insects. While it is important to alert people to the potential risks associated with close contact with bats, there are effective preventative measures for the zoonotic diseases of Australian bats, and the public also needs to be informed of the important role bats play in maintaining biodiversity and ecosystem integrity. Ongoing research is required to determine the reasons for the emergence of these zoonotic diseases and their spillover into both animal and human hosts.

## References and other information

Chant K, Chan R, Smith M, Dwyer DE, Kirkland P (1998) Probable human infection with a newly described virus in the family Paramyxoviridae. The NSW Expert Group. *Emerging Infectious Diseases* **4**, 273.

Communicable Diseases Network, (2014) Rabies Virus and Other Lyssavirus (Including Australian Bat Lyssavirus) Exposures and Infections. Department of Health, Canberra, ACT.

Dobson AP (2005) What links bats to emerging infectious diseases? *Science* **310**, 628-629.

Luis AD, Hayman DT, O'Shea TJ, Cryan PM, Gilbert AT, Pulliam JR, Mills JN, Timonin ME, Willis CK, Cunningham AA (2013) A comparison of bats and rodents as reservoirs of zoonotic viruses: are bats special? *Proceedings of the Royal Society of London B: Biological Sciences* **280**, 20122753.

Mühldorfer K (2013) Bats and bacterial pathogens: a review. *Zoonoses and Public Health* **60**, 93-103.

Queensland Health (2011) 'Hendra Virus Infection Queensland Health Guidelines for Public Health Units.' Available at <https://www.health.qld.gov.au/cdcg/index/hendra.asp#ip> [Accessed 15 January 2016].

Smith I, Wang L-F (2013) Bats and their virome: an important source of emerging viruses capable of infecting humans. *Current Opinion in Virology* **3**, 84-91.

**See also federal, state or territory government fact sheets on the diseases mentioned here.** For example:

Rabies, Australian bat lyssavirus and other lyssaviruses – Information for consumers (Department of Health) [www.health.gov.au/internet/main/publishing.nsf/Content/ohp-rabies-consumer-info.htm](http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-rabies-consumer-info.htm)

Rabies and ABLV Series of National Guidelines (SoNG) [www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-abvl-rabies.htm](http://www.health.gov.au/internet/main/publishing.nsf/Content/cdna-song-abvl-rabies.htm) (Communicable Diseases Network 2014).

Qld Health fact sheet on leptospirosis <http://conditions.health.qld.gov.au/HealthCondition/condition/14/33/88/Leptospirosis>

Qld Health Hendra Virus Infection Health Guidelines for Public Health Units [www.health.qld.gov.au/cdcg/index/hendra.asp#ip](http://www.health.qld.gov.au/cdcg/index/hendra.asp#ip)

Qld Department of Agriculture and Fisheries “Australian bat lyssavirus guidelines for veterinarians” <https://www.daf.qld.gov.au/animal-industries/horses/horse-health-and-disease-management/information-for-veterinarians/australian-bat-lyssavirus-handling-guidelines> and NSW government document [http://www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0007/513547/Australian-bat-lyssavirus-guidelines-for-veterinarians.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0007/513547/Australian-bat-lyssavirus-guidelines-for-veterinarians.pdf).

NSW DPI bats and health risks fact sheet [www.dpi.nsw.gov.au/\\_data/assets/pdf\\_file/0010/367255/Bats-and-health-risks.pdf](http://www.dpi.nsw.gov.au/_data/assets/pdf_file/0010/367255/Bats-and-health-risks.pdf)

The Australian Immunisation Handbook <http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home~handbook10part4~handbook10-4-16>

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## To provide feedback on this fact sheet

We are interested in hearing from anyone with information on these conditions in Australia, including laboratory reports, historical datasets or survey results that could be added to the National Wildlife Health Information System. If you can help, please contact us at [admin@wildlifehealthaustralia.com.au](mailto:admin@wildlifehealthaustralia.com.au).

Wildlife Health Australia would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to [admin@wildlifehealthaustralia.com.au](mailto:admin@wildlifehealthaustralia.com.au). We would also like to hear from you if you have a particular area of expertise and would like to produce a fact sheet (or sheets) for the network (or update current sheets). A small amount of funding is available to facilitate this.

## Disclaimer

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