Australian bat lyssavirus

Information for veterinarians

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1 Purpose

This information is intended to help veterinarians safely manage incidents involving contact between animals (often dogs or cats) and bats where there is the potential for in-contact animals to acquire and further transmit Australian bat lyssavirus (ABLV) infection.

2 About ABLV

ABLV is a member of the genus *Lyssavirus*, family Rhabdoviridae, and is closely related to classical (dog-mediated) rabies virus (RV). ABLV is the only lyssavirus endemic to Australia. The natural history of ABLV is similar to that of rabies. There are two closely related variants of ABLV:

- pteropid-ABLV in flying foxes (*Pteropus* spp.)
- YBST-ABLV in yellow-bellied sheathtail bats (*Saccolaimus flaviventris,* a microbat).

Other, unrecognised, variants may also be present in other bat species.

Australia has international animal health status through the World Organisation for Animal Health (formerly the Office International des Epizooties, or OIE) of being rabies-free.

For the purposes of risk assessment and risk management, wherever information specific to ABLV is lacking, information may reasonably be extrapolated from RV.

ABLV is a zoonosis. Disease in humans due to any lyssavirus, including ABLV, is recognised as rabies disease by the World Health Organization (WHO).

In animals and humans, progression to clinical disease is invariably fatal.

In Australia, there have been three human and two horse cases of disease due to ABLV. All were fatal and all occurred in Queensland. It is assumed that all mammals are susceptible to ABLV, as they are to RV.

Human health is a primary consideration in all incidents involving potential ABLV infection of bats, or where there has been contact between a bat and another animal and/or person.

The AUSVETPLAN *Response strategy: Lyssavirus* (available from **animalhealthaustralia.com.au**) outlines the nationally agreed approach for the response to an incident—or suspected incident—of lyssavirus infection (ABLV, RV or other lyssavirus) in Australia.

More information about ABLV is available from **business.qld.gov.au**.

2.1 Key features of ABLV and ABLV infection and their implications for risk management

The virus

ABLV is an enveloped RNA virus. It does not survive long (minutes) when exposed to heat, UV light, direct sunlight and/or desiccation or drying. It remains viable for prolonged periods (months to years) if protected from light and heat.

Implications for risk management

ABLV does not survive for more than a few hours outside an infected animal.

Contact with dry surfaces, including intact surfaces of bat carcasses, is unlikely to transmit infection.

ABLV remains viable in the tissues of a refrigerated or frozen carcass or sample for long periods.

Maintenance hosts (species)

Viral protein or genome has been detected in all four common species of flying fox (black, grey-headed, little red and spectacled) and the yellow-bellied sheathtail bat (*Saccolaimus flaviventris*, an insectivorous microbat).

Antibodies to lyssaviruses have been detected in multiple other microbat species.

Implications for risk management

ABLV is considered present in all populations of all species of Australian bats.

Prevalence in bats

The proportion of bats infected with ABLV is:

- less than 1% of all bats (free-flying populations)
- up to 2% of sick, injured or orphaned bats
- up to 30% of bats with central nervous system (CNS) disease or clinical signs consistent with ABLV.

Prevalence in some sick bats of some species (e.g. little red flying foxes, yellow-bellied sheathtail bats) is relatively high.

Fewer than 1% of bats that have had potential contact with domestic animals are shown to be ABLV-infected by laboratory tests.

Implications for risk management

Assessment of the clinical state and progression (see 'Clinical period' on page 7) can inform risk assessment for clinical ABLV infection.

- High relative risk—bat with CNS disease, sick little red flying fox or sick yellow-bellied sheathtail bat.
- Medium relative risk—sick bat.
- Low relative risk—clinically normal bat, orphan bat/pup without signs of CNS disease.

While bats that have had potential contact with domestic animals are unlikely to be infectious, the risk is not nil.

Spillover to (non-bat) hosts (species)

Domestic animals, including horses, dogs and other pets, may potentially be exposed to ABLV through contact with bats. The similarity of ABLV to other lyssaviruses suggests that, on rare occasions, exposure may lead to clinical ABLV disease.

ABLV is only known to have infected bats, humans and horses. Other lyssaviruses, particularly RV, are known to infect a wide range of mammals, including dogs and cats.

Implications for risk management

Any mammal adequately exposed to ABLV may be infected, may progress to invariably fatal clinical disease and may pose a future risk of transmission to others.

Mode of transmission

Transmission can be:

- naturally occurring—a bite or scratch from an infected animal
- anthropogenic—self-inoculation or other exposure to a laboratory source, or recipient of organ transplant from an infected donor

Eating a rabid animal is not a recognised mode of transmission for lyssaviruses.

Implications for risk management

The risks of ABLV infection in humans and animals may be minimised by avoiding contact with bats, and seeking urgent medical or veterinary advice about the use of rabies vaccines to prevent disease.

There is no known risk of contracting ABLV from bats flying overhead, or from contact with bat urine, faeces or blood.

There is no evidence to suggest that ABLV could be contracted by eating fruit that has been partly eaten by a bat. Any fruit that has been partly eaten by any animal should not be eaten, as it could be contaminated by a variety of pathogens.

There is no significant risk of exposure from living, playing or walking near bat roosting areas.

Pets that eat an *already dead* bat are unlikely to be infected. However, a pet that is suspected to have eaten a bat that it may have *interacted with while the bat was alive* may have been bitten or scratched and so may have been infected.

If a domestic carnivore (e.g. dog or cat) becomes clinically ill with ABLV, the nature of their relationship to humans and their capacity to bite means the likelihood of secondary transmission to a person or other domestic animal is relatively high.

Incubation period

The incubation period is unusually long and variable. While the incubation can be short (days), it is usually relatively long (weeks, months or years).

Implications for risk management

Quarantine of a potentially exposed or infected clinically well animal to exclude infection is neither practical nor appropriate from an animal welfare perspective, as it would require isolation for long periods (months or years).

A long incubation period provides opportunity for vaccination after exposure or infection to stimulate an immune response that clears infection before progression to clinical disease.

Clinical period

Progression of clinical ABLV in bats is rapid and relentless. Of 62 bats rescued with clinical signs consistent with ABLV and confirmed to be infected, death or euthanasia occurred for:

- >80% within 24 hours
- >90% within 3 days
- 100% within 10 days.

It is reasonable to assume that the clinical course of ABLV in other animals is similarly progressive and short (in the absence of heroic medical intervention that may be used for human patients).

Implications for risk management

Observation of an unwell bat for a relatively short period (at least 1–3 days, if reasonable and practical preferably up to 10 days) will differentiate those that may have clinical or infectious ABLV from those that do not.

Within 3 days, 90% of those with clinical infection will rapidly deteriorate. Within 10 days, ~100% of those with clinical infection will die or require euthanasia.

