



AUSTRALIAN BAT LYSSAVIRUS INFORMATION FOR MEDICAL PRACTITIONERS

This information provides a background to the Australian bat lyssavirus and recommendations for managing patients who have been in contact with bats.

Department of
AGRICULTURE
FISHERIES &
FORESTRY -
AUSTRALIA



Commonwealth Department of
Health and
Ageing



Communicable
Diseases
network
AUSTRALIA

1. BACKGROUND

A new lyssavirus, first identified in 1996, has been found in several species of flying foxes and bats in Australia. It has been provisionally named Australian bat lyssavirus (ABL). It is closely related but not identical to classical rabies virus. Two human cases of encephalitis due to ABL have been reported; in 1996 and 1998 respectively. Both patients had a history of bites and/or scratches from a bat, and died from the infection. The first case was shown to have been caused by a strain of ABL associated with insectivorous bats, and the other case was caused by a strain associated with flying foxes. On-going serological testing and virus studies on bats suggest that the lyssavirus is widely distributed in Australia. It should therefore be assumed that ALL Australian bats, both the larger flying foxes and the insectivorous microbats, have the potential to transmit lyssaviruses.

Lyssaviruses (including rabies and ABL) are usually transmitted to humans via bites or scratches, which provide direct access of the virus in saliva to exposed tissue and nerve endings. This means that people would not be exposed to lyssavirus through tactile contact with bats where parenteral or mucous membrane exposure to bat saliva or neural tissue does not occur. (Bat blood is not regarded as a high risk tissue for lyssavirus infection.) Exposure to bat urine or faeces does not constitute a possible exposure to ABL, although they may carry other human pathogens.

Animal studies suggest that human disease caused by the bat lyssavirus may be prevented by rabies vaccine and rabies immunoglobulin. Recommendations for administering these are provided below. Further research is being conducted into the distribution and transmissibility of the virus, and these recommendations may be updated as more information becomes available.

2. RECOMMENDATIONS:

Where possible, people should be advised not to handle bats at all. Only people vaccinated against rabies should consider handling bats. Ongoing public education is required warning the public about the risks of bats. Targeted education programs can warn specific groups whose recreation and occupation may place them at greater risk of exposure than the general public.

2.1 Pre-Exposure Prophylaxis

Pre-exposure vaccination should be recommended to those people whose occupation or recreational activities place them at increased risk of being bitten or scratched by a bat. For example:

- bat carers, bat handlers, researchers and students;
- veterinarians and veterinary assistants;
- veterinary laboratory staff;
- fruit pickers;
- wildlife officers (including local government officers);
- managers of display or research colonies of bats; and
- power line workers who frequently remove bats from power lines.

Pre-exposure prophylaxis consists of three deep subcutaneous or intramuscular doses of 1.0mL rabies vaccine given on days 0, 7 and 28. Doses should be given in the deltoid area, as rabies neutralising antibody titres may be reduced after administration in other sites. In children under 12 months of age, administration into the anterolateral aspect of the thigh is also acceptable. Vaccine should not be administered by the intradermal route.

2.2 Post-Exposure Treatment for Persons Bitten or Scratched by Bats

Where a person has been injured by a bat, the wound should be washed thoroughly (eg. for approximately 5 minutes) as soon as possible with soap and water. (If available, a virucidal antiseptic such as povidone-iodine, iodine tincture, aqueous iodine solution or alcohol (ethanol) should be applied after washing.) Exposed mucous membranes, (eg eyes, nose or mouth) should be flushed well with water. Proper cleansing of the wound is the single most effective measure for reducing the transmission of classic rabies virus. Where possible without placing other persons at risk of exposure, the bat should be kept and the local Public Health Unit or veterinary authority consulted on testing of the bat.

Rabies virus and other lyssaviruses are usually transmitted to humans via bites or scratches which provide direct access of the virus in saliva to exposed tissue and nerve endings, or where mucous membrane (eg eyes, nose or mouth) exposure to bat saliva has occurred. This means that people would not be exposed to lyssavirus through tactile contact with bats where parenteral or mucous membrane exposure does not occur. Contact such as patting bats or exposure to urine and faeces does not constitute a possible exposure to ABL, although bat urine and faeces may carry other human pathogens. Pre-exposure vaccination should, however, be offered if the person has on-going contact with bats.

The decision whether to offer post-exposure prophylaxis to a potentially exposed person should be made in consultation with the local Public Health Unit (PHU). If post-exposure prophylaxis is indicated, the protocol to be followed will be advised by the PHU on a case by case basis.

