

# Country Report: Australia

## Update of rabies and lyssavirus situation in Australia

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AUSTRALIAN ANIMAL HEALTH LABORATORY (AAHL)  
[www.csiro.au](http://www.csiro.au)

Launching meeting for OIE twinning project for rabies, Anses-Nancy and AHRI.  
Taiwan, 18-19 October 2018



# Australian Animal Health Laboratory (AAHL)



AAHL

# Overview

- Rabies situation in Australia
- Bat lyssavirus situation in Australia
- Rabies prevention
- Policies for rabies control
- Lyssavirus research at AAHL

# History of Rabies in Australia

- 1867: minor outbreak in dogs in Tasmania (unconfirmed). One human case.
- 1987: Human case, acquired from Asia
- 1990: Human case, acquired from Vietnam (incubation >5 years)
- No endemic rabies (Genotype 1) in Australia

# Australian bat lyssavirus (ABLV)



Earliest reported case: 1995

Endemic in flying foxes (*Pteropus* spp.)

Two viral species:

- Flying fox variant
- Variant of yellow-bellied sheath-tail bat

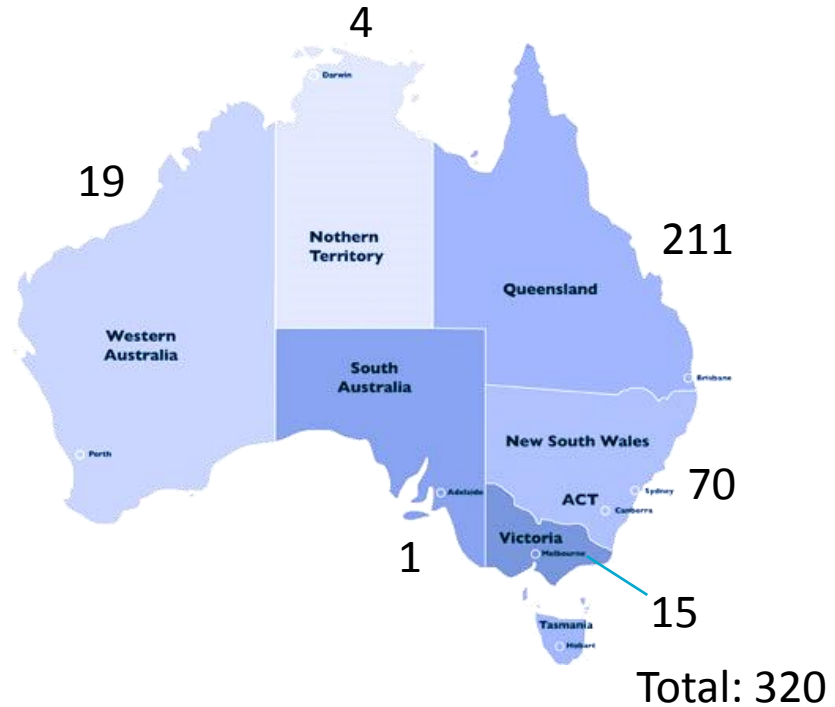
Human cases: 3

Horse cases: 2

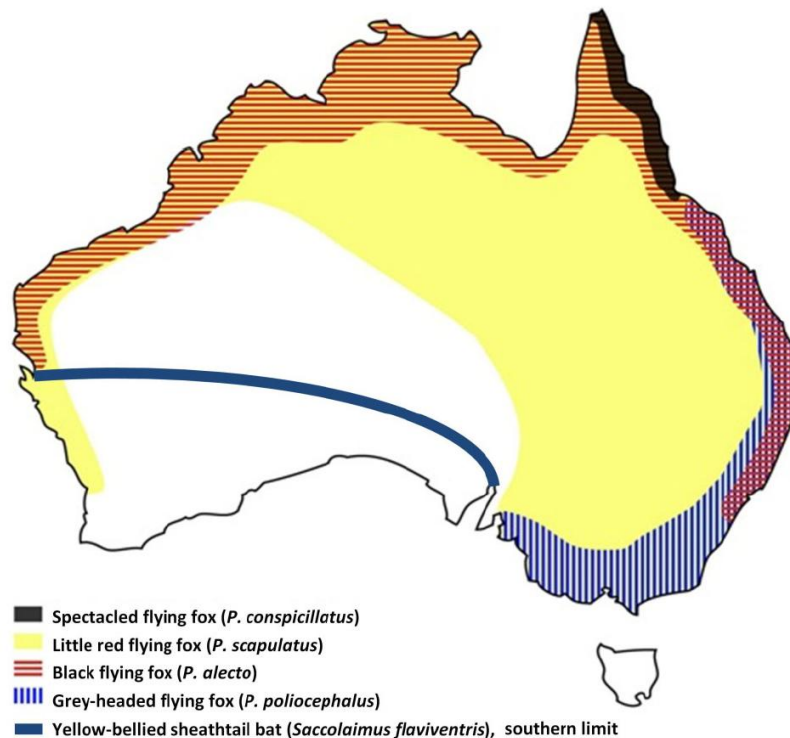
Grey headed flying fox  
(*Pteropus poliocephalus*)