Those that survive 10 days, particularly those who clinically improve, can be assessed as not being infectious at the time observation started.

Clinical signs in bats

There are progressive clinical signs of CNS disease of less than 10 days duration including:

- paresis—seen as an inability to fly, hang properly, swallow properly or move about
- paralysis—most obvious in the hind limbs
- seizures, tremors
- unusual vocalisation or incessant licking
- changes in behaviour, including agitation, aggression and approaching people.

Implications for risk management

ABLV should be considered a differential diagnosis in any bat with signs of CNS disease of less than 10 days duration.

Clinical signs in other animals

The clinical signs are consistent with those for encephalitis in that species and are of less than 10 days duration.

Implications for risk management

ABLV should be considered a differential diagnosis in any mammal with signs of CNS disease of less than 10 days duration.

ABLV should be considered a differential diagnosis in any mammal with histological evidence of a non-suppurative meningoencephalitis.

Natural history of disease due to ABLV

Contact with a bat may or may not include exposure to ABLV, and exposure to ABLV may or may not lead to infection.

Infection may result in:

- progression to clinical disease that is almost invariably fatal (with or without seroconversion)
- subclinical resolution of infection with seroconversion (i.e. a sufficiently early and effective immune response clears infection without progression to clinical disease or becoming infectious).

There is no ‘carrier state’. Animals infected with lyssaviruses do not get sick, recover and then continue to pose a risk of infection to others when clinically well.

Implications for risk management

Treatment of suspected clinical ABLV disease in animals is not appropriate. Humane euthanasia is indicated.

Vaccination promotes clearance of infection prior to or without progression to clinical disease.

Clinically well animals with anti-rabies virus titres do not pose a risk of infection to others. Euthanasia of clinically well seropositive animals is not justified.

Seroconversion in a clinically normal animal indicates one of the following:

- a false positive serology result
- naturally occurring seroconversion and clearance of prior infection with ongoing immunity of variable duration
- vaccine-induced seroconversion with ongoing immunity of up to 3 years duration.

Infectious period

Transmission usually occurs during clinical disease.

Research suggests that lyssaviruses may be transmitted in the immediate pre-clinical period (i.e. in the few days prior to the onset of clinical signs).

Implications for risk management

Assume the animal is infectious during the clinical period and for up to 7 days prior to clinical onset (the last few days of the incubation period).

2.2 Your responsibilities and obligations as a veterinarian

All people in Queensland, including veterinarians, have an obligation to report the presence of ABLV and to meet their general biosecurity obligation under the *Biosecurity Act 2014*.

Veterinarians in Queensland also have responsibilities under the *Veterinary Surgeons Act 1936* and the *Work Health and Safety Act 2011*.

People are likely to seek your advice about bats, pets and ABLV. If you find yourself in a position where you are not confident about your actions, information or advice, seek further information or refer the matter to a person who has more knowledge or experience.

The policies reflected in this information for veterinarians are informed by the *Human Rights Act 2019.*

Your reporting obligations under the *Biosecurity Act 2014*

Under Queensland legislation, if you suspect an animal is clinically ill with ABLV or if an animal has been bitten or scratched by a bat or other animal known to be infected with ABLV, you must report it to **Biosecurity Queensland** on **13 25 23** or contact the **Emergency Animal Disease Watch Hotline** on **1800 675 888**.

It is reasonable to believe that a bat or other mammal is clinically ill with ABLV (or RV) if it has progressive clinical signs consistent with encephalitis of less than 10 days duration.

You do not need to advise Biosecurity Queensland about contact between a bat and a clinically well animal unless the bat is known (by laboratory tests) to be infected with ABLV.

Your general biosecurity obligation

If you choose to be involved with bats or to provide advice to others about ABLV or bats (e.g. as a veterinarian or volunteer), you have an obligation to know about and minimise the risk from ABLV. (Visit **qld.gov.au** and search for 'ABLV' for more information.)

All Queenslanders have a general biosecurity obligation under Queensland's *Biosecurity Act 2014*. (Visit **daf.qld.gov.au** and **legislation.qld.gov.au** for more information about the general biosecurity obligation, the Act, biosecurity risks and biosecurity events.)

This means that you are responsible for managing biosecurity risks that:

- are under your control
- you know about, or should reasonably be expected to know about.

What a veterinarian should reasonably be expected to know about ABLV is relatively high compared to what might be expected of others in the community.

Individuals and organisations whose activities pose a biosecurity risk must:

- take all reasonable and practical steps to prevent or minimise each biosecurity risk
- minimise the likelihood of causing a biosecurity event, and limit the consequences if such an event is caused
- prevent or minimise the harmful effects a risk could have
- not do anything that might make any harmful effects worse.

If you have direct contact with ABLV or bats, **you must minimise the risk of ABLV transmission and progression to clinical ABLV disease.** You must minimise the risk to:

- yourself
- other people
- other bats
- other animals.

More information

More information about Australian bat lyssavirus and your general biosecurity obligation is available from **qld.gov.au.**

3 Pre-exposure prevention of disease due to ABLV

Domestic animals and humans may be exposed to ABLV through contact with bats under a wide range of circumstances.

Steps taken before contact with bats or ABLV can prevent disease.

3.1 Obtain pre-exposure vaccination

Pre-exposure vaccination is the single most effective way of preventing disease due to genotype 1 lyssaviruses, including ABLV. Rabies vaccines for people and animals have been shown to provide cross-protection against ABLV. However, research suggests a higher titre is required to provide the same level of prevention (efficacy) against ABLV as that associated with a 0.5 IU titre against RV.

In the absence of ABLV-specific efficacy data, **pre-exposure use of rabies vaccines in animals to prevent ABLV in animals is not permitted in Australia**.

Pre-exposure vaccination of people against ABLV with human rabies vaccines is recommended by the:

- Australian immunisation handbook (see **immunisationhandbook.health.gov.au**)
- Series of National Guidelines (SoNGs) for ABLV (see **health.gov.au**).

People such as veterinarians and bat carers who anticipate having contact with bats should discuss pre-exposure rabies vaccination with their doctor.

3.2 Avoid contact with bats

Only rabies-vaccinated people should have direct contact with bats. All other people and animals should avoid contact with bats.

To avoid pet–bat interactions, owners of pets may:

- keep animals inside at night, particularly when bats are feeding on fruiting or flowering trees on their property
- keep dogs on the lead when walking near bat colonies
- check their yard before releasing pets into the yard during periods in which bat mortality and morbidity is high (e.g. during starvation events).

If an owner realises their pet may have had contact with a bat (e.g. they see a bat in the yard), they should take immediate steps to prevent contact. This may include:

- moving pets indoors or otherwise confining or removing them
- if safe to do so, confining the bat (without touching it) so it cannot reach another person or animal (e.g. by placing a washing basket over the bat and weighing it down to secure it)
- seeking urgent veterinary advice.

