AUSVETPLAN is a series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.

National Biosecurity Committee
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1 Introduction

1.1 Scope of this manual

This disease strategy for the management of an outbreak of Rift Valley fever (RVF) in Australia is an integral part of the Australian Veterinary Emergency Plan, or AUSVETPLAN (Edition 4). AUSVETPLAN structures and functions are described in the [AUSVETPLAN Overview Document - in preparation]. The disease strategy provides information about the disease (Section 2); the relevant risk factors and their treatment, and the options for management of a disease outbreak, depending on the circumstances (Section 3); the starting policy and guidelines for agencies and organisations involved in a response to an outbreak (Section 4); declared areas and premises (Section 5); quarantine and movement controls (Section 6); and how to establish proof of freedom (Section 7). The key features of RVF are described in the RVF [Fact Sheet - under development].

This manual has been produced in accordance with the procedures described in the [AUSVETPLAN Overview Document - in preparation] and in consultation with Australian national, state and territory governments, and the relevant livestock industries, as well as public health authorities, where relevant.

In this manual, text placed in square brackets [xxx] indicates that that aspect of the manual remains contentious or is under development; such text is not part of the official manual. The issues will be worked on by experts and relevant text included at a future date.

1.2 Structure of AUSVETPLAN

Guidelines for the field implementation of AUSVETPLAN are contained in the disease strategies, response policy briefs, operational manuals and management manuals. Industry-specific information is given in the relevant enterprise manuals. The full list of AUSVETPLAN manuals that may need to be accessed in an emergency is shown below. The complete series of manuals is available on the Animal Health Australia website.\(^1\)

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<td><strong>Outbreak manuals</strong></td>
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EADRA =
1.3 Nationally agreed standard operating procedures

Nationally agreed standard operating procedures (NASOPs)\(^2\) have been developed for use by jurisdictions during responses to emergency animal disease (EAD) incidents and emergencies. These procedures underpin elements of AUSVETPLAN and describe in detail specific actions undertaken during a response to an incident.

1.4 World Organisation for Animal Health listing

The World Organisation for Animal Health (OIE) includes RVF on its list of notifiable diseases as a multiple species disease.

OIE-listed diseases are diseases with the potential for international spread, significant mortality or morbidity within the susceptible species, and/or zoonotic spread to humans.\(^3\) OIE member countries that have been free from a notifiable disease are obliged to notify the OIE within 24 hours of confirming the presence of the disease.

The strategies in this document for the diagnosis and management of an outbreak of RVF are based on the recommendations in the OIE Terrestrial Animal Health Code (Chapter 8.14) and the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (Chapter 2.1.14). The strategies and policy guidelines are for emergency situations, and are not applicable to quarantine policies for imported livestock or livestock products.

1.5 Australian emergency animal disease listing

In Australia, RVF is included as a Category 2 emergency animal disease in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses (EADRA).\(^4\) Category 2 diseases are those for which costs will be shared 80% by government and 20% by industry.

1.6 Manner and risk of introduction to Australia

In principle, RVF could be introduced into Australia through the importation of infected vectors or hosts, which could include humans.

Since transovarial transmission of RVF virus occurs in at least some vectors, it is possible that any stage of the insect’s lifecycle could be infected. Australia’s quarantine procedures include

\(^3\) These criteria are described in more detail in Chapter 1.2 of the OIE Terrestrial Animal Health Code (www.oie.int/index.php?id=169\&L=0,\&htfile=chapitre_1.1.2.htm)
\(^4\) Information about the EAD Response Agreement can be found at www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement
disinsection of all inbound overseas vessels to minimise the risk of introduction of vectors and disease viruses such as yellow fever virus. Although this disinsection procedure might not be 100% effective, the probability of introduction of RVF into Australia in this way would appear to be low.

The limited available evidence suggests that RVF has a 3–4-day incubation period in humans, and it may be possible for the disease to be introduced into Australia by an infected person before clinical disease became apparent. The number of migrants entering Australia from African countries has recently increased. These people may return to Africa to visit friends or on business, increasing the risk of this potential means of incursion. A number of people returning to Australia from areas where RVF is known to be endemic have subsequently been shown to be infected; however, one assessment concluded that the probability of RVF being introduced into a country by an infected human was negligible to very low, depending on the level of viral activity in the source country (Pfeiffer et al 2005).

Some vector species for RVF virus are known to be present in Australia and have been shown to be competent (Turell and Kay 1998). It can therefore be assumed that the virus cycle could be naturally maintained in Australia. Additional vector species, as yet unidentified, might also be present in Australia. The capacity of potential vector species in Australia to transmit RVF transovarially has not been reported.

Despite the lack of data, the risk of introduction of the disease by an infected person appears to be very low (Pfeiffer et al 2005). For establishment of the disease, the patient would have to be bitten by a vector while they were viraemic, and the virus would need to be passed on to a suitable host(s) in sufficient numbers to become established.

Australian quarantine requirements take into account the risks associated with the importation of animals or genetic material from RVF-affected regions, and either prohibit such imports or impose risk management strategies appropriate to the commodity and country concerned.

1.7 Social and economic effects

Effects of the disease in animals

An uncontrolled outbreak of RVF would cause serious stock losses in the sheep, cattle and goat industries. The resulting financial losses would have a major effect on the local economy in the area of the outbreak. Job losses both on farms and in support industries would occur (Pépin et al 2010).

Although there is little technical justification for doing so, it is quite likely that some export markets would place embargoes on meat and possibly other animal products from the whole of Australia. These could have significant effects on the Australian economy as a whole.

It would therefore be necessary to try to control and eradicate the disease, and to establish Australia’s freedom from RVF, in order to re-establish export trade in animal products. Although the international reaction to zoning is unknown, it could take more than 4 years for Australia to regain ‘free’ status, assuming that an eradication campaign is successful.
If RVF became endemic, continuing economic loss would occur as a result of reproductive losses, mortalities and the cost of ongoing vaccination. Permanent loss of some markets would be expected, with associated down-turn in the rural economy and increased rural unemployment.

Since an outbreak of RVF in Australia might be expected to cause a high mortality, the control strategies used will not lead to significantly more loss of stock on infected premises than the disease itself would cause. The cost of vaccination, including both the cost of vaccine and the cost of mustering for regular revaccination, would be considerable (see Appendix 3). Vaccinated stock may attract a higher market value.

The cost of monitoring to demonstrate proof of freedom would also be quite substantial.

Movement restrictions will cause loss of market opportunities and associated financial losses to nonaffected properties in the area and support industries (such as the stock transport industry). This effect might be reduced by implementation of zoning and/or vaccination (if it is used).

**Effects of the disease in humans**

In humans, the precise percentage of patients who develop the more serious forms of RVF and suffer permanent effects or death is unknown. However, in a few studies where data have been presented, serious illness was reported in about 20% of affected people; in this group, mortalities ranged from 2% to 18%. Although most human cases are relatively mild, a small percentage of patients develop a much more severe form of the disease. This usually appears as one or more of three distinct syndromes: ocular disease (0.5–2% of patients), meningoencephalitis (less than 1%) or haemorrhagic fever (less than 1%). The total fatality rate has varied widely between epidemics but, overall, has been less than 1% in those documented. Most fatalities occur in patients who develop the haemorrhagic icterus form.

The impact of the disease would be higher in remote areas where health services are limited.
2 Nature of the disease

Rift Valley fever (RVF) is an acute arthropod-borne viral disease, mainly affecting ruminants, camels and humans. RVF infection in ruminants causes abortion in pregnant animals and high mortality in young animals. RVF was first identified in Kenya’s Great Rift Valley in 1930.5

2.1 Aetiology and pathogenicity

RVF is caused by infection with RVF virus, which is a member of the Phlebovirus genus of the family Bunyaviridae. This genus also includes the sandfly fevers.

2.2 Susceptible species

RVF is highly pathogenic for sheep and cattle. Newborn lambs, newborn goat kids, puppies and kittens are reported to be extremely susceptible to infection and disease, with high mortality. Goats, buffalo and camels are important hosts. Donkeys, horses, pigs, adult dogs and cats, and rodents can be infected during large outbreaks, but they are considered unlikely to play a major role during RVF epizootics; for example, horses show inapparent infection following a low-grade viraemia, and pigs are relatively resistant (so do not represent a major source of virus for vectors). Other species known to be susceptible include antelopes, monkeys and hippopotami; however, infections in these species are usually subclinical. These latter species may be important in the zoo environment.

Humans are also susceptible.

The susceptibility of Australian native fauna is not known.

2.3 World distribution and occurrence in Australia

2.3.1 World distribution

Until 2000, RVF was restricted to the African continent (especially sub-Saharan areas) and Madagascar. A major outbreak occurred in Egypt in 1977–78, causing heavy animal losses and a large number of human cases; a less severe outbreak followed in 1993. Periodic large-scale epidemics have been reported from Senegal and Mauritania in 1987 and 1998, Madagascar in 1990–91, and east Africa (Kenya, Somalia and Tanzania) in 1997–98. The east African epidemic

affected approximately 200,000 people, caused 589 deaths and resulted in meat shortages (Gerdes 2004). South Africa reported the disease in buffalo in January 1999.

Since 2000, the disease has been reported in Saudi Arabia and Yemen — the first reported occurrence of RVF outside the African continent — resulting in approximately 800 human deaths, with a mortality rate of 14%. In 2006–07, a large outbreak occurred in Kenya and Somalia. In 2008, RVF was suspected or confirmed in South Africa, Yemen, Saudi Arabia (Madani et al. 2003), Sudan, Malawi, Mozambique, Madagascar, Union of the Comoros, Mayotte, Swaziland, Democratic Republic of the Congo, Mauritania and Cameroon. Outbreaks in cattle associated with abortions have also been reported in Zimbabwe and Zambia, where sentinel cattle monitoring suggests that emergence of the virus is an annual occurrence, with antibody prevalence reaching 20% (Gerdes 2004). Once there is evidence of previous virus activity, countries are likely to remain permanently infected.

2.3.2 Occurrence in Australia

RVF has never occurred in Australia.

2.4 Epidemiology

RVF is a viral disease affecting mainly ruminants and humans, and is transmitted primarily by mosquitoes. The virus appears capable of causing outbreaks in a wide range of ecological zones.

Serological evidence suggests that low-level endemic transmission occurs regularly throughout much of the African continent, but most of this remains unrecognised because of inadequate surveillance and health-care facilities (Meegan and Bailey 1988).

2.4.1 Incubation period

Sheep and cattle

Viraemia in lambs can begin within 8–12 hours after exposure to the virus, and a febrile response can occur by 24–36 hours after inoculation. In cattle, the febrile response can occur from days 2–6 after inoculation. Young animals rapidly develop clinical signs and die within 2–6 days.

Humans

The incubation period in humans is stated to vary from 2 to 6 days (WHO 2010).

2.4.1.1 OIE incubation period


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2.4.2 Persistence of agent and modes of transmission

Transmission (nonvector) to humans

The human epidemiology of RVF is poorly understood. In areas where the disease is endemic, there is no regular seasonal pattern of human infection. The vast majority of human infections result from direct or indirect contact with the blood or organs of infected animals. At particular risk are abattoir workers, veterinary officers and laboratory staff with animal exposure (see ‘Environment, including windborne spread’, below). In Mauritania, a serological survey demonstrated the presence of antibodies to RVF virus in 9 of 36 camel breeders; however, 7 butchers and 26 residents of the area with no history of camel contact were serologically negative (Saluzzo et al 1985). Morvan et al (1991) reported an outbreak in Madagascar in 1990 characterised by abortions in cattle, during which 15 human cases were subsequently admitted to hospital, with one fatality. Antibodies to RVF virus were detected in 5 of the 15 patients, in addition to 10 of 111 apparently healthy individuals from the same locality.

One study reported that patients who touched an aborted animal fetus had a risk of subsequently developing severe RVF disease. It was also found that handling or consuming sick animals was the only type of personal exposure that could be related to human deaths (Anyangu et al 2007).