2.2.1 Post-Exposure Treatment for Persons Not Previously Vaccinated Against Rabies

Rabies vaccine

Post-exposure prophylaxis for persons not previously immunised against rabies consists of 5 doses of 1.0mL of rabies vaccine given as deep subcutaneous or intramuscular injection, on days 0, 3, 7, 14 and 28. Doses should be given in the deltoid area, as rabies neutralising antibody titres may be reduced after administration in other sites. In children, administration into the anterolateral aspect of the thigh is also acceptable. Vaccine should not be administered by the intradermal route.

Rabies immunoglobulin

Rabies immunoglobulin (RIG) should be given as a single dose at the same time as the first dose of the post-exposure vaccination course. The dose for RIG is 20 International Units (IU) per kilogram of body mass. RIG should be infiltrated in and around all wounds using as much of the calculated dose as possible, and the remainder administered intramuscularly. It should not be given at the same site as the vaccine, and if administered in the buttock, care should be taken to ensure that the dose is given intramuscularly and not into adipose tissue. Although the RIG and first dose of rabies vaccine should preferably be given on the same day, if necessary the RIG can be given up to 7 days after the first dose of vaccine, but not thereafter.

Thai medical authorities (who have considerable experience in dealing with bites from rabid animals) consider that hand exposures are high risk areas for rabies because of the extensive nerve supply in the hand. They insist that RIG be infiltrated into fingers/hands bites, although this is likely to be painful for the recipient. The Thai recommendation is that RIG be infiltrated into finger wounds using a 25 or 26 gauge needles, and to avoid a compartment syndrome, the RIG should be infiltrated very gently, and should not cause the adjacent finger tissue to go pale or white. If necessary a ring-block using local anaesthesia may be required. (If the wounds are severe and the calculated volume of RIG is inadequate for complete infiltration, the RIG may be diluted in saline to make up an adequate volume for the infiltration of all wounds, but as most bat bites are small and fine, this will not be necessary).

2.2.2 Post-Exposure Treatment for Persons Previously Vaccinated Against Rabies

Post-exposure prophylaxis for persons who have previously completed the recommended course of either pre-exposure vaccination or post-exposure prophylaxis, or who have documented rabies neutralising antibodies, comprises a total of two doses of rabies vaccine (1.0mL each) given by either deep subcutaneous or intramuscular injection on day 0 and day 3. In cases where prior vaccination status is uncertain, or the person has been vaccinated by inappropriate intradermal injection, a full course of post-exposure prophylaxis (RIG plus 5 doses of vaccine) should be offered. It is therefore advisable to ensure that people are given adequate written documentation as to any RIG and vaccines administered. (Note that product information recommends a routine 6th dose at 90 days. This dose is not considered necessary, except for immunosuppressed persons. See the *Australian Immunisation Handbook* for more information).

2.2.3 Additional Information on Rabies Vaccines and Post-Exposure Treatment

Advice on the availability of RIG and rabies vaccine may be obtained from local Public Health Authorities. Contact numbers are listed in the attachment.

For more information on rabies immunoglobulin and vaccine, and recommendations on post-exposure rabies vaccination for travellers returning from overseas, see the current edition of the NHMRC publication, *The Australian Immunisation Handbook*.

2.3 Booster Vaccination

Booster doses of rabies vaccine should be considered for immunised persons who have ongoing exposure to bat lyssavirus. Persons who work with live bat lyssavirus in research laboratories are at risk of inapparent exposure, and should have the rabies antibody titre of their serum evaluated every 6 months. A booster dose of vaccine should be given, as needed, to maintain an adequate titre. Other laboratory workers (such as those performing bat lyssavirus diagnostic tests), and those veterinarians, animal control and wildlife officers who come into contact with bats, should have boosters every 2 years. Alternatively, they may have their serum tested for rabies antibody every two years (particularly if there is a history of severe adverse reaction to the vaccine). If the titre is inadequate (see section 2.4) they should have a booster dose.

2.4 Antibody Production and Titres

Active production of antibody is usually evident within about 7 days of commencement of a course of pre- or post-exposure vaccination. In general, antibody titres need not be measured after primary vaccination or booster, unless the patient is immunocompromised or at particular risk of inapparent exposure to rabies or ABL. Similarly, regular antibody titre measurement and/or booster doses of rabies vaccine are indicated only in those persons who have ongoing potential exposure to lyssaviruses.