3.3 Avoid bat bites and scratches

Vaccines work by preventing progression to clinical disease after infection. There is no effective treatment for clinical ABLV, and while vaccination is very effective, it is the last defence against death due to ABLV. Even people who are vaccinated should avoid infection by avoiding bat bites and scratches.

- Wear appropriate personal protective equipment when interacting with bats.
- Use bat-handling skills and equipment (e.g. a towel) to handle a bat safely.
- Follow good basic hygiene principles (e.g. wash hands well, stop handling bats and wash hands before eating, drinking or smoking).
- Seek the assistance of a vaccinated person who is trained to handle bats safely and wearing appropriate personal protective equipment to hold a conscious bat for examination, anaesthesia or euthanasia.
- Consider anaesthetising a bat for examination or treatment (sleeping bats do not bite).

3.4 Wear appropriate personal protective equipment

Appropriate personal protective equipment may include:

- puncture-resistant gloves (e.g. nitrile gloves that meet AS 2161.3) or two pairs of ordinary disposable gloves (double-gloving)
- forearm protection (gauntlets) worn with gloves—as the forearm is a common site for scratches
- water-resistant dressings to cover cuts and abrasions
- long sleeves, long pants and closed shoes to protect skin
- eye protection (e.g. safety glasses) if there is a risk of being scratched or getting fluid in eyes (e.g. when bats are overhead).

Note: While a bat bite when wearing a puncture-resistant glove may produce an injury, if the glove remains intact, there will be no direct contact, exposure or infection.

4 Treatment for a person who is bitten or scratched

If the person was wearing a glove, examine it carefully to determine whether it is still intact. If it is still intact, there was no exposure.

If there is potential exposure:

- Immediately wash (do not scrub) the wound with soap and water.
- Apply an antiseptic (e.g. povidone iodine).
- Seek urgent medical advice.

5 Post-contact management of potential exposure to ABLV in animals

Owners that know or suspect that their pet has had contact with a bat should seek urgent veterinary advice about minimising the risk of ABLV to their pets, themselves and others.

Post-contact risk assessment and management should be recorded in the patient's clinical record and should include these steps:

1. Assess whether transmission of ABLV has potentially occurred.
2. Consider and discuss the options for managing the risk to the pet.
3. Provide advice that enables the owner to make an informed decision about risk mitigation.
4. Implement the decision.
5. Monitor and review the patient as the situation changes.

5.1 Assess the potential for transmission

To determine whether transmission of ABLV could have occurred, assess two aspects of the incident:

- Was there opportunity for infectious contact between the bat and pet?
- Was the bat infectious for ABLV at the time of contact?

Was there opportunity for infectious contact?

The precautionary principle should be applied when assessing the potential for infectious contact.

Opportunity for infectious contact has occurred if:

- the owner observed direct contact between the pet and a possibly live bat, or
- the pet had access to an area (e.g. yard, verandah) in which a possibly live bat had been present for an unobserved period of time (e.g. when the owner was inside or not at home).

Opportunity for infectious contact should only be excluded if the pet and bat are *definitively known* to not have had contact *for the entire time* contact was possible. This could be, for example, if the owner arrives home with their dog, sees a bat in the yard and immediately confines the dog to the house until the bat is removed.

In most cases, the owner will not have observed the bat or pet for the entire time they may have been in contact and opportunity for infectious contact should be assumed.

Caution: Owners have a tendency to exclude the possibility of contact in the absence of definitive knowledge. Some examples are:

- A dog and a bat are both found in a yard. The owner claims there was no contact because the dog 'doesn't usually go to that part of the yard'. While that might be true, infectious contact was possible.
- An owner finds a freshly killed, half-eaten bat in a yard and assumes a particular dog with a history of killing animals was responsible, despite another dog and a cat also living in the yard. While one dog is more likely to have had contact, all pets with access to that area had opportunity for infectious contact.

Was the bat infectious for ABLV?

There are two options for determining whether a bat was infectious for ABLV at a particular point in time:

- laboratory testing of the brain
- clinical observation for 10 days.

To select an option, consider the following.

- Testing of bats that had opportunity for infectious contact indicates that more than 99% are not infected with ABLV.
- Of the less than 1% of bats that are infected with ABLV, 80–90% will die or require euthanasia within 3 days. If a bat is well 3 days after contact, the likelihood of earlier transmission is <0.2% ($p < 0.002$).
- The process of packaging and transporting a specimen, specimen receipt, sampling, testing and reporting a laboratory result takes more than 1 day (typically 2–5 days).
- Performing blood tests (serology) of an at-risk clinically well animal (e.g. potentially exposed pet) is meaningless for risk assessment. Specifically, negative serology in a clinically well animal does not exclude the possibility that the animal is incubating ABLV infection and may progress to clinical disease and pose a future risk of transmission to others.

Laboratory testing

See Appendix 1 for information about submitting specimens for ABLV testing (detection/exclusion).

The objective of laboratory testing is to exclude ABLV infection.

- **If ABLV is excluded (definitive negative laboratory result),** the possibility of ABLV transmission is effectively nil and no further assessment or response is indicated.
- **If ABLV is NOT excluded (e.g. positive result, no valid result, brain sample not available, sample not in diagnostic condition, bat or other animal not available for assessment),** it must be assumed ABLV transmission could have occurred and further risk assessment and risk management is indicated.

A definitive negative laboratory result requires:

- testing of a brain sample (live animal euthanased for sampling)
- a sample in good diagnostic condition (e.g. bat refrigerated soon after death)
- a sample tested with a combination of a pan-lyssavirus and variant-specific ABLV tests.

Note: Depending on the circumstances, it may be a number of days before laboratory results are known. How the risk of ABLV infection of the animal is to be managed while awaiting the result should be discussed with the owner (see 'While you wait for results' on page 15).

Clinical observation for 10 days

See Appendix 2 for the conditions for determining whether a bat or other animal was infectious by clinical observation.

The objective of clinical observation is to exclude that the source bat or other animal was infectious at the time of contact (i.e. to exclude transmission of ABLV) without killing the animal. This may be appropriate if the likelihood of being infectious is relatively low (e.g. a rescued orphan), the bat species is endangered or vulnerable (e.g. a spectacled or grey-headed flying fox) or the individual is otherwise valued.

- **Transmission of ABLV is excluded** if the animal does not have clinical signs consistent with ABLV (remains well, clinically improves, survives to day 10 *without* signs consistent with CNS disease). Transmission is progressively less likely with each uneventful day.
- **Transmission of ABLV is NOT excluded** if the animal develops clinical signs consistent with CNS disease, rapidly deteriorates, dies, or requires euthanasia within 10 days. If signs consistent with ABLV occur, the animal should urgently be euthanased (if safe to do so) and submitted for laboratory testing. Pending the laboratory result, all mammals with opportunity for infectious contact should be considered potentially infected and at risk of progressing to clinical disease and becoming infectious.