Transmission in humans

The vast majority of human infections result from direct or indirect contact with the blood or organs of infected animals. The virus can be transmitted to humans during handling of animal tissue during slaughtering or butchering, assisting with animal births, conducting veterinary procedures, or disposing of carcasses or fetuses. Certain occupational groups, such as herders, farmers, slaughterhouse workers and veterinarians, are therefore at higher risk of infection. The virus infects humans through inoculation — for example, via a wound from an infected knife or through contact with broken skin, or through inhalation of aerosols produced during the slaughter of infected animals. The aerosol mode of transmission has also led to infection in laboratory workers.

There is some evidence that humans may become infected with RVF by ingesting the unpasteurised or uncooked milk of infected animals.

Human infections have also resulted from the bites of infected mosquitoes, most commonly the Aedes mosquito.

Transmission of RVF virus by hematophagous (blood-feeding) flies is also possible.

To date, no human-to-human transmission of RVF has been documented, and no transmission of RVF to health-care workers has been reported when standard infection control precautions have been put in place.

There has been no evidence of outbreaks of RVF in urban areas (WHO 2010).
2.4.2.1 General properties

The RVF virus particle is relatively large and has a lipid-containing envelope, making it susceptible to a range of disinfectants, including detergents.

2.4.2.2 Environment (including windborne spread)

Characteristics of RVF virus in the environment are as follows:

- RVF virus is resistant to alkaline pH but is very susceptible to acid pH, being inactivated below pH 6.8. It is most stable within the pH range of 7–8.
- RVF virus rapidly loses titre at 56 °C, but the presence of high levels of proteins, as found in whole serum or plasma, can greatly stabilise the virus.
- Survival times of 120 minutes at 56 °C, 21 days at 37 °C and 4 months at 25 °C have been reported (Brès 1981). The virus may be able to survive in dried discharges for up to 3 months, and it was reported that workers were infected when scraping the walls of an animal room used 3 months earlier for RVF studies (Pfeiffer et al 2005). Where blood has been spilt, the contaminated area should be disinfected with appropriate chemicals by personnel wearing suitable personal protective equipment.
- RVF is highly stable in aerosol form at temperatures of 24 °C and relative humidities between 50% and 85% (Miller et al 1963).
- The virus is inactivated by strong solutions of sodium or calcium hypochlorite (residual chlorine should exceed 5000 ppm).
- The virus is destroyed by strong sunlight and ultraviolet radiation.

A high rate of RVF infection in people involved with slaughter, postmortem examination or laboratory handling of tissues from infected animals shows that aerosol transmission is an important means of infection. Evidence of virus transmission through exposure to infectious aerosols under laboratory conditions has also been reported (Brown et al 1981).

2.4.2.3 Susceptible animals

In adult animals, virus is rapidly cleared from the blood by day 6–9 after infection. However, virus has been detected in spleen and liver after 21 days, and presumably can be transferred to humans at slaughter of the infected animal.

There is no evidence that contact transmission plays any significant part in the spread of RVF between live animals or humans, even though virus may be present in the nasal discharges and saliva of viraemic animals (Gerdes 2004).

Animal carcasses

Direct contact with carcases, organs of freshly slaughtered sick animals and aborted materials has regularly caused disease in humans. Direct contact with blood and viscera of infected animals
during slaughter or shortly afterwards poses a significant likelihood of infection via a wound from a contaminated knife, contact with broken skin or inhalation of aerosols (see ‘Environment, including windborne spread’, above).

2.4.2.4 Animal products

The virus content of meat decreases rapidly following slaughter as a result of the decrease in pH with storage of the meat. RVF virus is excreted in milk but can be inactivated by pasteurisation or treatment with acid.

Little is known about the persistence of the virus in skins, wool (and other fibres), bones or manure. Since wool, skins and bones may contain blood, some virus may persist in these products. It is not known how long the virus would survive on wool after it is pressed into bales. Fibrous products can be decontaminated by scouring and carbonisation.

*Meat and meat products*

Chilled or frozen meat is not likely to present a human health hazard.

*Milk and dairy products*

RVF virus is excreted in milk during the viraemic phase in animals, and there is circumstantial evidence that consumption of raw milk is a source of infection in humans (Gerdes 2004). However, pasteurisation inactivates the virus.

2.4.2.5 Animal byproducts

*Hides, skin, wool and other fibres*

Little or no information is available about the possible role of wool (and other fibres such as mohair), bones, skins and manure in the transmission of RVF virus. However, since wool, bones and skins might contain some blood, they have the potential to spread the virus. The amount of viral contamination of wool would be much less than that of bones and skins.

2.4.2.6 Semen and embryos from live susceptible animals

The virus is likely to be present in semen, and transmission may occur. It is known to be present in ova but is most probably not transmitted via embryo transfer (see the Artificial Breeding Centres Enterprise Manual).

Liquid nitrogen tanks used to store and transport genetic material may preserve fungal spores and yeast, bacteria and viruses for extended periods of time. Experimental studies have shown that cross-contamination of germ plasm can occur if it is stored in unsealed vials in contaminated tanks.
Consideration should be given to disinfection — before movement or subsequent use — of liquid nitrogen tanks used to store and transport genetic material that is infected or potentially infected.

2.4.2.7 Equipment, including personal items

No data are available on persistence of RVF virus on equipment or personnel. However, the virus may be able to survive in dried discharges on walls for up to 3 months (Pfeiffer et al 2005).

No data are available on transmission of RVF virus by equipment or personnel. However, anecdotal reports suggest that the virus may be spread between animals by contaminated needles.

2.4.2.8 Vectors

Biological transmission

Biological transmission by insects is the major means of transmission of RVF to animals, but a less important means of transmission to humans. More than 40 mosquito species in six genera collected in the field (Meegan and Bailey 1988) have been shown to be capable of transmitting the virus naturally and under experimental conditions (Moutailler et al 2008, Turell et al 2010). Approximately 40 other arthropod species have demonstrated vector competency in the laboratory. In epizootic situations in Africa, the virus has been isolated from *Aedes*, *Anopheles*, *Mansonia* and *Culex* mosquito species. Where the disease is regarded as enzootic, the virus has been isolated from *Aedes* and *Eretmapodites* mosquitoes (Shope et al 1982). Virus has also been isolated from *Culicoides* biting midges and *Simulium* black flies.

Little is known about the dynamics of the virus in its vectors. One trial with the Egyptian mosquito vector *Culex pipiens* demonstrated that, 7–15 days after feeding on blood, 78% of mosquitoes were infected with RVF virus. However, fewer than half of these were able to transmit virus, as infection did not spread past the midgut. When mosquitoes were inoculated intrathoracically with RVF virus, the virus titre reached a maximum after 3 days and remained at that level for up to 45 days. All inoculated mosquitoes transmitted virus.

Adult mosquitoes that become infected with an arbovirus will usually remain so for life. At least one mosquito species has been shown to transmit RVF 36 days after oral infection. The daily survival rate of a field population of mosquitoes is governed by a range of factors, such as temperature, rainfall, wind and availability of hosts. All these would need to be considered to determine how long adult mosquitoes could survive and maintain RVF virus. However, in general, survival of mosquitoes beyond about 4 weeks is unlikely. Transovarial transmission is also an important factor for persistence of RVF virus in the field (see ‘Vertical transmission in vectors’, below).

The ability of Australian biting insects to transmit RVF virus is not fully known. Some common Australian mosquito species, including *Aedes notoscriptus*, *A. vigilax*, *Culex annulirostris* and *C. quinquefasciatus*, have been shown to be competent vectors for RVF virus (Turell and Kay 1998), and it is possible that other species of mosquito may also be competent. Experimental studies elsewhere have demonstrated that *Aedes aegypti* and *Aedes albopictus* mosquitoes, and *Stomoxys*
*calcitrans* (stable fly) are capable of mechanically transmitting virus to laboratory animals (Hoch et al 1985, Turell et al 1988).

The role of other arthropods, namely argasid and ixodid ticks, is still under consideration in light of their capacity to transmit other zoonotic viruses, both transovarially and mechanically.

**Mechanical transmission**

Experimental mechanical transmission of RVF virus has been shown for three mosquito species, a biting midge species (*Culicoides*), a phlebotomine sandfly, black flies (*Simulium* spp.), a tsetse fly, the stable fly (*Stomoxys calcitrans*) and ticks. The explosive nature of epidemics of RVF suggests that mechanical transmission is a probable means of spread (Hoch et al 1985).

RVF virus is reported to have a relatively short transmission window (6–9 days) in non-insect hosts, although the OIE Terrestrial Code quotes an infective period of 30 days.

**Vertical transmission in vectors**

RVF virus has been isolated from male *Aedes* floodwater mosquitoes that emerged from dormant eggs after flooding of breeding sites. This demonstrates that RVF virus can be transmitted vertically between generations of mosquitoes without a stage in a vertebrate host and, in particular, can be transmitted into eggs (transovarial transmission).

Transovarial transmission in floodwater *Aedes* mosquitoes (primarily *Aedes neomelaniconion*) allows RVF virus to persist between seasons. These mosquitoes lay eggs in which the first-stage larvae develop to the point of being ready to hatch but then enter a resting phase until the egg is flooded. As a further aid to long-term survival of the species, not all eggs will hatch with the first flooding. Transovarial transmission has important implications for persistence of the virus in the field if it becomes established in an *Aedes* mosquito population. There is no evidence to show how long RVF virus can survive in mosquito eggs, but it may be months or even years.

**Effects of vector infection on feeding**

*Culex pipiens* mosquitoes infected with RVF are adversely affected by the virus (Turell et al 1985). One sign of this is a reduced ability to engorge with blood, leading to increased probing behaviour and increased likelihood of feeding on a greater number of hosts, both of which can produce a higher transmission rate. Turell et al (1984b) also demonstrated that infected *C. pipiens* could be separated into two distinct groups: those with a disseminated infection and those with a nondisseminated infection limited to the gut. Only mosquitoes with a disseminated infection were shown to be capable of transmitting virus.

**Preferential feeding**

It has been shown that mosquitoes are more likely to feed on lambs that are infected with RVF than on uninfected controls (Turell et al 1984a). There was a positive correlation between mosquito feeding and the higher temperature of the viraemic animal in very young lambs (3 days old) but not in older lambs (6–8 weeks old).
2.4.3 Factors influencing transmission

Infection rates of vectors are directly proportional to the titre of the virus in the circulating blood of the host. The high titres that occur in vertebrates infected with RVF virus are conducive to high infection rates in a range of vectors. For instance, the experimental infection rate of *C. pipiens*, the likely main vector in the epidemics of RVF in Egypt in 1977–78, was 87%. High titres of circulating virus are also an essential requirement for mechanical transmission. Titres as high as $10^{10}$ pfu/mL have been recorded in both sheep and humans.

Effects of rainfall

RVF appears to be maintained in a cycle or stage that has not yet been identified, and breaks out of that cycle in epidemics. In southern Africa, outbreaks are usually associated with wet seasons with above-average, widespread and persistent rainfall, often over several months or even 1–2 years. This leads to flooding of large ground formations known as dambos, with subsequent large increases in mosquito numbers. Such widespread rain helps to explain the simultaneous outbreak of RVF in widely separated areas. The 2006–07 outbreak in Kenya and Somalia was accurately predicted months in advance by NASA scientists from weather observations in the Pacific and Indian oceans. The predicted rainfall resulted in an ideal environment for rapid vector multiplication.

The outbreaks in northern Africa have not been associated with heavy rain but have been mainly along the irrigation areas of the Nile River, where suitable breeding sites produce high numbers of vectors.

Surface water will facilitate the breeding of vectors. Improved drainage and removal of such water from the area may be necessary to control an RVF outbreak.

The initial spread of RVF after heavy rain could be initiated by *Aedes* mosquitoes emerging from eggs, which may have been infected transovarially (Davies et al 1985). This can lead to rapid spread of RVF because mosquitoes with an existing infection at adult emergence can transmit virus at their first blood meal without the need to encounter a viraemic host, and then go through an incubation period for virus multiplication and dissemination. Heavy rain also provides breeding sites for mosquitoes of other genera, such as *Culex*, *Anopheles* and *Mansonia*, which do not have a resting phase in the egg stage but may become involved in the transmission cycle initiated by *Aedes* mosquitoes.