Where regular serological testing and boosting are indicated, an antibody titre of 0.5 IU/mL or such that a 1:5 serum dilution (or greater) neutralises challenge virus completely by the rapid fluorescent focus inhibition test (RFFIT) is regarded as adequate, and a routine booster dose is not needed. It should be recognised, however, that in the event of a known or suspected parenteral exposure to rabies virus or ABL, booster doses of vaccine should be considered in accordance with the advice above, irrespective of vaccination history or antibody titre. For additional information on serological testing and boosting, the local public health unit should be consulted.

3. NOTES ON THE AUSTRALIAN BAT LYSSAVIRUS AND ITS DISTRIBUTION

The genus *Lyssavirus* falls within the family Rhabdoviridae. Until 1996 there were six genotypes recognised within the genus. These include the classic rabies virus, Lagos bat virus, Mokola virus, Duvenhage virus and the two European bat lyssaviruses. These viruses have not previously been reported to occur in Australia. The newly identified seventh lyssavirus is closely related to, but is distinct from, the classic rabies virus. In laboratory animals, rabies vaccine and rabies immunoglobulin are protective against the new lyssavirus.

There is no evidence that lyssaviruses in bats can establish and spread amongst terrestrial animals, although isolated cases in humans may occur on rare occasions. The newly identified lyssavirus is currently known to infect naturally all four megachiroptera (fruit bats/flying foxes) in Australia, at least three species of microchiroptera (insectivorous bat), and humans. A surveillance program for ABL in bats has been put in place. On-going serological testing and virus studies suggest that the lyssavirus is widely distributed in Australia. It should therefore be assumed that ALL Australian bats, both megachiropterans and microchiropterans have the potential to carry and transmit this lyssavirus.

In general, engaging with bats or handling bats should not be promoted. Wildlife park educational programs may need to adjust their messages to the public and school children. Bats are not to be handled. Seeing park staff doing this sends a mixed message to the public, especially school children.

4. POSSIBLE EXPOSURE TO ABL THROUGH DOGS AND CATS

From time to time pet owners report that their cat or dog has caught or been exposed to a bat, and are concerned that they might be exposed to ABL through their pet. Available data, which includes results of studies performed at CSIRO AAHL, Geelong, and the absence of reported lyssavirus infection in terrestrial animals in Australia, suggest that the risk of contracting ABL infection from a cat or dog is very low.

Where a pet has caught a bat, medical examination of the owner is not necessary or recommended (based on the findings referred to above). If the bat has displayed any strange or unusual behaviour, it should be submitted to veterinary authorities for testing, provided this can be done without risk to humans. (See list of veterinary authorities at Attachment B). Examples of unusual behaviour include loss of shyness or unusual aggression. As dogs and cats would not normally be expected to catch bats exhibiting 'normal' behaviour, any bats they do catch should be considered as potentially from the higher ABL risk 'sick and injured' category.

If the bat tests positive for ABL, the pet owner should be advised that although natural infection with ABL has never been recorded in cats or dogs, there is a remote possibility that the animal may have been infected with the virus. However, in order to obtain more information about the risk of transmission to pets, it is recommended that (where a bat is positive) a blood sample for serology testing be taken from the pet 1 to 2 months after the initial exposure. The owner should also be advised to keep the dog or cat under close observation for at least three months, and to inform veterinary authorities if behavioural changes occur.

ATTACHMENT A

STATE AND TERRITORY PUBLIC HEALTH CONTACTS

| | |
|---|--|
| Northern Territory Territory Health Services, Disease Control – Darwin | T: 08 8922 8044 F: 08 8922 8310 |
| Victoria Department of Human Services Victoria Medical Officer on call | BH: 03 9637 4865 T: 03 9637 4127 AH: 03 9625 5000 Pager No. :46870 |
| Australian Capital Territory ACT Department of Health, Housing and Community Care | 02 6205 2155 |
| Western Australia Health Department of Western Australia | T: 08 9321 1312 F: 08 9322 5955 AH: 08 9480 4960 |
| South Australia Communicable Disease Control Branch Department of Human Services · South Australia | T: 08 8226 7177 |
| Tasmania Department of Health and Community Services | T: 03 6233 3762 1800 671 738 F: 03 6233 6620 |
| Queensland Brisbane Northside Public Health Unit Brisbane Southside Public Health Unit South Coast Public Health Unit – Southport Darling Downs Public Health Unit - Toowoomba Sunshine Coast Public Health Unit - Maroochydore Public Health Unit - Rockhampton Tropical Public Health Unit - Townsville Tropical Public Health Unit - Cairns | T: 07 3250 8555 T: 07 3000 9148 T: 07 5509 7222 T: 07 4631 9888 T: 07 5479 4655 T: 07 4920 6989 T: 07 4750 4000 T: 07 4050 3600 |