Note: Depending on the circumstances, it will take up to 10 days for transmission of ABLV to be excluded. If the animal proves to be infectious late in the observation period, a delay in initiating post-exposure vaccination may mean the vaccine does not to have sufficient time to work before the animal progresses to clinical disease, becomes infectious and later dies. How the risk of ABLV infection of the animal should be managed while awaiting the result of observation should be discussed with the owner (see 'While you wait for results' on page 15).

While you wait for results

If the likelihood of transmission is relatively low, 'monitor and report' may be appropriate.

If the likelihood of transmission is relatively high (e.g. contact with a bat reported to have clinical signs or other history suggesting ABLV infection/infectious), one option is to initiate vaccination of the animal. If transmission of ABLV is excluded (definitive negative laboratory result or bat well on day 10 post-contact), the second vaccination (due day 7 post-vaccination) is not indicated and the vaccination program (vaccination and isolation) should be discontinued.

5.2 Consider and discuss options

If there was potential exposure of a clinically well animal to ABLV, options for minimising the likelihood of progression to clinical disease, becoming infectious (potential for further transmission) and death should be discussed with the owner.

Broadly, there are three options, each with pros and cons:

1. euthanasia of potentially exposed animal
2. monitor and report
3. post-exposure vaccination.

No one option is universally preferred—depending on the circumstances, one or more options may be more appropriate than others.

Provide sufficient information and advice for the owner to make an informed decision about the option they consider most appropriate under the circumstances. As further information becomes available (e.g. laboratory results, the daily outcome of observation), the risk and most appropriate option should be reassessed.

Euthanasia

Pros This absolutely (100%) resolves the future risk of the animal progressing to clinical disease, becoming infectious and dying from ABLV disease.

Cons The animal is no longer alive and the owner/family loses their relationship with the pet. Given that most owners seek veterinary advice to help or prevent the death of their pet, this option is rarely considered the most appropriate. Other options are reasonable under most circumstances.

Monitor and report

The owner would be advised to monitor the animal for the onset of clinical signs consistent with encephalitis in that species and to report onset and the history of potential exposure to a veterinarian. As the incubation period for ABLV is known to be long and variable (months to years), the period during which the animal should be monitored is indefinite—effectively the rest of its life. The period of highest likelihood of onset is 1–6 months post-exposure. The likelihood subsequently declines, but is never nil.

Pros There is no/minimal cost, and a proportionately low-impact response to a low likelihood of transmission.

Cons Monitoring/observation does nothing to reduce the likelihood that the animal (if exposed and infected) will progress to clinical disease and pose a future risk to others.

Experience has shown that if disease develops months to years later, the owner is unlikely to remember, associate or recognise the possibility of ABLV disease and is likely to fail to report it. If an infectious animal has contact with a person or other animal and the possibility of ABLV infection and secondary transmission is not reported, the opportunity for the person or other animal to receive post-exposure vaccination will be lost and this may contribute to their death.

Due to relatively high risk of this mitigation option failing, it is NOT recommended if ABLV infection of the source animal is confirmed or suspected from the history (e.g. bat with CNS signs, laboratory test positive, or bat died within 10 days of contact).

Post-exposure vaccination

See Appendix 3 for details of the vaccination protocol for animals that have potentially been exposed to ABLV.

Pros The protocol is assumed to reduce the likelihood of an infected animal progressing to clinical disease and death, becoming infectious, and posing a future risk of secondary transmission to a person or other animal.

Cons There is considerable cost and inconvenience (vaccine, veterinary consultations and isolation during residual risk period).

There is a residual risk of clinical disease due to vaccination failure up to day 35_{PV} (35 days after the first vaccination). This must be clearly stated to, and appreciated by, owners.

The assumed efficacy of this option is based on a number of assumptions, which are themselves informed by reasonable extrapolations from data relating to ABLV and RV. There is no species-specific data (e.g. no experimental post-vaccination challenge of dogs) demonstrating that this post-exposure vaccination protocol is effective in domestic pets. While, as of 2020, no post-exposure vaccinated animal (or person) has been known to progress to clinical ABLV-disease, the low probability of infection prior to vaccination limits the value of this survival data.

Assumptions

- Post-exposure rabies vaccination provides cross-protection against ABLV in animals, as it is assumed to for humans.
- No vaccine works immediately—the vaccine may not have time to work before the onset of clinical disease.
- Timely vaccination maximises the likelihood that the vaccine has time to work, but as long as the animal is clinically well, it is never too late to try to prevent onset. For a clinically well animal, initiating post-exposure vaccination is best done as soon as possible.
- Individuals may not respond to vaccination due to issues with the vaccine (failure of cold chain), administration or immunocompetence.
- Post-vaccination serology data in Queensland mammals (J Barrett 2020, pers. comm., 30 October) provides 95% confidence that 95% of mammals acquire a titre ≥2 IU by day 28_{PV}.
- An anti-rabies titre of ≥2 IU sustained for a period of 1 week is assumed to clear subclinical infection with genotype 1 lyssaviruses, including ABLV. That is, an animal that acquires a titre ≥2 IU by day 28_{PV} and remains clinically well until day 35_{PV} can be assumed to either:

- not have been infected at contact, or
- have cleared infection and no longer be at risk of progressing to clinical disease or becoming infectious.

Either way, they pose negligible future risk and may return to normal management.

About the residual risk

- In humans, the residual risk of clinical onset is minimised by concurrent administration of anti-rabies antibodies (immunoglobulin), which provides passive immunity while active immunity is stimulated. Use of immunoglobulin is not included in this animal post-exposure vaccination protocol because:
  - anti-rabies immunoglobulin is very expensive
  - globally, supply of anti-rabies immunoglobulin is limited and prioritised for human use.
- The residual risk (up to day 35_{PV}) is limited to when owners are receiving veterinary advice, and awareness and compliance are relatively high.
- Clinical disease during the short residual risk period is highly likely to be recognised and reported, providing for post-exposure management of people or animals at risk of secondary transmission.

Supplementary option: post-vaccination confirmation of seroconversion

In the absence of conflicting evidence, it is reasonable for owners and veterinarians to rely on data that indicates a vaccinated animal is highly likely to respond adequately to the vaccination protocol. However, if evidence suggests seroconversion may not occur as expected, or the owner seeks explicit evidence that their animal has responded as intended, the adequacy of seroconversion may be confirmed by post-vaccination serology.