Effects of wind

Windborne dispersal of infected vectors has been proposed as a means of spread of RVF. In the week immediately preceding the first outbreaks of the Egyptian epidemic in 1977, prevailing winds were from Sudan in the south, where infections had been recorded previously. The distance travelled would have been 450–500 kilometres (Sellers et al 1982). However, Abd El-Rahim et al (1999) suggested that the infection could have resulted from the continuous importation of infected animals into Aswan Province at a time when a large population of insect vectors was present.

2.5 Diagnostic criteria
2.5.1 Case definition

For the purpose of this manual, Rift Valley fever (RVF) is defined as clinical signs of RVF in a susceptible animal accompanied by a confirmed laboratory diagnosis, or clinical signs in a susceptible animal after an outbreak has been confirmed.

2.5.2 Clinical signs

2.5.2.1 Animals

Cattle, sheep and goats

In Africa, indigenous ruminants, including sheep, goats and Bos indicus cattle, are relatively resistant to RVF infection and display few clinical signs. Introduced ruminant species and their crosses act as indicator species, because they develop clinical signs following infection. The susceptibility of Australian-bred Bos indicus cattle and their composites is unknown.

In cattle, sheep and goats, the disease is most severe in young animals, in which high mortalities can occur. In peracute (very acute) cases, animals are found dead or collapse and die when moved. In acute cases, the incubation period may be less than 24 hours and is followed by fever, weakness, unsteady gait, bilateral mucopurulent nasal discharge and vomiting. Death follows in less than 24 hours.

Clinical signs in affected lambs can include anorexia, reluctance to stand and bloody diarrhoea. Adult sheep have been reported to demonstrate a high temperature, unsteady gait, bloody diarrhoea, nasal discharge, vomiting and jaundice. Not all of these clinical signs are seen in every individual case. In lambs up to 1 week old, mortalities can reach 95%. Mortalities may reach 40–60% in weaner lambs and 15–30% in adult sheep. During the RVF epizootic in South Africa in 1950–51, 100 000 sheep are reported to have died and 500 000 aborted (Bouloy 2001, Swanepoel and Coetzee 2004).

Affected calves and adult cattle exhibit fever (40–41 °C). Calves have a loss of appetite and weakness, and mortality among affected calves may reach 70%. In adult animals, subacute disease is more common, and the mortality rate is usually less than 10% (Jouan et al 1989). For both the acute and subacute forms of the disease, fever is followed by weakness and anorexia. Jaundice, abdominal pain, and gastroenteritis with fetid diarrhoea may be observed in older calves and adult cattle, and there is also a drop in milk production.

Abortion (up to 85% in cattle) is a very common consequence of RVF infection in sheep and cattle.

The disease in goats is similar to that in sheep, although adult goats are reported to be less likely to display clinical signs and, depending on the breed, inapparent infections are reported to be more common (Gerdes 2004).

Buffalo, camels, horses, donkeys, pigs, cats, dogs and rodents

Buffalo and camels are susceptible to infection and will abort. Infections in nonpregnant animals are often inapparent, and death rates are low.
Horses, donkeys, pigs, cats, dogs and rodents are low on the susceptibility scale, and inapparent infections are the most likely outcome.

Table 2.1 shows the susceptibility of vertebrate hosts to RVF infection.

<table>
<thead>
<tr>
<th>Extremely susceptible (70–100% mortality)</th>
<th>Highly susceptible (20–70% mortality)</th>
<th>Moderately susceptible (&lt;10% mortality)</th>
<th>Resistant (infection inapparent)</th>
<th>Refractory (not susceptible)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn lambs</td>
<td>Calves</td>
<td>Adult cattle</td>
<td>Equines</td>
<td>Birds</td>
</tr>
<tr>
<td>Newborn kids</td>
<td>Adult sheep</td>
<td>Adult goats</td>
<td>Pigs</td>
<td>Reptiles</td>
</tr>
<tr>
<td>Puppies</td>
<td>Certain rodents</td>
<td>Camels</td>
<td>Adult dogs</td>
<td>Amphibians</td>
</tr>
<tr>
<td>Kittens</td>
<td></td>
<td>Buffalo</td>
<td>Adult cats</td>
<td></td>
</tr>
<tr>
<td>Mice</td>
<td></td>
<td>Asian monkeys</td>
<td>African monkeys</td>
<td></td>
</tr>
<tr>
<td>Hamsters</td>
<td></td>
<td>South American monkeys</td>
<td>Guinea pigs</td>
<td></td>
</tr>
<tr>
<td>Certain other rodents</td>
<td></td>
<td>Humans</td>
<td>Rabbits</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Certain other rodents</td>
<td></td>
</tr>
</tbody>
</table>

Sources: Gerdes 2004, Pfeiffer et al 2005

2.5.2.2 Humans

The clinical syndromes associated with RVF virus infection in humans are described briefly below (adapted from WHO 2010).

Mild form

The mild form of RVF is the most common presentation in people.

The incubation period (interval from infection to onset of symptoms) for RVF varies from 2 to 6 days.

Those infected either experience no detectable symptoms or develop a mild form of the disease characterised by a feverish syndrome, with sudden onset of flu-like fever, muscle pain, joint pain and headache.

Some patients develop neck stiffness, sensitivity to light, loss of appetite and vomiting; in these patients, the disease, in its early stages, may be mistaken for meningitis.

The symptoms of RVF usually last for 4–7 days, after which the immune response becomes detectable with the appearance of antibodies, and the virus gradually disappears from the blood.
Severe form

Most human cases are relatively mild, but a small percentage of patients develop a much more severe form of the disease. This usually appears as one or more of three distinct syndromes: ocular (eye) disease (0.5–2% of patients), meningoencephalitis (less than 1%) or haemorrhagic fever (less than 1%).

The total case–fatality rate has varied widely between different epidemics but, overall, has been less than 1% in those documented. Most fatalities occur in patients who develop the haemorrhagic fever form.

Ocular disease

In the ocular form of the disease, the usual symptoms associated with the mild form of the disease are accompanied by retinal lesions. The onset of the lesions in the eyes is usually 1–3 weeks after appearance of the first symptoms. Patients usually report blurred or decreased vision. The disease may resolve itself with no lasting effects within 10–12 weeks. However, when the lesions occur in the macula, 50% of patients will experience a permanent loss of vision. Death in patients with only the ocular form of the disease is uncommon.

Meningoencephalitis

The onset of the meningoencephalitic form of the disease usually occurs 1–4 weeks after the first symptoms of RVF appear. Clinical features include intense headache, loss of memory, hallucinations, confusion, disorientation, vertigo, convulsions, lethargy and coma. Neurological complications can appear later (after more than 60 days). The death rate in patients who experience only this form of the disease is low, although residual neurological deficit, which may be severe, is common.

Haemorrhagic fever

The symptoms of the haemorrhagic fever form of the disease appear 2–4 days after the onset of illness, and begin with evidence of severe liver impairment, such as jaundice. Subsequently, signs of haemorrhage appear, such as vomiting blood, passing blood in the faeces, a purpuric rash or ecchymoses (caused by bleeding in the skin), bleeding from the nose or gums, menorrhagia and bleeding from venepuncture sites. The case–fatality ratio for patients developing the haemorrhagic form of the disease is high (approximately 50%). Death usually occurs 3–6 days after the onset of symptoms. The virus may be detectable in the blood for up to 10 days.

2.5.3 Pathology

Haematology

The presence of RVF is indicated by:

- leucopenia
- elevated blood enzymes associated with severe liver damage
- thrombocytopenia.
2.5.3.1 Gross lesions

The main sites for viral replication are reported to be the liver and spleen, although the brain can also be involved (Peters and Anderson 1981).

At postmortem examination, affected animals have petechial and ecchymotic haemorrhages on the serosal surfaces and in the internal organs, including liver, gall bladder, lymph nodes and kidneys. The liver, which is swollen, congested and friable, contains necrotic, greyish-white foci (about 1 mm in diameter) associated with haemorrhages under the outer layer. These are more severe in young animals than in adults. There may be ascites, hydropericardium, hydrothorax and pulmonary oedema. The fluid is frequently bloodstained, and the carcass may be jaundiced. There is a variable level of intestinal inflammation, which may include haemorrhages (see Geering et al 1995, DAFF 2007, OIE 2009).

2.5.3.2 Microscopic lesions (histopathology)

In the livers of young animals, including fetuses, peracute liver damage is seen (Easterday et al 1962). This is characterised by well-defined primary foci of severe coagulative necrosis, which may be centrilobular. These are accompanied by diffuse and massive pan-necrosis involving most (or all) of the rest of the parenchyma. Some livers also show mineralisation of scattered (or small groups of) necrotic hepatocytes. The primary necrotic foci are later infiltrated by histiocytes, lymphocytes and neutrophils, many with marked pyknosis and karyorrhexis. Intracytoplasmic Councilman-like bodies may be present in degenerate hepatocytes or free in sinusoids. Eosinophilic inclusion bodies are often found in the nuclei of cells that are still recognisable as hepatocytes (Geering et al 1995).

In older animals, the hepatic necrosis may be less extensive and confined to focal areas of individual lobules (Geering et al 1995).

2.5.4 Differential diagnosis

Animals

Disease outbreaks in ruminants characterised by abortions; deaths in young animals, with liver necrosis; and an acute febrile illness in humans handling sick animals are highly suggestive of RVF.

The following diseases and conditions should be considered in differential diagnosis of RVF:

- Wesselsbron disease
- Nairobi sheep disease
- enterotoxemia of sheep
- vibriosis
- trichomoniasis
- heartwater
- poisoning by toxic plants
- bacterial septicaemias
- bluetongue
- bovine ephemeral fever
• Middelburg virus disease
• ovine enzootic abortion
• bovine brucellosis
• leptospirosis
• malignant catarrhal fever
• peste des petits ruminants
• any disease capable of causing widespread outbreaks of abortion in sheep or cattle.

Humans

In humans, the clinical signs of RVF are diverse. The differential diagnosis will vary between the mild, meningoencephalitic, ocular or haemorrhagic forms, and should include:

• dengue fever (including dengue haemorrhagic fever)
• malaria
• brucellosis
• Lassa fever
• Ebola fever
• Marburg haemorrhagic fever
• Crimean–Congo haemorrhagic fever
• influenza
• Hendra virus
• Nipah virus.

Other viral encephalitides, including Murray Valley encephalitis, should be considered if there are encephalitic signs or symptoms. It is particularly important that malaria be considered in any patient presenting with a fever within 12 months of leaving a malarious area.

When notified of a human case of RVF, the appropriate state or territory health authority will notify the Australian Government Department of Health, and will undertake epidemiological studies.

2.5.5 Laboratory tests

Because the blood and tissues of infected animals may carry a high concentration of virus during the viraemic phase, this material must be processed in a biocontainment laboratory, preferably by staff vaccinated against RVF. Such facilities are only available in Australia at:

• the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), Geelong, Victoria — for animal specimens
• the National High Security Quarantine Laboratory in the Victorian Infectious Diseases Reference Laboratory, or the Communicable Diseases unit of Queensland Health Forensic and Scientific Services — for human material.

2.5.5.1 Samples required

Whole blood, liver, lymph nodes and spleen are the tissues of choice for isolation of the virus. Blood samples (about 20 mL each) should be collected from febrile animals into ethylenediaminetetraacetic acid (EDTA) or heparin. Duplicate samples of liver and spleen should
be collected aseptically, and placed in sterile containers for virus isolation, and in neutral buffered formalin for histopathology (Geering et al 1995). Such samples should be taken from both freshly dead animals at postmortem examination and aborted fetuses (if available).

2.5.5.2 Transport of specimens

Specimens should be forwarded to the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), Geelong, for emergency disease testing, after the necessary clearance has been obtained from the chief veterinary officer (CVO) of the state or territory of the suspect case, and after the CVOs of Victoria and Australia have been informed about the case and the transport of the specimens to Geelong. Sample packaging and consignment for delivery to CSIRO-AAHL should be coordinated by the relevant state or territory laboratory.

