



Paralysis event in flying-foxes Qld & NSW

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Paralysis event - background

- **When:** December 2020 to May 2021
- **Where:** Range of locations across South East Qld & northern NSW
- **What:** Reports from carers and vets of large numbers of flying-foxes with neurological signs
- WHA received reports detailing >200 affected bats, anecdotally much larger numbers
- Wildlife rehabilitators and vets submitted affected bats to the Qld Biosecurity Sciences Laboratory (BSL)

All bat submissions to BSL - Qld

	No. submissions	No. pet contact (%)	No. neuro/sick (%)	Paralysis syndrome	No. tested for ABLV	ABLV-positive
Dec 2020	21	12 (57)	9 (43)	1	19	3
Jan 2021	39	4 (10)	35 (90)	27	39	6
Feb 2021	22	6 (27)	16 (73)	10	21	5
Mar 2021	19	16 (84)	3 (16)	1	19	2
Apr 2021	19	12 (63)	7(37)	3	18	2
May 2021	15	6 (40)	9 (60)	3	15	1
Totals	135	56 (41)	79 (59)	45	131	19

- Long term testing data: pet contacts comprise 58-81% of bats submitted
- A few dog contact cases were likely part of paralysis event e.g. bat noted hanging low in bush the day attacked by dog
- Not all bats submitted can be tested for ABLV as suitable sample may not be available

Signalment - bats to BSL Qld

Submissions – paralysis event

- **Species**

- **Black flying-fox**
- **Little red flying-fox**
- Grey-headed flying-fox
- Reported: Spectacled flying-fox (no submissions)
- Reports showed similar species range

	BFF	LRFF	GHFF	Total
Dec 2020	1	0	0	1
Jan 2021	16	11	0	27
Feb 2021	2	8	0	10
Mar 2021	0	1	0	1
Apr 2021	1	2	0	3
May 2021	0	1	2	3
Total	20	23	2	45

- **Sex & age**

- Both sexes, mostly adult, some pregnant little red flying-foxes

- **Nutritional status**

- Variable: very poor to obese

Clinical signs

- Paresis/paralysis
- Protruding tongue, inability to swallow, mouths often filled with dirt
- Often markedly dehydrated
- Unable to blink - corneal ulcers/oedema
- Respiratory difficulty
- Many found on ground or hanging low in vegetation
- Other reported signs: nystagmus, anisocoria (unequal pupil size), head tremor, aggressive, reactive, frothing at mouth

Outcome:

- Most died or were euthanased
- Small number of milder cases recovered with supportive treatment

Laboratory investigation - BSL

- **Necropsy:** 45 bats
- **Histopathology:**
 - Brain (20)
 - Spinal cord (5)
 - Peripheral nerve (4)
 - Skeletal muscle (11)
- **ABLV exclusion:** 45 bats (qPCR +/- FAT)
- **Botulinum C/D toxin ELISA:** 9 bats (blood and/or GIT)
- **Botulinum C/D toxin PCR:** 6 bats (DPIRD, WA) (blood and/or GIT)

Summary of laboratory findings - BSL

- **Necropsy:**
 - Unusual or mild trauma (non life-threatening or healing fractures, mild contusions)
 - No paralysis ticks or tick attachment sites detected
 - Some bats had large numbers of bat flies (up to 20) – inability to groom?
- **Histopathology:**
 - No consistent lesions in central nervous system
 - Frequent aspiration pneumonia, especially in BFF
 - *Hepatocystis* sp. schizonts in LRFF, especially lung – generally incidental finding
 - No sign of *Angiostrongylus* sp. adults or larvae ('rat lungworm')
- **ABLV testing:** All negative
 - Other bats tested positive around this time, including a cluster of LRFF
- **Botulinum C/D toxin ELISA and PCR:** All negative

Conclusion

- **Case definition: Neurological signs with no apparent cause**
(but complete diagnostic workup rare)
- **Ruled out by testing and/or nature of the event:**
 - ABLV
 - Botulism
 - Tick paralysis
 - Angiostrongylosis
- **No evidence of infectious disease**
- **Possible cause: Toxic (e.g. plant toxin) or metabolic disease?**
Cause difficult to determine: long distance travel between foraging and roost sites, broad geographic range of the event
- **Next steps?**