# ABLV in bats

Laboratory-confirmed ABLV cases  
in bats since 1995  
(to June 2018)



# Distribution of ABLV bat hosts



Annand & Reid 2014 AVJ 92:324-332

# ABVL in other species

- 3 human cases:
  - 1996: YBSB variant, bat carer
  - 1998: flying fox variant, 27 months incubation
  - 2013: flying fox variant, uncertain contact history
  - All from Queensland
  - None had received vaccine
- 2 horse cases
  - 2013: 2 horses in single outbreak, YBSB variant



# ABLV prevention and control

- No specific control measures in bats (bats are protected species)
- Public awareness – avoidance of bats
- Destruction and testing of suspect bat cases
- Post-exposure vaccination of in-contact humans and animals
- Pre-exposure vaccination of people susceptible to occupational contact (eg. bat carers, vets)

# Australia's Rabies Prevention Policy

- Australia is free of rabies virus (Genotype 1 lyssavirus)
- Advantage of being an island
- Freedom is maintained by:
  - Pre-border support measures
  - Border controls
  - National surveillance and diagnostic capability
  - Policy support for disease response

# Rabies prevention: Pre-border

- Surveillance support for Papua New Guinea and Indonesia
  - Laboratory support (equipment, reagents)
  - Training for laboratory and field staff
  - RIAD test: Antigen detection using a peroxidase-based system. Suitable for labs without a fluorescent microscope.

# Border controls: Pet importation

- Restrictions on pet travel into Australia
  - Subject to vaccinations and health status
- Restrictions are based on category of country of origin
  - Short quarantine for pets from approved countries
  - Pets from unapproved countries need to live in an approved country for 6 months

# Vaccination of animals

- Vaccination of pets not routinely practiced
- Exceptions:
  - Pets traveling to other countries
  - Animals exposed to ABLV
- Vaccination would be implemented if an outbreak of rabies was to occur

# Ausvetplan

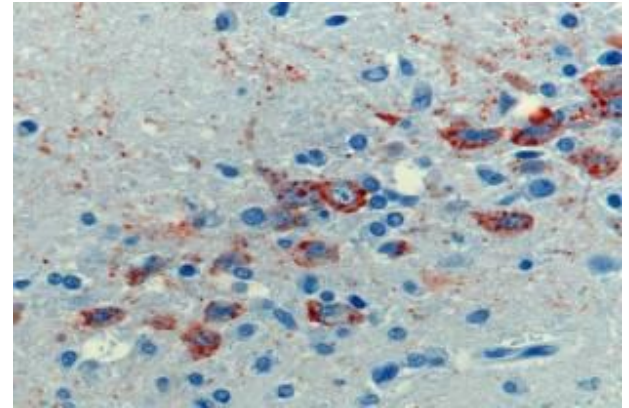
- Australian Veterinary Emergency Plan (Ausvetplan)
  - A reference resource for veterinary personnel in the event of an outbreak
  - Describes scientific knowledge and policy for containing an outbreak
  - Available on Animal Health Australia webpage
- Emergency Animal Disease Response Agreement
  - Cost-sharing agreement for significant animal diseases
  - Rabies = Category 1 disease (major impact on human health, minimal impact on animal industries)
  - 100% funded by government