For some diseases (bluetongue, Hendra virus infection, influenza (any species), Newcastle disease), the state or territory diagnostic laboratory may conduct initial screening under the Laboratories for Emergency Animal Disease Diagnosis and Response (LEADDR) program. LEADDR is a coordinated laboratory network that provides a collaborative program of test harmonisation and quality assurance. Specimens will be forwarded to CSIRO-AAHL for confirmation of non-negative results and for further testing and characterisation.

For further information, see the Laboratory Preparedness Manual.

Packing specimens for transport

Blood and unprocessed samples should be transported at 4 °C. If delays of more than 48 hours are expected, unprocessed tissue specimens should be frozen and transported on dry ice.

2.5.5.3 Laboratory diagnosis

Laboratory diagnosis in animals

The disease agent can be identified, and virus isolated, from fresh tissue samples.

Histopathology can provide further confirmation of RVF diagnosis. Formalin-fixed sections of liver from infected animals are examined; if multiple foci of diffuse necrosis are seen in hepatic cells, a diagnosis of RVF is supported.

A highly specific immunocapture enzyme-linked immunosorbent assay (ELISA) (van Vuren and Paweska 2009) has been developed to detect RVF antigen. The RVF antigen may also be detected by direct or indirect immunofluorescence tests on impression smears or cryostat sections of liver, spleen and brain. A rapid diagnosis can sometimes be made by agar gel immunodiffusion tests on fresh tissues. Histochemical staining of cryostat sections or formalin-fixed tissues, and polymerase chain reaction (PCR) (see below) are also widely used for RVF diagnosis.

The ELISA test has replaced the haemagglutination inhibition test, immunofluorescence assay and serum neutralisation tests as the test of choice, although serum neutralisation is still used as a confirmatory test.
A reverse transcriptase PCR test is now available for detecting viral genetic material. The sequence of the NS₅ protein can be used for phylogenetic analysis of isolates.

**CSIRO-AAHL tests**

The testing method used by CSIRO-AAHL is shown in Figure 2.1. Further details of tests currently available at CSIRO-AAHL are shown in Table 2.2.

### Table 2.2a Laboratory tests currently available at CSIRO-AAHL for diagnosis of Rift Valley fever

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen required</th>
<th>Test detects</th>
<th>Time taken to obtain result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agent detection</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real-time RT-PCR</td>
<td>Blood, tissues</td>
<td>Viral RNA</td>
<td>6 hours</td>
</tr>
<tr>
<td>Immunofluorescence</td>
<td>Tissues</td>
<td>Viral antigen</td>
<td>1 day</td>
</tr>
</tbody>
</table>

**Figure 2.1** The current approach to diagnostic testing at CSIRO-AAHL
Table 2.2b  Laboratory tests currently available at CSIRO-AAHL for diagnosis of Rift Valley fever

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen required</th>
<th>Test detects</th>
<th>Time taken to obtain result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electron microscopy</td>
<td>Tissues</td>
<td>Viral antigen</td>
<td>12 hours</td>
</tr>
<tr>
<td>Histopathology</td>
<td>Tissues</td>
<td>Microscopic changes</td>
<td>2 days</td>
</tr>
</tbody>
</table>

**Agent characterisation**

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen required</th>
<th>Test detects</th>
<th>Time taken to obtain result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virus isolation and identification</td>
<td>Whole EDTA blood, Fresh brain/spleen/liver</td>
<td>Virus</td>
<td>5–10 days</td>
</tr>
<tr>
<td>RT-PCR and sequencing</td>
<td>Tissue or virus isolate</td>
<td>Viral RNA</td>
<td>2–3 days</td>
</tr>
</tbody>
</table>

**Serology**

<table>
<thead>
<tr>
<th>Test</th>
<th>Specimen required</th>
<th>Test detects</th>
<th>Time taken to obtain result</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELISA</td>
<td>Serum</td>
<td>Antibody</td>
<td>1 day</td>
</tr>
<tr>
<td>Virus neutralisation</td>
<td>Serum</td>
<td>Antibody</td>
<td>3–5 days</td>
</tr>
</tbody>
</table>

EDTA = ethylenediaminetetraacetic acid; ELISA = enzyme-linked immunosorbent assay; PCR = polymerase chain reaction; RT-PCR = reverse transcriptase polymerase chain reaction

Source: Information provided by CSIRO-AAHL, 2012 (refer to CSIRO-AAHL for most up-to-date information).

**Disease diagnosis in humans**

RVF infection in humans is diagnosed in the National High Security Quarantine Laboratory in the Victorian Infectious Diseases Reference Laboratory, or the Communicable Diseases unit of Queensland Health Forensic and Scientific Services. These laboratories should be advised by telephone of the impending arrival of the specimens, including the name of the airline, the date and time of expected arrival, and the airway bill number.

**2.6 Resistance and immunity**

**2.6.1 Innate immunity**

Passive immunity can be transferred from mother to offspring in colostrum. However, the mother needs to have a sufficient level of antibody, produced by previous exposure to the disease or by vaccination with an attenuated ‘live’ virus vaccine. Inactivated virus vaccines do not usually produce a sufficient level of antibody. (Aspects of innate immunity are addressed in Section 2.5.2.)
2.6.2 Adaptive immunity

A high level of immunity is produced in animals following exposure to the virus. This immunity appears to be lifelong.

2.7 Vaccination and/or treatment of infected animals

Two forms of vaccine are generally used overseas in livestock: attenuated virus vaccines and inactivated virus vaccines. In humans, an inactivated vaccine has been developed; however, this vaccine is not licensed and is not commercially available. It has been used experimentally to protect personnel considered to be at high risk of exposure to RVF, such as veterinary and laboratory personnel (WHO 2010).

The use of vaccines in animals is contraindicated at any time when virus transmission is occurring.7 Virus can be spread via contaminated needles from animal to animal, thus extending the outbreak. A predictive model has been developed that may detect an incursion of disease at a very early stage, and thus, in some situations, enable vaccination to take place during the pre-epizootic phase (Linthicum et al 1999, Anyamba et al 2009). This approach could be adapted for the Australian situation should RVF become endemic.

Attenuated (‘live’) vaccines

Attenuated vaccines have been produced by serial passage of RVF virus through laboratory animals, usually mice, and in cell cultures. The Smithburn virus strain, used in South Africa since 1952, produces a high level of immunity and has been used extensively as a veterinary vaccine.

Although more effective than the inactivated vaccine, attenuated vaccine is not used in pregnant animals because of undesirable reactions (abortions and fetal abnormalities) in susceptible sheep. Other considerations relating to attenuated vaccines are the need to ensure that the vaccine is free from exotic agents, the possibility of insect transmission and the possibility of reversion to virulence. Attenuated vaccines are produced in South Africa, Egypt and Kenya.

Inactivated (‘killed’) vaccines

Inactivated vaccines are usually treated with formalin or -propiolactone. South Africa has produced an inactivated vaccine for veterinary use that protects sheep against RVF challenge. It has been used to prevent spread of RVF in South African sheep (Barnard and Botha 1977). The vaccine gives lower antibody responses than live vaccines and would require regular vaccination to maintain immunity. Cattle develop a marginal virus-neutralising response and are protected for a short time.

An inactivated vaccine for human use has been produced by the United States Army Medical Research Institute for Infectious Diseases, Fort Detrick. It is only available in limited quantities and is not approved for use in Australia.

The preferred vaccine for use in livestock in Australia would be an attenuated vaccine (Tweddle 2009), if one could be developed that does not cause abortions or birth defects. Otherwise, an

inactivated vaccine would be used. However, inactivated vaccines are currently only available from manufacturers that are unlikely to comply with Australian quarantine requirements. In the event of an outbreak, an Australian vaccine manufacturer might be able to produce a suitable vaccine under licence.

Vaccines under development for use in livestock include two live strains (RVF MP-12 and RVF arMP-12ΔNSm) derived using mutagen attenuation from a human field isolate from Egypt. Both vaccines are immunogenic and nonabortogenic in pregnant ewes, and immunogenic and nonpathogenic in neonatal lambs when exposed to virulent challenge. Experimental studies have shown that both vaccine strains can replicate in, and be transmitted by, *Culex pipiens* mosquitoes. However, it is unlikely that mosquitoes would become infected by feeding on an animal inoculated with these strains because of the low viraemias produced in vaccinated animals (Turell and Rossi 1991).

Another vaccine, clone 13, has also been derived from a field strain from a naturally mild human case. In trials of the vaccine involving vaccinated pregnant ewes, the animals failed to develop fever or any other clinical signs of RVF, including abortion. This vaccine recently became available in South Africa and is undergoing field trials in RVF-endemic areas (FAO 2011).

**Treatment**

There is no effective animal treatment.
3 Principles of control and eradication

3.1 Critical factors for formulating response policy

3.1.1 Features of the disease

- Introduction of Rift Valley fever (RVF) to Australia is unlikely to occur naturally from long-distance travel of insect vectors on wind currents unless the disease considerably expands its present distribution.
- The incubation period varies from 1 to 5 days.
- The World Organisation for Animal Health (OIE) *Terrestrial Animal Health Code* states that the infective period for RVF is 30 days.
- There is limited documented evidence to confirm the existence of a carrier state.
- Epizootics of RVF in Africa are usually associated with flooding and extreme abundance of vectors.
- Laboratory tests are available in Australia that will detect RVF within 24 hours of receipt of samples.
- RVF has a relatively short transmission window (6–9 days) in non-insect hosts.
- Immunity derived from infection is lifelong.
- A number of species of mosquito that are present in Australia have been shown to be potentially competent vectors for RVF. These are widespread in their distribution and are known to feed on a wide variety of hosts.
- It is assumed that insect vectors remain infected for life. Vertical (transovarial) transmission occurs in some insect vectors; it has not yet been demonstrated in Australian mosquito species.
- Mechanical transmission by a number of insects, including *Culicoides* spp., *Simulium* spp. and ticks, has been demonstrated experimentally.
- RVF virus is susceptible to a range of disinfectants and detergents.
- The virus content of meat decreases rapidly following slaughter, as a result of the fall in pH.
- RVF virus is excreted in milk but can be inactivated by pasteurisation or treatment with acid.
- Little or no information is available about the possible role of wool (and other fibres such as mohair), bones, skins and manure in the transmission of RVF virus.
- Carcasses of infected animals are a potential source of human infection. If a postmortem examination is to be performed, staff will need to be adequately protected.
- Contact with an aborted fetus significantly increases the risk of subsequently developing severe RVF disease.
- The slaughtering process is a potential source of human infection. Animals in the restricted area should not be slaughtered for meat.
- Transmission via semen may occur. The risk of transmission via ova is unknown.
- RVF may be maintained in a cycle or stage of the arthropod vector lifecycle that has yet to be identified.
- Long-distance spread of RVF after its establishment in Australia could occur through movement of infected animals and windborne movement of vectors. Establishment at any destination will require competent insect vectors and a susceptible vertebrate population.
- Vector monitoring is important to determine the species involved and their distribution, but facilities and expertise available for vector trapping and identification in Australia are limited.
3.1.2 Features of susceptible populations

- RVF is highly pathogenic for sheep and cattle, causing abortion in pregnant animals and high mortality in young animals. The clinical signs associated with RVF in ruminants are unlikely to pass undetected.
- RVF is primarily a disease of ruminants. Goats, buffalo and camels are also important hosts and may play a significant role as reservoir hosts if RVF becomes established in Australia.
- Horses, donkeys, pigs, cats, dogs and rodents are low on the susceptibility scale, and infections in these species are likely to be inapparent.
- The susceptibility of Australian native fauna is not known.
- RVF is a zoonotic disease; disease in humans is associated with contact with infected animals or animal products.
- An RVF outbreak in a susceptible population would result in trade impacts, as well as impacts on affected producers and rural communities.

3.2 Options for control and eradication based on the critical factors

The policy options for the control and eradication of RVF are:

- do nothing — this is unlikely to be acceptable because of the zoonotic potential of RVF and economic losses
- stamping out, if the virus has not already spread widely when RVF is diagnosed
- modified stamping out, if the disease is widespread when diagnosed or spreads beyond available resources
- vaccination
- vector (including wild animal) control.