Disease reporting

What to look out for

- Anything unusual for bats in your area, for example:
 - Increased numbers of sick or dead bats
 - Unusual signs
 - Change in pattern of a known disease e.g. different species or age class, new location, change in seasonality

REPORT AN INCIDENT

If you see any unusual signs of disease or deaths in wildlife you can report it to:

- Your **State/Territory WHA Coordinator** [🔗](#)
- the 24 hour **Emergency Animal Disease Watch Hotline** [🔗](#) on freecall **1800 675 888***
- your local veterinarian
- the Department of Primary Industries or Agriculture in the State/Territory in which the event is occurring/occurred.

Please complete the **Wildlife Incident Submission Form** and provide to your WHA coordinator to help them determine the level of response.

Keeping up-to-date

- Wildlife Health Fact Sheets

Australian bat lyssavirus

Fact sheet

Introduction

Australian bat lyssavirus (ABLV) belongs to the same family as (but is antigenically distinct to) the rabies virus. ABLV causes similar clinical signs to rabies in affected people and animals. Bats are the natural reservoirs for the virus. Both flying-foxes and insectivorous bats (or 'microbats') may be infected. ABLV is of significant public health concern because infection causes an acute, fatal, neurological disease in humans.


Aetiology

The causative agent of ABLV is a virus: family *Rhabdoviridae*, genus *Lyssavirus* genotype 7 (van Regenmortel et al. 2000). Other lyssavirus genotypes (2, 4, 5 and 6) solely or mainly affect bats; classical rabies is genotype 1. There are two known sub lineages of ABLV, the yellow-bellied sheath-tailed bat variant and pteropid variant (Hooper et al. 1997; Gould et al. 2002; Barrett 2004).

Natural hosts

ABLV infections have been detected in all four of the mainland species of flying-fox in Australia:

- *Pteropus alecto* (black flying-fox)
- *P. scapulatus* (little red flying-fox)
- *P. poliocephalus* (grey-headed flying-fox)
- *P. conspicillatus* (spectacled flying-fox).

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FACT SHEETS

This area of the website contains brief, factual information on what we do and don't know about wildlife health conditions in Australia.

For many these fact sheets will be their source of truth and they need to be kept up to date. If you think you know more than is presented, feel you can contribute, offer advice or criticism, or have a condition you would like to see included, please send us an email at: admin@wildlifehealthaustralia.com.au. We are especially keen to hear from those who are actively working, researching or publishing in these areas. A small amount of funding is available to assist.


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General Fact Sheets

Amphibians

Birds

Mammals

-  Australian Bat Lyssavirus Mar 2019 (2.2)
-  Australian Marine Mammals and Biotoxins Jun 2011 (1.1)
-  Australian Marine Mammals and Brucella Jun 2019 (1.3)
-  Australian Marine Mammals and Pollutants May 2011 (1.1)
-  Bandicoot Papillomatosis and Carcinomatosis Syndromes Apr 2008 (1.1)
-  Besnoitia in Australian Wildlife Jul 2011 (1.2)
-  Blastocystis in Australian Wildlife Jul 2011 (1.1)
-  Cetacean Morbilliviruses in Australian Whales and Dolphins Jun 2013 (1.4)
-  Chlamydia in Koalas Feb 2014 (1.1)
-  Coccidia in Kangaroos Jul 2011 (1.1)
-  Coronaviruses in Australian Bats Feb 2017 (2.0)
-  Cryptococcosis in Koalas Mar 2014 (1.1)
-  Disease Agents Identified in Feral Animals in Australia May 2013 (1.4)
-  Epidemic Blindness in Kangaroos Nov 2010 (1.3)
- Hendra virus and Australian Wildlife Jun 2017 (3.0)
- Hydatid Disease in Australian Wildlife Dec 2018 (3.2)

Keeping up-to-date

- ABLV Bat Stats

- COVID-19 & Bats

ABLV BAT STATS



Australian Bat Lyssavirus Report - June 2020

Cases of ABLV infection - January to June 2020

Ten cases of Australian bat lyssavirus (ABLV) infection were reported in bats in Australia between January and June 2020, four from New South Wales, four from Victoria and two from Queensland (Table 1). These cases are described below.