Ideally, a titre would be established (samples taken) on day 0_{PV} and day 28_{PV}, in the expectation that the results would demonstrate a rise in titre from nil to ≥2 IU attributable to vaccination. As the cost of rabies serology is relatively high (~$250 per sample), post-vaccination confirmation of seroconversion is uncommon or may be limited to a single day 28_{PV} sample.

Post-vaccination confirmation of seroconversion may be indicated if there is suspicion of:

- an issue with the integrity of the vaccine dose (e.g. concern about failure of cold chain, expiry date etc.)
- an issue with administration (but this may more effectively be dealt with by administering a second dose, as the safety of rabies vaccines is high)
- suboptimal immune competence in the patient (advanced age, concurrent immunosuppressive therapy or history of immune-mediated disease).

5.3 Provide advice

There is no single option for ABLV risk mitigation that is preferable in all circumstances.

The decision about which option to implement at any point of time should be informed by the following:

- Disease due to ABLV in a non-bat is inherently unlikely. ABLV has yet to be detected in a dog or cat. However, what is known about ABLV and RV leads us to assume that infection is likely if adequately exposed and that a pet with clinical disease due to ABLV is well placed to transmit infection to people (particularly children) or other animals.

- The most effective way to minimise the risk of secondary transmission to people or other animals is to minimise the likelihood of a potentially exposed animal progressing to clinical disease.
- While the likelihood is inherently low, the high (effectively 100%) mortality rate of clinical disease means the consequences are potentially major (e.g. death of pet and exposed person). Management of unlikely but life-threatening risks is more effective if the quality of risk controls is considered and attention is directed to residual risk. See Appendix 4 for details.
- While the likelihood is inherently low, the relative risk (higher or lower) of a particular situation can be assessed by considering the likelihood that infectious contact occurred, the likelihood that ABLV was present, the potential consequences of failure (e.g. the potential for secondary exposure), and the likelihood that risk mitigation will be implemented adequately.

The higher the relative risk, the less appropriate it becomes to attempt to minimise risk by monitoring and reporting.

The lower the relative risk, the more a decision to euthanase becomes increasingly unnecessary and disproportionate.

As a veterinarian, you should:

- provide the owner with advice to make an informed decision about what the most appropriate option would be
- document in the patient's clinical record the basis on which the owner made an informed decision, given the likelihood of infection, potential consequences, and pros and cons specific to the circumstances.

In particular, you should document that the owner's decision to vaccinate post-exposure or monitor and report is made in the knowledge that neither option reduces the risk to zero.

See Appendix 5 for a checklist on advising owners.

5.4 Implement the decision

Euthanasia

The animal should be euthanased using a method that is safe for the operator and humane for the species.

Monitor and report

The owners should be advised to monitor their animal for clinical or behavioural signs consistent with encephalitis in that species. They should be warned that clinical signs of lyssavirus disease are variable and may initially be subtle but are expected to progress rapidly. Onset of disease that progresses rapidly to death within 10 days should be reported.

If onset of clinical signs or behaviour suggestive of ABLV occurs, the animal should be either:

- urgently euthanased and tested, or
- strictly isolated and monitored for further progression, and euthanased and tested if progression consistent with lyssavirus infection occurs.

Post-exposure vaccination protocol

Supply and use of the Nobivac® Rabies inactivated rabies vaccine (containing ≥2 IU/mL inactivated rabies virus Pasteur strain as the only active constituent) is permitted in Australia under Australian Pesticides and Veterinary Medicines Authority (APVMA) permit number PER14326.

For information about the rationale behind the post-exposure vaccination protocol, see 'Post-exposure vaccination' in section 5.2 on page 15.

For information about accessing the Nobivac® Rabies vaccine, see Appendix 6.

For information about the vaccination protocol for animals post-exposure to ABLV, see Appendix 3.

5.5 Monitor and review

Determining the risk mitigation option that is most appropriate for the circumstances is limited by the information available at the time. As additional information becomes available, the relative risk and the most appropriate risk mitigation should be reassessed and discussed with the owner.

Example

An orphan flying fox (pup) is found in a yard occupied by two dogs that are owned by an undergraduate student. While dehydrated, the pup is not demonstrating clinical signs suggestive of ABLV nor wounds to suggest contact with either dog. The *relative* likelihood that the pup was infectious at the time of possible contact is assessed as low and the pup is transferred to a bat carer for observation, rehabilitation and eventual release.

The burden of the cost of vaccinating both dogs is relatively high for the student. Given the relative likelihood that the pup was infectious is low, the owner decides to 'monitor and report' the two dogs while awaiting the outcome of the 10-day observation period.

However, 2 days later the bat carer calls to say the pup seemed unwell the previous evening and is now gravely ill. This new information about rapidly progressing clinical disease in the pup raises suspicion that pup was infectious at the time of potential contact with the dogs, and the risk of transmission is reassessed as relatively high. Arrangements are made for the pup to be euthanased by a vaccinated person and submitted for testing as soon as possible. The change in risk assessment is discussed with the owner, who is asked for a new decision about the most appropriate option for mitigating the higher possibility that the disease was transmitted to one or both dogs. If infected, either dog may progress to clinical disease and become infectious to others, notably the owner and others living at the same address.

The cost of vaccination is still an issue for the student, who does not want to euthanase either dog. Other options at this point include:

- Continue to 'monitor and report' both dogs pending the laboratory result from the pup.
- Give both dogs their first (day 0_{PV}) vaccine pending the result. This will minimise the delay in vaccine onset and maximise the likelihood the vaccine will have time to work in the unlikely event that a dog is infected. The decision on whether to give the second vaccination can be deferred until the laboratory result is known.

Outcome1: The laboratory report, provided 2 days later, shows that the pup was negative for ABLV—an undetected wound/infection accounts for the pup's sudden deterioration. As the pup was not infectious at the time of contact, the risk of transmission is nil and both dogs can return to normal management.

If the first (day 0_{PV}) vaccine had been administered, the second (day 7_{PV}) vaccine is no longer indicated. The vaccination protocol can be discontinued and the dogs return to normal management.

Outcome 2: The laboratory report, provided 2 days later, shows that the pup was positive for ABLV. This confirms that the risk of transmission to the dogs, while still low overall, is relatively high.

The updated risk assessment of the situation should be discussed with the owner—this includes the owner's general biosecurity obligation now that the dogs are known to have had potential contact with an ABLV-infected bat. While continuing to monitor and report remains an option, it is less appropriate now than when the initial decision was made. The owner should be encouraged to consider completing the post-exposure vaccination protocol if euthanasia remains undesirable. While the cost of the vaccine is still an issue for the owner, the probability of the dogs being vaccinated unnecessarily has been reduced.

Appendix 1 Submitting samples to the Biosecurity Sciences Laboratory for ABLV testing

Safety advice

When dealing with an animal suspected to be infected with a lyssavirus, including ABLV or RV, take the following precautions.