If a diagnosis of RVF is confirmed, control and possible eradication would be based on:

- early recognition and laboratory confirmation of cases; urgent identification of infected premises (IPs) and dangerous contact premises (DCPs) would involve meticulous tracing of contacts with infected herds and intense surveillance in the areas involved
- a thorough epidemiological investigation to scope the extent of RVF infection before finalising the long-term response program; this would include recording all environmental factors, including the presence of ruminants, stocking densities, movement of ruminants into and out of the area, presence of potential vectors, and recent rain and wind patterns
- identification of competent vectors, including any ‘new’ vectors for the Australian environment; since it will take a number of weeks to identify new vectors, the early response should focus on epidemiological scoping and movement controls
- stopping the spread of infection through quarantine and movement controls, particularly for IPs and DCPs, and risk enterprises such as abattoirs, saleyards and milk factories (see Section 5)
- movement controls on all live animals, including animals that die or are humanely destroyed, and animal products
- minimising the spread from cadavers, and appropriate carcass disposal
- minimising the production of virus by insect vectors through vector controls (see Appendix 1)
• minimising the mechanical spread of virus by arthropod vectors
• eliminating infection by the rapid destruction and sanitary disposal of affected and in-contact animals
• testing the contaminated premises 6 weeks after destruction of animals by placing susceptible sentinel animals (cattle and sheep) on the premises (see Section 7); this period may be longer if insect transovarial transmission is considered a possibility in Australia (see Section 2.4.2)
• increasing the resistance of susceptible populations through vaccination with an inactivated vaccine
• registration of all livestock holdings and gathering knowledge of feral ruminant populations
• good communication to coordinate activities across all producers and owners.

Policy options, based on consideration of the critical factors, are:

• immediate zoning through declaration of transmission areas, restricted areas and disease-free areas
• tracing and surveillance to delimit the area of infection
• modification of zones following an epidemiological investigation
• movement controls on live animals, and possibly semen, within zones
• vaccination of susceptible animals
• modified stamping out to target susceptible feral populations within zones
• vector monitoring and management
• destruction and disposal of infected and in-contact animals
• decontamination of fomites to eliminate the virus on IPs and to prevent human infection
• industry and community awareness programs.

The policy to be implemented is described in Section 4.
4 Policy and rationale

4.1 Introduction

4.1.1 Summary of policy

Rift Valley fever (RVF) is a World Organisation for Animal Health (OIE)–listed disease that has the potential for rapid spread, with significant production losses. It is important in the international trade of cattle, sheep and goats, and is of major public health significance.

The policy with regard to an outbreak of RVF is to eradicate RVF in the shortest possible time using *stamping out*, or, if the disease is widespread when diagnosed, to implement a control policy using modified stamping out until RVF can be eradicated.

A combination of the following strategies (not listed in priority order) will be used in eradicating or controlling the disease:

- *early recognition* and *laboratory confirmation* of cases
- an *immediate assessment of the epidemiological situation*, including vector monitoring and serosurveillance of susceptible animals to determine the zone of active transmission
- *destruction and disposal* of infected animals
- *destruction and disposal* of products likely to be contaminated, to reduce the source of infection
- *quarantine and movement controls* for animals in declared areas
- *treatment and husbandry procedures* to control vector attack on susceptible animals, minimise health and production effects, and provide animal welfare in declared areas
- *decontamination* of fomites (facilities, products and things) to eliminate the virus on infected premises and to prevent human infection
- *tracing and surveillance* to determine the source and extent of infection in both animals and insects, and to provide proof of freedom from the disease
- *vaccination* to create buffer zones for the protection of noninfected susceptible animals, protect against clinical disease and facilitate livestock movement — vaccination is likely to be a key component of any control program
- *vector control* measures in declared areas to reduce the spread of disease by insects
- *zoning* to define infected and disease-free areas
- *an awareness campaign* to encourage cooperation from industry and the community, raise awareness of the public health risks and the need to follow public health guidelines and, where necessary, assure consumers of product safety.

Successful implementation of the policy will depend on total industry cooperation and compliance with all control and eradication measures.
4.1.2 Case definition

For the purpose of this manual, Rift Valley fever (RVF) is defined as clinical signs of RVF in a susceptible animal accompanied by a confirmed laboratory diagnosis, or clinical signs in a susceptible animal after an outbreak has been confirmed.

4.1.3 Cost-sharing arrangement

In Australia, RVF is included as a Category 2 emergency animal disease in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses (EADRA).\(^8\) Category 2 diseases are those for which costs will be shared 80% by government and 20% by industry.

4.1.4 Criteria for proof of freedom

Any approach to declaring proof of freedom should be based on the OIE Terrestrial Animal Health Code chapters on RVF (Chapter 8.14) and animal health surveillance (Chapter 1.4).

See Section 7 for further information on proof of freedom.

4.1.5 Governance

4.1.5.1 Chief veterinary officer

The chief veterinary officer (CVO) in the state or territory in which the outbreak occurs and, where relevant (for zoonotic diseases), the chief medical officer (CMO) are responsible for instituting control action within the state or territory. Where the jurisdiction plans to seek cost sharing of the response under the Emergency Animal Disease Response Agreement (EADRA), the CVO is also responsible for recommending an Emergency Animal Disease Response Plan (EADRP) for the particular outbreak to the Consultative Committee on Emergency Animal Diseases (CCEAD).

For cost-shared responses, CVOs will implement disease control measures as agreed in the EADRP and in accordance with relevant legislation. They will make ongoing decisions on follow-up disease control measures in consultation with the CCEAD and, where applicable, the National Management Group (NMG), based on epidemiological information about the outbreak.

Unaffected jurisdictions may also need to develop response plans to address jurisdictional activities that are eligible for cost sharing. Overall operational management of the incident rests with the CVO of the affected jurisdiction, with oversight by the CCEAD.

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\(^8\) Information about the EAD Response Agreement can be found at www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement
4.1.5.2 Consultative Committee on Emergency Animal Diseases

For diseases covered by the EADRA, the CCEAD, convened for the incident, has specific responsibilities (as per Schedule 8 of the EADRA), as follows:

- Receive formal notifications from governments on suspected emergency animal disease (EAD) incidents.
- Advise the NMG if an EADRP is required.
- Recommend to the NMG an EADRP.
- Consider regular reports on progress of an EAD response and develop a consensus on further actions required.
- Provide regular consolidated reports to the affected governments and industries, and to the NMG, on the status of an EAD response.
- In circumstances where rapid eradication of an EAD is judged no longer feasible, provide advice and recommendations to the NMG on when the EAD response should be terminated, when cost sharing should no longer apply, and options for alternative arrangements.
- Determine when a disease has been controlled or eradicated under an EADRP.
- Recommend when proof of freedom has been achieved following the successful implementation of an EADRP.

The CCEAD reports to the NMG when appropriate.

4.1.5.3 National Management Group

If convened for the specific incident, the NMG decides on whether cost sharing will be invoked (following advice from the CCEAD) (see Section 4.5) and approves the EADRP. It also has responsibility for authorising an order for vaccine (if relevant), on advice from the CCEAD. Also refer to Schedule 8 of the EADRA.

For further details, refer to the Summary Document.

For information on the responsibilities of the state coordination centre and local control centre, see the Control Centres Management Manual (Parts 1 and 2).

4.1.5.4 Disease-specific governance issues

For RVF, the CCEAD would include Australian Government human health representation.

4.2 Public health implications

As for other viral haemorrhagic fevers, a human case of RVF would be notified to the appropriate state or territory health authority. This authority, in collaboration with the Communicable Diseases Network Australia, will undertake epidemiological studies and liaise with the Australian
Government. Epidemiological studies are essential to trace both the source of the infection and possible secondary cases.

The state and national health authorities will notify agricultural authorities in their respective jurisdictions, and liaise as required to minimise the impact on the agricultural sector.

Since many species of zoo animals are susceptible to RVF, biosecurity measures need to be enforced in zoos to prevent spread of the disease to humans.

4.3 Control and eradication policy

The policy is to control and eradicate RVF through stamping out, and to re-establish the RVF-free status of Australia as quickly as possible.

Any strategy must be supported by close liaison with all affected industries, public health authorities, the media and the public.

4.3.1 Stamping out

The destruction of all susceptible animals on an infected premises (IP) (stamping out) will be undertaken only when it is believed that the disease has not become widespread and the virus has not established in insect vector populations. If the virus has not spread beyond the index property and stamping out is considered feasible, it will be carried out in association with movement controls, decontamination, vector control, and tracing and surveillance.

If stamping out is not considered feasible because the disease was widespread when diagnosed or it is believed that the virus has become established in the insect population, a modified stamping-out policy will be implemented. Within this overall policy, the strategies selected will depend on a thorough assessment of the epidemiological situation at the time, and will need to be reassessed during the course of the outbreak and altered if necessary. The selected strategies must be directed to containing and eliminating the virus, and protecting animal and public health.

It is very important that the timing and sequence of operations is such that they provide the greatest chance of eliminating RVF virus from IPs. Clinical cases will be destroyed first, followed by animals in direct contact with clinical cases, then the remaining susceptible animals (see the Destruction of Animals Manual).

Aerosols created by blood splash during destruction and disposal of animals present a considerable danger to operators. Safety precautions that minimise exposure to blood and other body fluids will need to be adopted, and only staff (including vaccinated staff) wearing appropriate personal protective equipment should handle the animals.

4.3.2 Quarantine and movement controls

See Section 6 for details on declared premises and areas, and recommended quarantine and movement controls.
4.3.2.1 Quarantine

Quarantine will be immediately imposed on all premises and areas on which infection is either known or suspected.

Premises will be declared (see Section 5.2). A restricted area (RA) and control area (CA) will be declared around the infected premises (see Section 5).

4.3.2.2 Movement controls

Movement controls are best implemented through the declaration of declared areas and linking permitted movements to each area. As a general principle, the aim of movement controls is to reduce the spread of disease by preventing the movement of infected animals, infected animal products and infected vectors (where relevant for the disease), and by allowing movements that pose a minimal risk.

Section 6.4 provides details on movement controls for live animals, reproductive material (semen and in vivo-derived embryos), animal products and byproducts, waste products and effluent, and other items that might be contaminated.

4.3.3 Tracing and surveillance

4.3.3.1 Tracing

Trace-back will involve tracing the movements of susceptible animals, people and products for at least 30 days before the detection of the first clinical case. Trace-forward will involve movements from 30 days before the first clinical case to the time that quarantine is imposed. Tracing will include both livestock and animal products such as blood, milk, semen and embryos (where virus may persist and be infective). Since infected humans could play a role in the transmission of RVF, it may be necessary to trace both animals and people who have come into contact with RVF virus.

It is possible that the first reported animal case will not be the index case, and trace-back will identify other animal or human cases. Stock owners should be encouraged to maintain records of stock movements to facilitate tracing.

4.3.3.2 Surveillance

Surveillance will need to be undertaken on animals, including wild animals, on and around the IPs and dangerous contact premises, to determine the sizes of the transmission area (TA), RA and CA. Surveillance in these areas will also be required if zoning is introduced. This information will play a major role in establishing proof of freedom.

Livestock in the TA and RA will be observed daily, where feasible, for clinical signs of disease. Blood will be taken at weekly intervals from a statistically valid sample of unvaccinated animals.
and tested for antibodies to RVF virus. This testing will commence following the index case and continue for 30 days following the last confirmed case. Serological monitoring will then be continued at monthly intervals for the next 12 months, and then quarterly for a further 4 years.

Surveillance for RVF in humans will be undertaken jointly by national and state/territory health authorities under the auspices of the Communicable Diseases Network Australia. Relevant data will be published by the Australian Government.

The state/territory and national health authorities will also notify agricultural authorities in their respective jurisdictions of human cases detected and potential sources of infection, and liaise as required to minimise the impact on the agricultural sector.

**Vectors**

In the event of an outbreak, surveillance for vectors will need to be conducted for virus isolation and to record the current population of biting insects. A range of collection techniques, including carbon dioxide light traps, truck traps and larval sampling, will be necessary.