New South Wales

Three grey-headed flying-foxes (*Pteropus poliocephalus*) and an unspecified flying-fox (*Pteropus* sp.) from the south coast, Sydney and northern rivers regions of NSW were found to be infected with ABLV in the first half of 2020. All four presented with neurological signs. One bat was found hanging low in a tree, then fell and showed jerking movements and head tremors. The others presented with various signs such as twitching, shaking, biting, change in voice and weakness in the legs.

Victoria

Four grey-headed flying-foxes from the Melbourne region were found to be infected with ABLV from January to June. One presented with neurological signs and died in transit. Two were found on the ground, and one was found with a broken foot.

(continued overleaf)



Table 1: ABLV infection in Australian bats as confirmed by FAT, PCR, IHC and/or virus isolation^a

YEAR	NSW	NT	QLD	VIC	WA	SA	Total
1995	0	0	1 ^a	0	0	0	1
1996	1	0	9	1	0	0	11
1997	7	1	27 ^a	0	0	0	35
1998	1	0	26 ^a	0	0	0	27
1999	0	0	6	0	0	0	6
2000	1	0	14	0	0	0	15
2001	0	0	9	1	4	0	14
2002	4	0	10	2	1	0	17
2003	5	0	3	2	0	0	10
2004	5	0	6	1	0	0	12
2005	6	0	5	0	0	0	11
2006	2	0	4	0	0	0	6
2007	6	0	2	0	0	0	8
2008	0	0	0	0	0	0	0
2009	2	0	8 ^a	0	0	0	10
2010	0	0	8	0	1	0	9
2011	0	0	4 ^a	2	0	0	6
2012	1	0	3	0	0	1	5
2013	3 ^a	0	11 ^a	0	0	0	14
2014	5	1	14 ^a	1	11 ^a	0	32 ^a
2015	10	1	11 ^a	0	0	0	22
2016	5	1	8 ^a	1	0	0	15 ^a
2017	4 ^a	0	19 ^a	3	2	0	28 ^a
2018	5	0	5 ^a	1	0	0	11 ^a

COVID-19 AND BATS

Wildlife Health Australia, in collaboration with government and non-government stakeholders, is continually assessing information on the COVID-19 situation. A risk assessment was conducted to assess the likelihood of SARS-CoV-2 establishing in an Australian bat population following human-to-bat transmission, and the resulting consequences:

Qualitative Risk Assessment – COVID-19 & Australian Bats (August 2020)

Publication: Cox-Witton K et al (2021). **Risk of SARS-CoV-2 transmission from humans to bats – An Australian assessment.** *One Health*, 13, 100247

On the basis of the findings of this assessment and the current situation, information has been developed to assist bat carers, researchers and others interacting with bats to manage the potential risk:

COVID-19 and Australian bats – information for bat carers and others interacting with bats

For more information and general guidance for wildlife carers, field researchers, and others interacting with wildlife, see WHA's **COVID-19 (SARS-CoV-2 virus) Fact Sheet**.

As this is a dynamic situation, we will continue to assess new information within the Australian context, and update these documents accordingly.

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Resources

- PPE Information



PERSONAL PROTECTIVE EQUIPMENT (PPE) INFORMATION FOR BAT HANDLERS

This document provides information on personal protective equipment (PPE) aimed at preventing the transmission of ABLV and other bat-borne pathogens through bat bites and scratches, or via contact with infected urine, faeces, saliva or aerosols. It is intended to provide information for vaccinated bat rehabilitators, researchers, ecologists, veterinarians and associated workers. Use of appropriate PPE will also help prevent disease transmission from the person to the bat. For more information on biosecurity measures for working with Australian wildlife, see the [National Wildlife Biosecurity Guidelines](#).

Only people who are [appropriately vaccinated](#) and [maintain ongoing immunity](#) should handle bats. If you are unvaccinated and find an injured or sick bat, do not handle the bat and contact a wildlife care organisation or your local veterinarian.