New South Wales

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| Central Coast Public Health Unit – Ourimbah | T: 02 4349 4845 F: 02 4349 4850 |
| Central Sydney Public Health Unit – Camperdown | T: 02 9515 3180 F: 02 9515 3182 |
| Corrections Health Service Public Health Unit – Malabar | T: 02 9289 2977 F: 02 9311 3005 |
| Far West Area Health Service & Population Health Unit - Broken Hill | T: 08 8080 1499 T: 08 8087 8697 |
| South Eastern Sydney Public Health Unit - Zetland | T: 02 9382 8333 F: 02 9382 8334 |
| Hunter Public Health Unit - Wallsend | T: 02 4924 6477 F: 02 4924 6490 |
| Illawarra Public Health Unit - Warrawong | T: 02 4275 4600 F: 02 4275 4611 |
| Macquarie AHS Centre for Population Health - Dubbo | T: 02 6841 2216 F: 02 6884 7223 |
| Mid North Coast Population Health Unit - Port Macquarie | T: 02 6588 2750 F: 02 6588 2837 |
| Mid-Western Public Health Unit - Bathurst | T: 02 6339 5500 F: 02 6339 5577 |
| New England Public Health Unit - Tamworth | T: 02 6766 2288 F: 02 6766 3003 |
| Northern Rivers Division of Population Health - Lismore | T: 02 6620 7500 F: 02 6622 2151 |
| Northern Sydney Public Health Unit - Hornsby | T: 02 9477 9400 F: 029482 1650 |
| Southern NSW Public Health Unit - Goulburn | T: 02 4827 3428 F: 02 4827 3438 |
| Greater Murray Centre for Public Health - Albury | T: 02 6021 4799 F: 02 6021 4899 |
| South Western Sydney Public Health Unit -Liverpool | T: 02 9828 5944 F: 02 9828 5955 |
| Western Sector Public Health Unit - North Parramatta | T: 02 9840 3603 F: 02 9840 3608 |
| Wentworth Public Health Unit - Kingswood | T: 02 4734 2022 F: 02 4734 3300 |
| NSW Health Dept – Head Office (Communicable Diseases Surveillance and Control Unit) | T: 02 9391 9192 F: 02 9391 9848 |

ATTACHMENT B

STATE AND TERRITORY VETERINARY LABORATORIES AND RELATED INFORMATION

Australian Capital Territory

Contact the ACT Government Veterinary Officer on 02 6207 2357. Veterinarians should have gathered a history and considered whether the bat is a suspect lyssavirus case.

New South Wales

In NSW, practitioners with a suspect lyssavirus bat should contact the nearest Regional Veterinary Laboratory:

Menangle: Duty Officer 02 46406327

Orange: Duty Officer 02 63913858

Wollongbar: Duty Officer 02 66261261

Northern Territory

All injured, sick and dead bats are collected by Parks and Wildlife Commission officers through Wildlife Rescue. They then assess the animal and if it is a suspect lyssavirus case, deliver it to the Berrimah Laboratory.

In Darwin the contact number is 08 8999 4536. In Katherine the contact is 0419 828 487.

Queensland

Bats that have bitten and or scratched someone (Category 3) should be submitted for testing as soon as possible to Queensland Health using the appropriate form. The Department of Environment will assist with collection.

Further information can be obtained from the Public Health Units listed at Attachment A.

All other sick or injured bats may be submitted to the Department of Primary Industries for testing.

South Australia

The phone number of IDEXX Laboratories, the operators of Vetlab, is 08 8372 3700. This number is diverted out of hours to the duty pathologist.

Tasmania

The direct line to the Animal Health Branch is 03 6336 5332 After hours it would be appropriate to use the 1800 675 888 disease hotline

Victoria

Normal reporting channels should be used, that is veterinary practitioners should contact their local Government veterinary officer. If this fails they can ring the hotline number, their Regional Veterinary Officer, the Office of the CVO, Manager Animal Health Operations or the Exotic Disease Veterinarian. These numbers can be readily found in Victoria under Natural Resources and Environment (Department) listings in the Melbourne phone book.

Western Australia

During office hours, people should contact the Animal Health Laboratories South Perth on 08 9368 3351 and request to speak to the duty pathologist. There is an after hours emergency mobile number (041 791 0082) staffed by a veterinarian.

GLOSSARY

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| AAHL | Australian Animal Health Laboratory |
| ABL | Australian bat lyssavirus |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| NHMRC | National Health and Medical Research Council |
| PEP | Post-exposure prophylaxis |
| RFFIT | Rapid fluorescent focus inhibition test |
| RIG | Rabies immunoglobulin |