See Appendix 1 for further details on surveillance for vectors.

### 4.3.4 Zoning and compartmentalisation for international trade

#### 4.3.4.1 General considerations

The OIE sets international standards for the improvement of animal health and welfare, and veterinary public health worldwide, including standards for safe international trade in animals and their products.

According to the OIE *Terrestrial Animal Health Code*, establishing and maintaining a disease-free status throughout the country should be the final goal for OIE Members. However, given the difficulty of establishing and maintaining a disease-free status for an entire territory, especially for diseases whose entry is difficult to control through measures at national boundaries, there may be benefits to a Member in establishing and maintaining a subpopulation with a distinct health status within its territory. Subpopulations may be separated by natural or artificial geographical barriers (‘zoning’) or, in certain situations, by the application of appropriate management practices (‘compartmentalisation’). In practice, spatial considerations and good management, including biosecurity plans, play important roles in the application of both concepts.

Compartmentalisation is based on biosecurity provisions of specific enterprises and is a joint industry–government undertaking. Zoning is based on geographic areas and is a government responsibility.

The OIE guidelines for RVF are in Chapter 8.14 of the OIE Terrestrial Code.

If desired, a zoning application would need to be prepared by the Australian Government in conjunction with the relevant jurisdiction(s). The recognition of zones must be negotiated.

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9 [www.oie.int/index.php?id=169,&L=0&htmfile=chapitre_1.4.3.htm](http://www.oie.int/index.php?id=169,&L=0&htmfile=chapitre_1.4.3.htm)
bilaterally with trading partners and is not an overarching international agreement. Zoning will also require considerable resources that could otherwise be used to control an outbreak, and careful consideration will need to be given to prioritising these activities.

Agreements between trading partners will take time to develop, consider and finalise, as a result of the need for provision of detailed information, costing and resourcing, and national frameworks to underpin the approach that is developed. An importing country will need assurance that its animal health status is not compromised if it imports from an established RVF-free zone in Australia. It is not known how Australia’s trading partners would react to a zoning proposal; some countries might not accept ‘zone freedom’.

Eradication may be achieved before a decision on a free-zone application is reached.

Managing disease-free zones is a responsibility of veterinary authorities.

4.3.4.2 Specific considerations

The area at risk for RVF can be determined by the geographical range of the vectors. If it can be established that vectors are limited to a particular geographical region of Australia, control procedures may be largely confined to that region. Movements of animals outside the vector zone should have little bearing on the spread of the disease and will be relatively unimpeded. However, serological and/or entomological surveillance will still be required outside the zone to ensure that the disease is indeed confined to that zone.

If trading partners can be convinced that the definition of insect distribution is soundly based, zoning could reduce the economic consequences of the disease by freeing up export markets for products and live animals from outside the disease zone. However, the definition of insect vectors and their distribution is likely to take time and may not be readily accepted by trading partners.

4.3.5 Vaccination

4.3.5.1 General considerations

Importation of RVF vaccines is subject to the issuing of import permit(s) from the Australian Government Department of Agriculture. Supply and use of the vaccine in Australia will require an emergency permit and consent to import from the Australian Pesticides and Veterinary Medicines Authority. Importation, distribution, use and disposal of a vaccine that is a genetically modified organism must also be licensed by the Office of the Gene Technology Regulator, or permitted under an Emergency Dealing Determination by the minister responsible for gene technology, or other relevant and appropriate processes.

Vaccination will be approved by the NMG based on the recommendation of the CCEAD.
4.3.5.2 Specific considerations

Vaccination will be used during an outbreak to protect animals in the immediate area of the index case. All ruminants on farms within the RA, including properties within the TA, will be vaccinated as soon as possible with an inactivated RVF vaccine in accordance with the manufacturer’s directions (eg administered twice at an interval of 2–4 weeks). Vaccination of ruminants in the CA may follow. Consideration should be given to vaccination of zoo animals within the CA.

See Section 2.7 for further details on availability of vaccines.

4.3.6 Treatment of infected animals

There is no effective treatment for RVF.

4.3.7 Treatment of animal products and byproducts

Treatment of animal products from the RA and CA will be necessary.

Animals in the TA or RA will not be slaughtered for meat while transmission is occurring because of the high risk to humans from the slaughtering process. Animals can be slaughtered for meat only after transmission ceases.

However, animals in the CA may be sent to slaughter at an approved abattoir. Chilled or frozen meat is safe for consumption following storage and cooking.

Milk from certain premises in the TA (see Section 6.4.4) may be collected and transported under permit to an approved processing facility (APF) for pasteurisation. Milk from the RA and CA must be pasteurised before consumption. The product from the pasteurised milk may then be distributed without restriction. If the milk cannot be pasteurised, it must be disinfected by acidification and disposed of appropriately (refer to the Disposal Manual).

Processing plants in the RA must comply with increased biosecurity protocols (refer to the relevant enterprise manuals, and the Decontamination and Disposal manuals) to continue receiving milk from any area, and be approved as an APF.

Since it is not known how long RVF virus can survive on wool after it is pressed into bales, wool shorn from sheep within the TA during the period of virus transmission should be despatched for scouring, or scouring and carbonisation. Other fibres such as mohair should be treated by an equivalent process.

Skins, bones and manure will be regarded as contaminated, and therefore will be disinfected and disposed of as described in the Disposal Manual.
4.3.8 Disposal of animals, and animal products and byproducts

Disposal of carcasses should be in accordance with the Disposal Manual, after consideration of factors such as topography, soil type and watertable depth. The preferred method for disposal of milk that has been identified for disposal within a TA is by acidification and appropriate disposal. See the Disposal Manual for further details.

Dead animals on farms outside the TA will be disposed of without postmortem examination. If a postmortem is to be performed, staff will need to be adequately protected against exposure to the virus by appropriate personal protective equipment, and have current vaccination (vaccinated people should still use personal protective equipment). Healthy animals on properties adjacent to the index farm should not be slaughtered.

Composting may be used for disposal, provided that temperatures within the pile reach at least 65 °C. Any assessment of the appropriateness of composting must include consideration of the persistence of RVF virus in proteinaceous substances exposed to heat, the risk to workers from aerosols, and the ability to monitor the composting process — in particular, temperature. Large-scale compost sites can be developed with minimal worker exposure and health risks (Eamens et al 2011).

4.3.9 Decontamination

For human health reasons and the necessity to demonstrate proof of freedom, property decontamination will be carried out, preferably using an acidic disinfectant such as 2% acetic acid (see Section 2.4.2).

Sheds and structures where animals have been held will be decontaminated. These include buildings used to house livestock, dairies, woolsheds, yards, and all areas used for destruction and disposal activities. It is important to ensure that blood-splattered areas are decontaminated by spraying with a suitable disinfectant (eg 2% acetic acid). At all stages of decontamination, steps need to be taken to prevent the generation and dispersal of infective dusts and aerosols.

After destruction of animals, the area and clothing can be decontaminated using formalin, glutaraldehyde-based disinfectants or acids. Enclosed premises may be fumigated with paraformaldehyde; alternatively, a suitable liquid disinfectant can be used.

See the Decontamination Manual for further details.

4.3.10 Sentinel animals and restocking

Where destocking has been used as a means of disease control, the period before the introduction of sentinel animals will depend on whether transovarial transmission within an insect vector is considered likely (see Section 2.4.2). If transovarial transmission is unlikely, a period of 6 weeks will be used. If transovarial transmission is likely, the period may be extended to up to 1 year, depending on the weather (particularly rainfall) and ongoing vector monitoring.

Serological monitoring of unvaccinated animals will be necessary at monthly intervals for 1 year and quarterly for the following 2 years to demonstrate freedom from the disease (see Section 7).
A decision on when to allow full restocking will be made after taking epidemiological factors into account (eg the presence and type of vectors, and the presence or absence of disease elsewhere).

4.3.11 Wild animal control

Epidemiological investigations to determine the distribution and abundance of wild animals (especially goats, camels and buffalo) will need to be undertaken early in the outbreak to assess which (if any) wild animals are likely to be in contact with domestic stock and/or insect vectors, and the likely role of these animals in the outbreak. Initially, these investigations will focus on the IP, followed by sites throughout the TA. If wild animals pose a threat, the presence and extent of antibody or virus in the various populations will be determined. This may involve intensive trapping, baiting and shooting operations.

If serological or virological evidence of RVF is found in wild animals, more extensive and systematic epidemiological studies will be undertaken to monitor the extent and spread of the disease in the wild animal populations. If a large wild animal population is found to be infected, the disease would be considered endemic, and wild animal controls would not be implemented.

If wild animals are considered to be a risk factor in the dissemination of infection, programs aimed at reducing contact between infected vectors, wild animals and uninfected susceptible livestock will be initiated as soon as possible. This is because wild animals may remain a mobile reservoir of virus that could be transmitted by insects to domestic livestock.

See the Wild Animal Response Strategy for details on performing wild animal population surveys, containment, control and disease surveillance.

4.3.12 Vector control

To limit the spread of the virus, vector control will need to be attempted as rapidly as possible after diagnosis of RVF. The methods used will be determined by the particular circumstances, including the available equipment and insecticide, the target species, the location, the weather and, in the case of systemic or pour-on insecticides, stock density and accessibility (see Appendix 1).

If spraying is undertaken, the appropriate people or groups — including the local council, local landholders, police and beekeepers operating in the area — will need to be advised. Mosquito populations can be reduced by taking steps to drain areas of still water and applying controls over the use of water for irrigation. Where water cannot be drained, larvacides can be applied. (For details regarding insecticide application, see Appendix 1.)

Treatment of all domestic livestock in the area with either a systemic insecticide, such as ivermectin (Standfast et al 1984), or a topical insecticide will reduce the population of some of the potential vector species. These chemicals have withholding periods that will need to be observed.

Targeted vector suppression measures could be considered around valuable commercial animals (eg high-value genetic stock), or rare or valuable animals or herds (eg zoo animals).
4.3.13 Public awareness and media

Public awareness programs will be mounted by the appropriate state or territory authorities, in collaboration with the Australian Government. Because of the public health significance of RVF, the public must be kept fully and accurately informed.

Producers will need to be informed of the symptoms of RVF and what to do if they suspect it in their herd or their workers.

The public awareness programs must advise people in high-risk occupations — such as pastoralists, slaughterers and veterinarians — of the measures to be applied to reduce the potential for human exposure to disease.

A media information kit similar to those recommended in the Biosecurity Incident Public Information Manual needs to be available as soon as the disease is diagnosed.

4.4 Other strategies

Strategy if the disease becomes established

If RVF becomes endemic in Australia, the most effective control strategy would be to vaccinate animals with an attenuated RVF vaccine. However, current vaccines based on the Smithburn strain suffer from several problems (see Section 2.7), and their use in an endemic situation should be discouraged.

At present, no RVF vaccine is approved for human use in Australia, and there is no specific therapeutic agent for the disease. Therefore, control strategies from a human perspective would be:

- vector control (adult and larval)
- public education about vector control and means of preventing exposure to vectors (eg insect repellents and mosquito nets)
- public education about the risks of occupational exposure
- strengthening of surveillance and intervention programs.

Vector control programs should be undertaken at the state/territory government, local government and individual levels. Public education would be the responsibility of the state and territory governments.

4.5 Funding and compensation

4.5.1 General considerations

Details of the cost-sharing arrangements can be found in the Summary Document and the Valuation and Compensation Manual.
5 Guidelines for classifying declared areas and premises

5.1 Declared areas

A declared area is a defined tract of land that is subjected to disease control restrictions under emergency animal disease (EAD) legislation. There are two types of declared areas: restricted area (RA) and control area (CA).

Declared areas are risk based, with several areas or premises of higher risk nested within areas of lower risk.

All declared areas need to be clearly identified and easily understood, so that all affected parties can recognise which area they are in, and what regulations and control measures are applicable to them.

Declared areas are declared by a chief veterinary officer (CVO) or their delegate, or a ministerial declaration, according to the appropriate legislation of the states and territories involved.