Bat-borne zoonotic pathogens circulate in Australian bat populations, meaning there is always some risk of transmission from bats to people. Risk is best minimised via a combination of appropriate PPE and manual handling techniques. PPE that allows for a good feel of the bat and its body parts is essential for reducing handling stress, getting the job done well and quickly and staying in control of the bat with a minimum of force. These factors combine to keep the bat calm and so help to avoid bites and scratches.

This document provides generic, helpful principles and examples; however, bat handlers may be required to adapt this information according to their expertise, experience and the task at hand. The appropriate level of PPE will vary under specific circumstances (Table 1). For example, risk may be increased in an individual bat demonstrating neurological signs or abnormal behaviour or decreased in healthy bats that have been handled intensively in care for long periods of time (e.g. months). Events preceding handling may be an important consideration. Handlers dealing with sick and injured bats are more likely to encounter an ABLV infected bat than those working with wild-caught healthy bats. Microbats being taken from harp traps are generally calmer than those being untangled from mist nets, and handling microbats requires a greater feel of the bat than handling flying foxes, and so lighter and thinner gloves are required. Bats in care generally humanise quite quickly, are much calmer and their behaviour more predictable. Many flying foxes in care are orphans and so much smaller and easier to handle; while orphaned microbats in care are so small that other challenges exist. Risk will vary according to individual bat temperament.

Each organisation and individual must assess the risk of each situation and apply the level of risk mitigation appropriate to that situation.

Table 1. Factors contributing to the risk spectrum

Lower risk scenario	Higher risk scenario
Healthy / normal behaviour	Unhealthy / abnormal behaviour
Bat has been handled in care for an extended period (e.g. months)	Wild-capture
Experienced handler	Inexperienced handler
Pups	Older juveniles, subadults, adults
Anaesthetised	Conscious
Calm capture (harp traps)	Entanglement (nets and barbed wire)

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- National Wildlife Biosecurity Guidelines



Wildlife Health
Australia



National Wildlife Biosecurity Guidelines
September 2018 – Version 1.0

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Bat News - WHA - August 2021



✓ Keren Cox-Witton <kcox-witton@wildlifehealthaustralia.com.au>

To: ✓ Keren Cox-Witton

Dear Bat News subscribers,
Please see below for recent news articles and publications relating to bat health.
Best regards,
Keren

Australian bat lyssavirus

- [ABLV BAT STATS \[June 2021 issue\]](#)

COVID-19 & bats

- [Bat Conservation Trust \[UK\]: Bat Group Activities and COVID-19](#)
- [Disease avoidance model explains the acceptance of cohabitation with bats during the COVID-19 pandemic](#)
- [A novel SARS-CoV-2 related coronavirus with complex recombination isolated from bats in China](#)
- [COVID-19 and bats – other news & publications](#)

White-nose syndrome

- [State and federal partners in California and Arizona ask public to help detect and prevent spread of white-nose syndrome](#)
- [‘Bat boxes’ could help revive Canada’s depleting bat population](#)
- [Mycobiome traits associated with disease tolerance predict many western North American bat species](#)
- [How has white-nose syndrome changed cave management in National Parks?](#)
- [Molecular genetic analysis of air, water, and soil to detect big brown bats in North America](#)
- [Long-term changes in occurrence, relative abundance, and reproductive fitness of bat species](#)

Other news

- [Eurobodalla’s flying fox numbers drop to lowest in almost a decade](#)
- [Here’s what climate change will mean for bats](#)

Publications

- [Updated: NSW Code of Practice for Injured, Sick and Orphaned Flying-foxes](#)
- [Using iNaturalist to monitor adherence to best practises in bat handling](#)
- [Review of flying-fox camp dispersal attempts in Australia](#)
- [Cross-sectional study on *Brucella* spp., *Leptospira* spp. and *Salmonella* spp. in bats from Mexico](#)
- [Paramyxoviruses from neotropical bats suggest a novel genus and nephrotropism](#)

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Acknowledgements

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Thank you