- Whenever reasonable, only rabies-vaccinated people should handle, euthanase, or remove the head or brain of the suspect animal.
- Take all reasonable steps to avoid being bitten or scratched (see section 3.3).
- Wear appropriate personal protective equipment (see section 3.4).
- If a person is bitten or scratched, immediately wash (do not scrub) the wound, apply a disinfectant and seek urgent medical advice.

Urgent testing

If testing is urgent (e.g. if the start of post-exposure vaccination is being delayed pending the result or if you suspect lyssavirus disease in an animal other than a bat):

- contact the laboratory to arrange for urgent testing.
- provide an after-hours phone number.

What to submit for lyssavirus testing

To exclude lyssavirus infection definitively, brain tissue must be tested.

Tests cannot exclude lyssavirus infection (including ABLV and RV) in a live animal.
Specifically, serology cannot exclude lyssavirus infection in a live animal. Live animals will need to be euthanased, and preferably refrigerated, before transport.

For safety reasons, where reasonable, submit whole, dead animals for testing.

If the animal is small enough to fit in an esky (e.g. a bat), submit the whole, refrigerated animal.

If the whole animal is too large, but the head of the animal can fit in an esky, submit the whole, refrigerated head.

If the head is too large to fit in an esky, remove the brain, divide it longitudinally and submit:

- half the brain fresh (refrigerated)
- half the brain fixed (in 10% buffered neutral formalin).

Euthanasing a live bat for ABLV exclusion

Bats must be killed humanely.

One humane option is to administer an intraperitoneal injection as follows.

1. Dilute ~0.5 mL Lethobarb® or similar into 2.5–3 mL of water or saline.
2. Inject the diluted Lethobarb® into the peritoneal cavity. Avoid the kidney, liver and gravid uterus. **Do not inject**:
    - into the heart of a conscious animal (unjustifiably painful)
    - concentrated Lethobarb® into a conscious animal (unjustifiably painful).
3. Leave the bat in a cage for at least 5 minutes.
4. **Gently** prod the bat with a long instrument. If the bat is responsive, wait a bit longer.
5. Once the bat is unresponsive, remove it from the cage. If the bat is anaesthetised but not dead, administer a small volume of diluted Lethobarb® into the heart to hasten death.

Packaging the sample

- Double-bag each animal (i.e. place the animal in a plastic bag, then place that bag in a second bag).
- Refrigerate, rather than freeze, fresh animal tissues.
- If you are submitting more than one animal, identify each animal (e.g. attach a foot tag, or write on the bag containing the animal).
- Complete a specimen advice sheet (Form A, available from **business.qld.gov.au**) and attach it to the outside of the esky.
  Do not contaminate the documentation by placing it inside the esky.
- Indicate on the form the reason or reasons for requesting testing. These could be:
    - clinical signs consistent with ABLV (describe these signs)
    - potentially infectious contact with another animal (describe the circumstances and provide details of the animal/s and owner/s)
    - other reasons (describe the circumstances and signs).
- If you know or suspect that the animal has had potentially infectious contact with a person, describe the circumstances and provide the person's details.

Delivery address

Specimen Receipt (Loading Dock 12)

Biosecurity Sciences Laboratory

Health and Food Sciences Precinct

39 Kessels Road

COOPERS PLAINS QLD 4108

Laboratory contacts

Phone: (**07) 3708 8762** (Monday to Friday, 9 am to 5 pm)

After hours: Call the Emergency Animal Disease Watch Hotline on **1800 675 888**

Fax: (07) 3708 8860

Email: bslclo@daf.qld.gov.au

Appendix 2 Determining if a bat was infectious for ABLV by clinical observation

You should only use clinical observation to determine whether a bat (or other animal) was infectious for ABLV when it is reasonable under the circumstances. A bat showing progressive clinical signs clearly suggestive of ABLV should be euthanased and tested for animal welfare reasons and to inform risk assessment.

Conditions for clinical observation

Clinical observation allows you to assess the likelihood that a bat was infectious at a particular point in time (e.g. at the time of a potentially infectious contact). It may be reasonable to make this assessment clinically (rather than via laboratory testing) if the following conditions apply.

- There are no clinical or behavioural signs clearly suggesting ABLV.
- The carer is rabies-vaccinated and experienced in handling bats safely (avoiding bites and scratches).
- The carer agrees to:
    - use appropriate personal protective equipment when in contact with the bat
    - hold the bat in a separate enclosure (no direct contact with other bats or animals) for 10 days post-contact
    - contact the veterinarian urgently (as soon as reasonable, and within 24 hours) if the bat becomes unwell, dies or warrants euthanasia
    - support euthanasia and testing of the bat if the veterinarian decides the bat is clinically consistent with ABLV
    - contact the veterinarian to report the bat's clinical status 10 days post-contact.
- The carer is aware of their general biosecurity obligation in relation to bats and ABLV. For more information, visit **qld.gov.au**.

Interpreting the outcome of observation

Bat survives for 10 days post-contact

If the bat survives for 10 days after contact without showing clinical signs suggesting ABLV, you can reasonably assume that the bat was not infectious at the time of contact and did not transmit ABLV to other animals at that time.

The bat, and all animals that had potential contact with the bat, may be released to normal care or rehabilitation. The bat may be released to the wild once adequately rehabilitated.

If other animals had received a vaccination pending the outcome of observation, the second vaccination (day 7_{PV}) is not necessary. You may discontinue the vaccination protocol.

Note: If the bat survives to day 10 post-contact, it does not mean the bat was not infected (subclinically) at the time of contact, but it does mean that the bat was not infectious at the time of contact. A bat incubating ABLV may progress to clinical disease and become infectious in the following months or years, but would not have been infectious months or years earlier.

Bat dies within 10 days of contact

If the bat dies or is euthanased within 10 days of contact, and laboratory tests show the bat was ABLV-infected, or if tests do not exclude ABLV, you should:

- assume the bat was infectious at the time of contact
- consider any in-contact person or animal as exposed and potentially infected.

Your response may include advising the owner to initiate or complete the post-exposure vaccination protocol.

Appendix 3 Vaccination protocol for animals post-ABLV exposure

Residual risk period - from the time of potential contact to Day 35_{PV}

The residual risk period is from the time of potential contact to 35 days after the initial vaccination (day 35_{PV}). The day of the initial vaccination is day 0_{PV}.

During this period, isolate the potentially exposed animal and minimise contact between it and people and other animals until the post-exposure protocol has been completed. Ideally, only people with a history of rabies vaccination, and a recently demonstrated titre >2 IU, should have contact with the animal.

To isolate and minimise contact.