5.1.1 Transmission area (TA)

The TA is an area, not legally declared, that is used for vector-borne diseases for epidemiological purposes, recognising that vectors are not confined by property boundaries. It includes infected premises (IPs) and, where possible, suspect premises (SPs), trace premises (TPs), dangerous contact premises (DCPs), and dangerous contact processing facilities (DCPFs). A TA is subject to an increased level of surveillance, and has movement controls appropriate to its associated RA.

The TA will be drawn around known sources of infection, as evidenced by disease, seroconversion or trapping of infected vectors, and any other confirmation of active transmission of RVF.

In the presence of competent vectors, a TA of not less than 50-km radius should be declared. The TA does not need to be circular but can have an irregular perimeter, provided that the boundary is initially an appropriate distance from the nearest IP, DCP, SP or TP. This distance will depend on the information gained about vector numbers and competence, environmental factors (eg prevailing winds, rainfall, temperature, humidity), and the number and distribution of infected animals. The boundary in a densely populated area will take into account the distribution of infected and/or susceptible animals.

In the absence of competent vectors, the TA may be reduced in size.

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10 In most cases, a TA is focused on insect (arthropod) vectors.
5.1.2 Restricted area (RA)

The RA will be a larger legally declared area around the TA(s). The boundary of the RA does not have to be circular or parallel to that of the TA but should be at least 100 km from the boundary of the TA; this may be influenced by World Organisation for Animal Health (OIE) standards or an official surveillance program. The RA can include areas of known competent vector distribution. In general, surveillance may be less intense than in the TA, but movement controls will be the same, with animals permitted to move under permit from and within the area.

The boundary of the RA will be adjusted as confidence about the extent of the outbreak increases. It will take into account, if appropriate, OIE standards on zoning and compartmentalisation (Chapter 4.3).11

5.1.3 Control area (CA)

A CA is a legally declared area where the disease controls, including surveillance and movement controls, applied are of lesser intensity than those in an RA (the limits of a CA and the conditions applying to it can be varied during an incident according to need).

A CA is a disease-free buffer between the RA and the outside area (OA). Specific movement controls and surveillance strategies will be applied within the CA to maintain its disease-free status and prevent spread of the disease into the OA.

An additional purpose of the CA is to control movement of susceptible livestock for as long as is necessary to complete tracing and epidemiological studies, to identify risk factors, and forward and backward risk(s).

The CA will be a larger declared area around the RA(s) — initially, possibly as large as the state or territory in which the incident occurs — where restrictions will reduce the risk of disease spreading from the RA(s). The CA will have a minimum radius of [XX] kilometres, encompassing the RA(s). It may be defined according to geography, climate and the distribution of relevant wild (including feral) animals. The boundary will be adjusted as confidence about the extent and distribution of the incident increases.

In general, surveillance and movement controls will be less intense in the CA than in the RA, and disease-susceptible animals and their products may be permitted to move under permit within and from the area.

5.1.4 Outside area (OA)

The OA is the area of Australia outside the declared (control and restricted) areas.

The OA is not a declared area but is used to describe the rest of Australia outside the declared areas. The OA will be subject to surveillance. Because it is highly desirable to maintain the OA

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11 [www.oie.int/international-standard-setting/terrestrial-code/access-online](http://www.oie.int/international-standard-setting/terrestrial-code/access-online)
as ‘disease free’, the movement of animals and commodities from the RA and CA into the OA will be restricted.

The OA will be of interest for ‘zoning’ and ‘compartmentalisation’ for purposes of trade access, as well as for disease control.

5.1.5 Other types of areas

It is possible that other types of areas (eg vaccination area or surveillance area), which are not legally declared, may be used for disease control purposes in some jurisdictions.

5.2 Declared premises

The status of individual premises will be declared after an epidemiological risk assessment has been completed.

Based on the disease risk they present, the highest priorities for investigations are IPs, DCPs, DCPFs, SPs and TPs.

In a disease outbreak, not all classifications may be needed. Premises classifications are mutually exclusive — that is, a given premises can have only one classification at any given time. After an epidemiological investigation, clinical assessment, risk assessment or completion of control measures, a premises may be reclassified.

5.2.1 Infected premises (IP)

An IP is a defined area (which may be all or part of a property) on which animals meeting the case definition are or were present, or the causative agent of the EAD is present, or there is a reasonable suspicion that either is present, and that the relevant CVO or their delegate has declared to be an IP.

A premises with susceptible animals that have met the case definition will be declared an IP. For most diseases, the RA(s) will include all IPs.

For most diseases, the classification of a premises as an IP would be followed by the declaration of the areas around it as an RA and a CA. If required, transmission area (TA) may also be identified, if required.

Depending on the situation, control measures in accordance with the agreed Emergency Animal Disease Response Plan (EADRP) or the relevant AUSVETPLAN disease strategy or response policy brief may be applied immediately, or may await the outcomes of further investigation of the IP.

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12 Less contagious diseases (eg Hendra virus, anthrax, Australian bat lyssavirus) do not use declared areas as part of their control measures. See the applicable AUSVETPLAN disease strategies or response policy briefs for details.

13 An EADRP will usually be prepared for consideration at the first CCEAD meeting, at the start of a disease response.
When the required control measures for an IP have been completed, the premises would be classified as a resolved premises (RP). After further risk assessment, it may be reclassified as:

- a zero susceptible species premises (ZP), if destocked
- an at-risk premises (ARP) with a vaccination qualifier (ARP-VN), if not destocked, and vaccinated
- an ARP with an assessed-negative qualifier (ARP-AN), if neither destocked nor vaccinated.

If a premises has been classified as an IP on the basis of clinical signs as per the case definition, and subsequently both the EAD and the causative agent are confirmed as absent (ie a ‘false’ declaration), the premises would be reclassified as an RP. Thereafter, depending on the specific disease and its epidemiology, it would be reclassified as a ZP or an ARP (the qualifiers AN and/or VN may also be used, depending on the actions taken on the premises).

### 5.2.2 Suspect premises (SP)

SP is a temporary classification of a premises that contains a susceptible animal(s) not known to have been exposed to the disease agent but showing clinical signs similar to the case definition, and that therefore requires investigation(s).

For most diseases, the RA should contain as many SPs as practical. Every effort should be made to investigate and reclassify SPs as soon as possible. SPs are considered a very high priority for veterinary investigations. The investigation and risk assessment may produce the following outcomes:

- If the case definition is confirmed, the premises would be classified as an IP.
- If the case definition is not confirmed but suspicion remains, the premises would continue to be classified as an SP, until further investigation determines its reclassification.
- If the case definition is ruled out, the premises would be given the qualifier AN. If it is located in the RA, it would then be reclassified as an ARP with the qualifier AN (ARP-AN). If it is located in the CA, it would be classified as a premises of relevance (POR) with the qualifier AN (POR-AN).

### 5.2.3 Trace premises (TP)

TP is a temporary classification of a premises that contains a susceptible animal(s) that tracing indicates may have been exposed to the disease agent, or contains contaminated animal products, wastes or things, and that requires investigation(s).

For most diseases, the RA should include as many TPs as practical. Every effort should be made to investigate and reclassify a TP as soon as possible. Exposure may occur from animal movements, contaminated material, vehicles, equipment and fomites, as well as via aerosol, especially if the premises is contiguous with an IP. The investigation and an epidemiological assessment may produce the following outcomes:

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14 During the early phase of an EAD response, a comprehensive ‘initial case definition’ is used — eg individual and herd clinical signs, epidemiological investigation and risk assessment, and laboratory evaluation. Later in the response, the ‘response case definition’ may be used, which may be only clinical signs and on-site clinical assessment.
• If the case definition is met, the premises would be classified as an IP.
• If it appears highly likely that the disease is present and that the TP is highly likely to contain an infected animal(s) or contaminated animal products, wastes or things, even though there are no visible clinical signs, the premises would be classified as a DCP or a DCPF.
• If the investigation shows no evidence of the EAD, the premises would be assessed as negative. If it is located in the RA and there are susceptible animals remaining, it would then be reclassified as an ARP with the qualifier AN (ARP-AN). If it is located in the CA, it would be classified as a POR with the qualifier AN (POR-AN).
• If the tracing investigation reveals no susceptible animals or risk products, wastes or things on the destination premises, a TP may be reclassified as a ZP.

5.2.4 Dangerous contact premises (DCP)

A DCP is a premises, apart from an abattoir, knackery or milk processing plant or other such facility, that, after investigation and based on a risk assessment, is considered to contain a susceptible animal(s) not showing clinical signs, but considered highly likely to contain an infected animal(s) and/or contaminated animal products, wastes or things that present an unacceptable risk to the response if the risk is not addressed, and that therefore requires action to address the risk.

During the initial phase of a response, the RA should contain all the DCPs. As the incident develops, epidemiological investigation and tracing from IPs, SPs and TPs within the RA could identify DCPs that are sufficiently distant that they are outside the existing RAs and within the CA. This could trigger an extension of the RA to include them. However, it may prove impractical to extend an RA if the DCP is sufficiently distant from the existing RA. The trigger to declare a separate RA would be the identification of an IP. A DCP on its own does not trigger an RA. In these cases, it is possible that a DCP would be situated within a CA.

Whether an RA is drawn around a DCP depends on whether the transmission risk can be contained on the premises using premises-specific measures, or whether there is a need for RA measures to be applied as well, involving surrounding properties in heightened surveillance and tighter movement controls. The characteristics of the disease and its behaviour will be the major determinant. The risk assessment would consider these, as well as the stage of the response, the animal(s) present and the local situation.

Although susceptible animals on such premises are not showing clinical signs, they are considered to have been significantly exposed to the disease agent — this might be via an infected animal(s); a vector; contaminated animal products, wastes or things; or another transmission mechanism. If susceptible animals on a premises were exhibiting clinical signs that were similar to the case definition, the premises must be classified as an SP.

Since a DCP presents an unacceptable risk to the response if the risk is not addressed, such premises are subjected to appropriate control measures, including ongoing epidemiological monitoring, risk assessment and investigation, as required. Monitoring, risk assessment or investigation of a DCP may produce the following outcomes:

• If the presence of an infected animal or contaminated animal products, wastes or things is confirmed, the premises would be classified as an IP.
• If their presence is not confirmed but the likelihood is considered to remain high, the premises would continue to be classified as a DCP until completion of control measures enables it to
be reclassified as an RP. A subsequent risk assessment would allow it to be reclassified as an ARP with an AN qualifier. If animals had been vaccinated as part of the control measures, the premises may also have the qualifier VN.

- If it is considered unlikely that an infected animal or contaminated animal products, wastes or things are present, the premises would be assessed as negative (DCP-AN). If it is located in the RA, it would then be reclassified as an ARP with the qualifier AN. If it is located in the CA, it would be classified as a POR with the qualifier AN.

Once the control measures are completed, the DCP will be reclassified as an RP.

### 5.2.5 Dangerous contact processing facility (DCPF)

A DCPF is an abattoir, knackery, milk processing plant or other such facility that, based on a risk assessment, appears highly likely to have received infected animals, or contaminated animal products, wastes or things, and that requires action to address the risk.

Particularly for DCPFs, classification provides authorities with a framework for the exercise of legal powers over the premises and to facilitate product tracking, and serves as a communication tool for reporting nationally and internationally on progress in the response.

Since a DCPF presents an unacceptable risk to the response if the risk is not addressed, such premises are subjected to appropriate control measures, including ongoing epidemiological monitoring, risk assessment and investigation, as required. Monitoring, risk assessment and investigation of a DCPF may produce the following outcomes:

- If the presence of an infected animal or contaminated animal products, wastes or things is confirmed, the premises would be classified as an IP.
- If their presence is not confirmed but the likelihood is considered to remain high, the premises would continue to be classified as a DCPF until completion of control measures enables it to be reclassified as an RP. A subsequent risk assessment may allow it to be reclassified as an approved processing facility (APF), if increased biosecurity measures are maintained.
- If it is considered unlikely that an infected animal or contaminated animal products, wastes or things are present, the premises would be assessed as negative (DCPF-AN). It may then be reclassified as an APF, if increased biosecurity measures are maintained.