# Rabies activities at AAHL



# Laboratory diagnosis

- Laboratory diagnosis for rabies conducted at AAHL
- Diagnosis for ABLV conducted at AAHL and in some state labs (Queensland and New South Wales)
- Diagnostic tests
  - FAT and PCR
  - Sequencing of positives, when necessary
  - Immunohistochemistry (fixed tissues)
  - Cell culture





# Laboratory diagnosis – antibody detection

## Antibody detection tests at AAHL

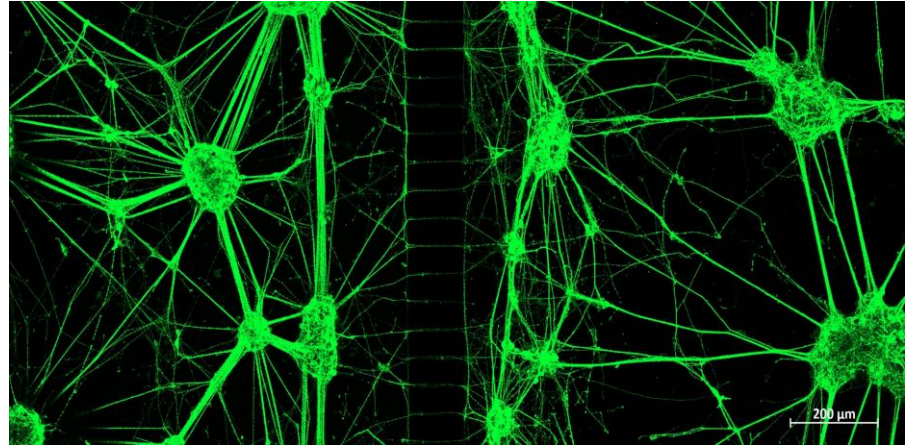
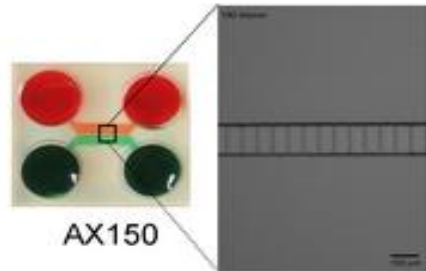
- Fluorescent antibody virus neutralisation (FAVN) test
- Confirmation of vaccine response (human)
- Pet travel certification schemes

# Regional programme

- Laboratory support
  - Reagents: polyclonal antibodies and conjugate
  - Training for laboratory and field staff
  - RIAD test: Rabies Immunoperoxidase Antigen Detection – development and validation. Suitable for labs without a fluorescent microscope.

# Rabies activities at AAHL

- Study of pathogenesis at cellular and molecular levels
- Use of novel biological models
  - Neuron cultures
  - Animal models



Stem cell derived human neuron culture, MAP2 stain

# References

- AUSVETPLAN: <https://www.animalhealthaustralia.com.au/our-publications/ausvetplan-manuals-and-documents/>. Animal Health Australia policy documents for response to animal disease events in Australia.
- ABLV Bat Stats: <http://www.wildlifehealthaustralia.com.au/>. A report of the ABLV situation in Australia, issued every 6 months, including information on cases, ABLV testing and other interesting facts about ABLV and bat health.
- Annand EJ and Reid PA (2014). Clinical review of two fatal equine cases of infection with the insectivorous strain of Australian bat lyssavirus. *Australian Veterinary Journal* **92**: 324-332.
- Rahmadane et al. (2017) Development and validation of an immunoperoxidase antigen detection test for improved diagnosis of rabies in Indonesia. *PLoS Negl Trop Dis* **11**(11): e0006079

## **Abstract:** Country report for rabies: Australia, 2018

To date, Australia remains free of genotype 1 rabies lyssaviruses. Two cases, in 1987 and 1990, have been reported in humans, both acquired from outside Australia. Control measures for rabies virus include pre-border and border controls, along with national surveillance. Lyssavirus belonging to genotype 7 (Australian bat lyssavirus), is endemic in bat populations along the northern and eastern coastal areas. Three human cases of Australian bat lyssavirus have been reported and two cases have been reported in horses. This report describes the current and recent historical situation and control measures for lyssavirus in Australia.

# Thank you

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