- Confine the animal to the house or yard, preferably in a section of the property not used by people or other animals (e.g. garage, laundry or fenced section of yard).
- Prevent any contact between the animal and children. If contact with children cannot consistently be prevented at a specific place, consider sending either the animal or children to another location for the residual risk period.
- Confine the animal at night—do not allow it to roam the house or sleep with people.
- Do not take the animal to off-leash areas, parties or other situations where the animal may have contact with people or other animals.
- Take all reasonable steps to prevent unauthorised access and contact (e.g. consider putting up warning signs and locking doors and gates).

Take all reasonable steps to avoid being bitten or scratched during the residual risk period. Everyone should wear appropriate personal protective equipment whenever contact with the animal is possible. This may include:

- a long-sleeved shirt
- long pants
- closed shoes
- puncture-resistant gloves
- a hat
- glasses (preferably safety glasses).

Animal showing signs suggestive of ABLV

If, at any point, an animal shows behavioural or clinical signs suggesting ABLV, isolate it (if safe to do so) and contact Biosecurity Queensland on **13 25 23**.

Vaccination on day 0_{PV}

Administer the first dose of Nobivac® Rabies vaccine.

If the animal is not microchipped, microchip and register it to comply with the APVMA permit.

Vaccination on day 7_{PV}

Administer the second dose of Nobivac® Rabies vaccine.

Assessment on day 35_{PV}

If the animal is clinically well and is not showing signs suggestive of ABLV, you can consider the protocol complete.

The animal can return to normal management.

Advise the owner to take all reasonable steps to avoid future contact with bats.

Supplementary option to confirm seroconversion

More information about the option to confirm seroconversion in an individual animal is given in section 5.4 of this guide. Post-vaccination confirmation of seroconversion may be indicated if:

- you suspect an individual may not respond to the vaccine as intended (e.g. due to immunosuppressive therapy or disease)
- the owner seeks laboratory confirmation of a response to the vaccine.

Appendix 4 Managing risks to health using risk control ratings

Information in this appendix is based on *Measuring and reporting on work health & safety*, pages 28–29 and 37.[1]

Using risk matrixes or 'heat maps'

Reliably estimating the likelihood and consequence of injury associated with a particular hazard can be difficult in the absence of adequate empirical evidence. It is made more challenging due to the low frequency of fatal and disabling injury, and poor access to past detailed injury data at an organisational level. However, many serious and catastrophic events have resulted from risk that had been previously known and readily understood but was not adequately controlled, because the likelihood of injury had been seriously underestimated. This illustrates why risk assessment and the design of risk control measures must give particularly careful attention to hazards with the potential to cause life-altering harm or damage, even where the likelihood of failure appears to be low. It also shows why a traditional approach to constructing work health and safety risk matrixes can be misleading and counterproductive.

Part of the problem stems from inadequate weight (and therefore priority) given to catastrophic and major risk in traditional business risk matrixes (see Table A1).

Table A1 Traditional business risk matrix

		CONSEQUENCE (Needs to be the dominant factor)				
		Negligible	Minor	Moderate	Severe	Catastophic
Likelihood	Very likely	moderate	moderate	high	critical	critical
	Likely	low	moderate	moderate	high	critical
	Possible	low	moderate	moderate	moderate	high
	Unlikely	very low	low	moderate	moderate	moderate
	Very unlikely	very low	very low	low	low	moderate

Given that each catastrophic, major or moderate injury/illness not only reflects a failure to ensure work health and safety but also results in significant human, social and financial consequences, the need to direct attention to the prevention of Class 1 injury/illness (fatal and permanently disabling) is particularly critical (see classifications in Figure A1). Alternative methods of risk rating to guide due diligence are required. One method (see Table A2) does not address the limitations of likelihood estimates, but seeks to clarify and reweight the risk matrix to direct attention to potential harm.

Table A2 Work health and safety risk matrix—potential harm

		Class 3—Negligible	Class 2—Moderate	Class 1—Severe	Class 1—Catastrophic
Likelihood	Very likely	low	critical	critical	critical
	Likely	low	critical	critical	critical
	Possible	low	high	critical	critical
	Unlikely	low	moderate	high	high
	Very unlikely	very low	very low	very low	low

A more meaningful rating approach (see Table A3) clarifies and reweights the risk matrix by considering the quality of risk controls and directing attention to residual risk. This begins to address

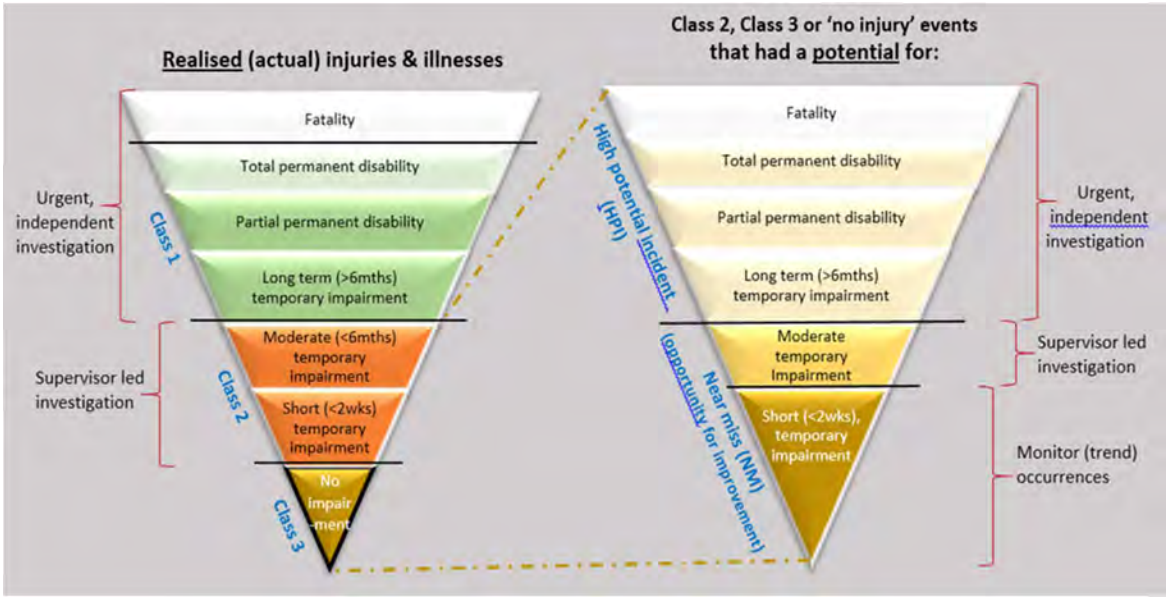
[1] O'Neill, S & Wolfe, K 2017, *Measuring and reporting on work health & safety*, Safe Work Australia, Canberra, pages 28–29 and 37. Retrieved from <https://www.safeworkaustralia.gov.au/system/files/documents/1802/measuring-and-reporting-on-work-health-and-safety.pdf>.

the limitations of likelihood estimations by instead aligning the potential consequence to the adequacy of controls in place. The effectiveness of each control is rated as follows:

1. **Controls are in place.** The controls are currently working and are effective (i.e. the hazard has been eliminated or residual risk is insignificant).
2. **Controls are in place to the full extent reasonably practicable**. There is some remaining risk because the controls are not ideal, but either there is simply no better control currently available or a better alternative would require investment *grossly* disproportionate to the risk. Ongoing monitoring of this risk is needed.
3. **Satisfactory controls are currently in place and appear to be working adequately at this time.** However, more effective controls are known, are available and could be implemented.
4. **Controls currently in place are inadequate**. There are known problems or limitations with existing controls and further action to eliminate or minimise the risk is needed.
5. **The risk is essentially uncontrolled**. Controls either have not been implemented, or they are grossly inadequate. Urgent action is required.

