Zoonoses in Australian bats

Fact sheet

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

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


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


**Acknowledgements**

We are extremely grateful to the many people who had input into this fact sheet. Without their ongoing support production of these fact sheets would not be possible.

Updated: February 2018

**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. 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.

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