TableA3 Work health and safety risk matrix—risk control ratings

		CONSEQUENCE			
		Class 3	Class 2	Class 1	Catastrophic
1. Risk eliminated or insignificant	Cost effectiveness	Very low	Very low	Very low	Very low
2. Controls are in place, to the full extent reasonably practicable		Low	Low	Moderate (5)	Moderate (5)
3. Satisficing controls seem adequate, but better controls are available		Low	**High** (10)	Critical (20)	Critical (20)
4. Existing controls are inadequate		Moderate (1)	Critical (50)	Critical (100)	Critical (100)
5. Risk is uncontrolled		Moderate (1)	Critical (50)	Critical (100)	Critical (100)



Appendix 5 Information checklist for advising owners on managing ABLV risk in a clinically well animal

General information

- ☐ ABLV is a fatal zoonosis that can be transmitted by a bite or scratch to humans and other mammals (including pets).
- ☐ There is a low, but not zero, possibility that the exposed animal has been infected and, at a later time, the animal may become ill (and die) and transmit ABLV to a person or other animal.
- ☐ The owner has a general biosecurity obligation in relation to ABLV. This means they must take all reasonable and practical measures to prevent or minimise the risk to human health. They may do this by:
  - vaccinating the animal, or
  - euthanasing the animal, or
  - monitoring the animal for and reporting the onset of clinical signs consistent with ABLV.
- ☐ Also, to meet their obligation, they should minimise contact between the animal and people and other animals until the vaccination program is completed, or the animal is euthanased, or for at least 6 months.
- ☐ More information about ABLV (including the pros, cons and limitations of the options for meeting the general biosecurity obligation) is available from **business.qld.gov.au**.

Vaccination

- ☐ No vaccine works immediately. The vaccine is more likely to be effective if given as soon as possible, and two vaccinations are required 7 days apart. There is a residual risk period of 35 days between when the first vaccine is given and when immunity can be assumed to have taken effect.
- ☐ **During the residual risk period, the animal may still develop ABLV disease and could transmit infection to others.** Contact with the pet should be minimised until the program has been successfully completed. The vaccine program does not end until the 35-day residual risk period has passed with the vaccinated animal remaining well.
- ☐ **The earlier the vaccine can be given, the better.** If the owner's private veterinarian does not have the vaccine in stock, options for reducing the delay include seeking veterinary services from a veterinarian that has the vaccine in stock or the owner's veterinarian sourcing the vaccine from another veterinarian pending supply by a veterinary wholesaler.

Euthanasia

- ☐ Euthanasia is not necessary to reasonably minimise the risk and is entirely at the owner's discretion.

Monitor and report

- ☐ This option is appropriate when the likelihood of exposure is relatively low, or for short periods while awaiting further information (e.g. a laboratory result, the outcome of observation). This is the most risky option and the hardest to implement effectively, as it is natural for a person's awareness, alertness and perception of the risk to wane over the long incubation/risk period for ABLV.
  Note: Where there has been exposure to a confirmed source of ABLV, this option is not recommended and should be discouraged when reasonable.

Appendix 6 Accessing the Nobivac® Rabies vaccine

Permit for supply and use of the rabies vaccine

Supply and use of the Nobivac® Rabies inactivated rabies vaccine is permitted in Australia under Australian Pesticides and Veterinary Medicines Authority (APVMA) permit number PER14236. This vaccine contains ≥2 IU/mL inactivated rabies virus (Pasteur strain) as the only active constituent.

Search 'PER14236' on the APVMA website (**portal.apvma.gov.au**) to see the permit.

No animal rabies vaccine is fully registered for use in Australia.

Who may use the rabies vaccine

The reason for using the vaccine determines who may use it:

- A registered veterinarian with case-specific authorisation from the Queensland Chief Veterinary Officer (CVO) may use the vaccine in Queensland to manage ABLV risk following potential exposure to ABLV.
- All veterinarians who are fully registered by a state or territory veterinary board may order and use the rabies vaccine to prepare cats and dogs for export from Australia.

Minimising the delay between ABLV-exposure and vaccination

Minimise the interval between potential exposure and the first vaccine (day 0_{PV}) as far as reasonable.

Apply as soon as possible to the CVO to use the vaccine for ABLV prophylaxis. This may include applying:

- before finalising a decision with the owner
- while awaiting the outcome of a laboratory test or observation period.

An authorisation allows you to use the vaccine to prevent ABLV, but does not mean you have to use it. Whether or not to use the vaccine remains your decision.

Once you have received approval to use the vaccine for ABLV-prophylaxis, you can order the vaccine from a veterinary supplier. However, processing and delivery may take some days. To minimise delays, consider:

- using rabies vaccine held in stock at your practice (e.g. to prepare cats and dogs for export)
- using the approved application to source the vaccine from another practice
- referring the case to a practice that has the rabies vaccine in stock.

Applying to use the rabies vaccine

To use the vaccine for ABLV risk management, complete the application form to use Nobivac inactivated rabies vaccine (available from **publications.qld.gov.au**) and submit it to the Queensland CVO by:

- emailing it to ChiefVetOffice@daf.qld.gov.au or
- faxing it to (07) 3087 8328.

The office will make all reasonable efforts to respond on the same working day.

The office will respond on the next working day to applications received on weekends and public holidays.

If you submit an application in the afternoon, call (07) 3087 8019 to alert the office—this will help to ensure a same-day response.

Veterinarians in other jurisdictions should apply to the relevant state or territory CVO.

Ordering the rabies vaccine from veterinary suppliers

You can order the rabies vaccine from a veterinary supplier. You will need to provide authorisation from the CVO when you request the vaccine for ABLV prophylaxis.

As cold chain is important to the integrity of the vaccine, it is not usually shipped over the weekend, and supply may be delayed until early the following week.

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