Once the control measures are completed, the DCPF will be reclassified as an RP.

If, as part of disease control management, a DCPF is used to slaughter suspect or infected animals, it will be reclassified as an IP until it meets the definition for an APF or ZP.

### 5.2.6 Approved processing facility (APF)

An APF is an abattoir, knackery, milk processing plant or other such facility that maintains increased biosecurity standards. Such a facility could have animals or animal products introduced from lower risk premises under a permit for processing to an approved standard.

Before being classified as an APF, the premises is assessed to confirm that it has not received infected animals, or contaminated animal products, wastes or things, and is operating according to agreed biosecurity standards.
If, during the course of a response, the premises is suspected to have received infected animals, or contaminated animal products, wastes or things, it will be reclassified as a DCPF pending further investigation.

5.2.7 At-risk premises (ARP)

An ARP is a premises in an RA that contains a live susceptible animal(s) but is not considered at the time of classification to be an IP, DCP, DCPF, SP or TP.

The animal(s) on such premises are subject to disease control procedures, such as regular surveillance and movement restrictions, that are appropriate to the RA.

5.2.8 Premises of relevance (POR)

A POR is a premises in a CA that contains a live susceptible animal(s) but is not considered at the time of classification to be an IP, SP, TP, DCP or DCPF.

The animal(s) on such premises are subject to disease control procedures, such as heightened surveillance and movement restrictions, that are appropriate to the CA.

5.2.9 Resolved premises (RP)

An RP is an IP, DCP or DCPF that has completed the required control measures and is subject to the procedures and restrictions appropriate to the area in which it is located.

Later in a response, as control measures on IPs, DCPs and DCPFs are completed, the premises are reclassified to RP, and their risk status is progressively reviewed.

After appropriate investigation and risk assessment, an RP will become an ARP, POR, ZP or APF.

5.2.10 Unknown status premises (UP)

A UP is a premises within a declared area where the current presence of susceptible animals and/or risk products, wastes or things is unknown.

If an investigation and epidemiological risk assessment on a UP confirmed:

- the presence of an infected animal or contaminated animal products, wastes or things, the premises would be classified as an IP
- that it contained no susceptible animals and/or risk products, wastes or things, the UP would be reclassified as a ZP
- the presence of susceptible animals and excluded the presence of an EAD or the causative agent of the EAD, the UP would be reclassified as an ARP if in the RA, or a POR if in the CA
- clinical signs similar to the case definition, the UP would be reclassified as an SP
• an epidemiological link to a risk premises, the UP would become a TP
• a high-risk epidemiological link but without clinical signs of an EAD, the UP would be reclassified as a DCP or DCPF.

5.2.11 Zero susceptible species premises (ZP)

A ZP is a premises that does not contain any susceptible animals or risk products, wastes or things.

5.2.12 Qualifiers

The following qualifying categories may be added to a property status.

5.2.12.1 Assessed negative (AN)

AN is a qualifier that may be applied to ARPs, PORs and premises previously defined as SPs, TPs, DCPs or DCPFs that have undergone an epidemiological and/or laboratory assessment and have been cleared of suspicion at the time of classification, and can progress to another status. The animals on such premises are subject to the procedures and movement restrictions appropriate to the declared area (RA or CA) in which the premises is located.

This classification is a description to document progress in the response and in the proof-of-freedom phase. The AN qualifier is a temporary status and only valid at the time it is applied. The time that the AN qualifier remains active will depend on the circumstances and will be decided by the jurisdiction. One day is considered a reasonable guideline. The AN qualifier should also provide a trigger for future surveillance activity to regularly review, and change or confirm, a premises status.

The AN qualifier can also function as a counting tool to provide quantitative evidence of progress, to inform situation reports in control centres during a response. It provides a monitor for very high-priority premises (SPs and TPs) as they undergo investigations and risk assessment, and are reclassified, as well as a measure of surveillance activity overall for ARPs and PORs.

The AN qualifier can be applied in a number of ways, depending on the objectives and processes within control centres. The history of each premises throughout the response is held in the information system; the application of the AN qualifier is determined by the jurisdiction, the response needs and the specific processes to be followed in a local control centre.

5.2.12.2 Vaccinated (VN)

VN is a qualifier that can be applied in a number of different ways. At its most basic level, it can be used to identify premises that contain susceptible animals that have been vaccinated against RVF. However, depending on the legislation, objectives and processes within a jurisdiction, the VN qualifier may be used in different ways to track a range of criteria and parameters. The details would need to be developed and tailored to meet individual needs of jurisdictions and circumstances.
Some of the issues that could be included for consideration are detailed below.

Definition and monitoring of vaccination

The vaccination status of a population of animals or premises might be important when considering movement controls and the proof-of-freedom phase.

For the purposes of AUSVETPLAN, the following guidance should be followed.

To be referred to as a vaccinated population, the population must have been vaccinated in accordance with:

- the Australian Pesticides and Veterinary Medicines Authority (APVMA) registered label particulars, or
- APVMA-approved permit instructions relating to an approved EADRP for off-label use or use of an unregistered immunobiological product(s), or
- instructions of the relevant CVO.

Monitoring vaccination programs

A mechanism for recording and monitoring primary and booster vaccinations for all vaccinated animals should be part of the disease control monitoring system, to provide information on the control of the outbreak as well as evidence for proof of freedom. For example, jurisdictions may choose to add numbers to the qualifiers to indicate primary (VN1) or booster (VN2) vaccinations.

Incomplete vaccination programs

Vaccination programs during emergency responses are not always completed by the time a response is terminated. Therefore, there may be populations of animals present in the proof-of-freedom phase that are only partially vaccinated and will need to be accounted for, particularly if serology is used for proof of freedom.

Vaccination records and identification of vaccinated animals

The key requirement in an EAD response in which vaccine is used will be to identify animals that have been vaccinated (fully or partially) so they can be disposed of or tested in the proof-of-freedom phase. Records of the number of doses administered and their timing can be kept to identify fully vaccinated premises and premises that have not completed the planned vaccination program (partially vaccinated) or are overdue for booster vaccinations.

In cattle, the National Livestock Identification System (NLIS) can record the animals vaccinated. For other species, the NLIS still relies on mob identification. Where appropriate, individual animal identification by means other than the NLIS (eg individual animal management tags, microchips [radio-frequency identification], collars) may be necessary.
5.3 Guidelines for reclassifying previously declared areas

Maintaining movement restrictions on areas for long periods has important implications for resource management, animal welfare, business continuity, and socioeconomic impacts on producers and regional communities.

During the course of an EAD response, it may become necessary for a CA or RA to be expanded, as additional geographic areas or new foci of infection are identified. Later in the response, as control is achieved, mechanisms for gradually reducing the size of the CA and RA can be introduced.

An EAD may involve multiple foci of infection, with several jurisdictions potentially involved. Since disease might be controlled at different rates in different areas, there may be the opportunity to progressively lift restrictions on an area basis. This would involve reclassifying previously declared areas (RAs and CAs), with a staged approach to lifting of movement restrictions. This is a key step in the recovery process and will have positive benefits on the community.

The lifting of restrictions in declared areas is managed by jurisdictions according to their local legislation, regulations and processes.

The key principles for reclassifying a previously declared area during a response should include the following, noting that not all will be relevant for some diseases:

- The area should be epidemiologically distinct from other declared areas.
- All TPs and SPs have been investigated and reclassified, and all IPs, DCPs and DCPFs in the area have been reclassified as RPs.
- All tracing and surveillance associated with EAD control has been completed satisfactorily, with no evidence or suspicion of infection in the area.
- A minimum period of \([xxx] \) days\(^{15}\) has elapsed since pre-determined disease control activities and risk assessment were completed on the last IP or DCP in the area.
- An approved surveillance program (including the use of sentinel animals, if appropriate) has confirmed no evidence of infection in the RA (see below).
- For vector-borne diseases, vector monitoring and absence of transmission studies indicate that vectors are not active.

Lifting of restrictions is a process managed by the combat CVO under jurisdictional legislation and consistent with the most current agreed EADRP. When the appropriate conditions are satisfied, a combat jurisdiction can, in consultation with the Consultative Committee on Emergency Animal Diseases (CCEAD), reduce the size of the RA or lift all restrictions. The previous part of the RA would then become part of the CA. Jurisdictions should be able to present documented evidence that the appropriate conditions have been met.

When an RA is lifted and becomes part of the CA, it will have a lower risk status, and the movement restrictions that apply will be consistent with those applying within the CA. Over time, all of the RAs will be reduced and lifted.

If there is more than one combat jurisdiction involved, each will use its own appropriate legal jurisdictional mechanisms to lift the declaration of the RA or CA, coordinating with each other and consulting with the CCEAD to ensure wide communication and coordination.

\(^{15}\) The minimum period uses, or is based on, the disease-specific incubation periods defined by the OIE — two incubation periods is a common guideline.
After a further period of surveillance and monitoring, and provided that the additional surveillance and monitoring find no evidence of infection, a jurisdiction, in consultation with the CCEAD, could lift the CA. This would result in the lifting of all the remaining regulatory controls associated with the response, and a return to business as usual.
6 Quarantine and movement controls

6.1 General principles

The principles for the recommended quarantine practices and movement controls are as follows:

- Containment and eradication of Rift Valley fever (RVF) is the highest priority. Therefore, ‘normal business movements’ are not allowed.
- Live animals pose the greatest risk of disease spread; therefore, their movements from all premises within the restricted area (RA) and control area (CA) must be strictly controlled.
- The outside area (OA) should remain as ‘clean’ as possible. Therefore, movement of animals from the RA to the OA is prohibited, and movement of products is generally prohibited. Movement of animals and products from the CA to the OA will also be restricted.
- Trace premises (TP) and suspect premises (SP) are temporary classifications, and every effort should be made to resolve the status of these premises as soon as possible.
- The numbers of susceptible animals within the RA should be minimised. Therefore, movements of animals into the RA will be limited and usually for slaughter only.
- Movement restrictions are more stringent within the RA than within the CA, and will be more stringent in the early stages of the response.
- Movement controls may be varied during a response from those listed here. However, this will involve a variation to the agreed Emergency Animal Disease Response Plan, with endorsement by the Consultative Committee on Emergency Animal Diseases (CCEAD) and the National Management Group (NMG).
- Recommended movement controls apply to any movement off a premises, whether on foot or by vehicle, that involves either public or private land.

6.2 Guidelines for issuing permits

When assessing risk for the purposes of issuing a permit, the elements to consider may include:

- sources of risk
  - species of animal
  - type of product
  - presence of disease agent on both the originating and destination premises
  - current vector activity, if relevant
  - organisation and management issues (ie confidence in animal tracing and surveillance, biosecurity)
  - proposed use of the animals or products
  - proposed transport route
  - vaccination status of the animals (if relevant)
  - treatment of animals and vehicles to prevent concurrent movement of vectors, if relevant
  - security of transport
  - security and monitoring at the destination
  - environment and natural events
• community and human behaviour
• risk of sabotage
• technology
• regulations and standards
• available resources for compliance and enforcement

• areas of impact
  - livestock health (health of affected species, including animal welfare)
  - human health (including work health and safety)
  - trade and economic impacts (including commercial and legal impacts)
  - environmental impacts
  - organisational capacity
  - political impacts
  - reputation and image

• proposed risk treatment measures
  - vaccination
  - processing of product
  - disinfection or other treatment of animals, vehicles and fomites
  - vector control, if relevant
  - security
  - communication.

6.3 Types of permits

Permits are either general or special. They are legal documents that describe the animal(s), commodities or things to be moved, the origin and destination, and the conditions to be met for the movement. Either type of permit may include conditions. Once permit conditions have been agreed from an operational perspective, all permit conditions must be met for every permit. Both general and special permits may be in addition to documents required for routine movements between or within jurisdictions (eg health certificates, waybills, consignment notes, National Vendor Declarations).

6.3.1 General permit

General permits (GPs) are used for lower risk movements, and create a record of each movement to which they apply. They are granted without the need for direct interaction between the person moving the animal(s), commodity or thing and a government veterinarian or gazetted inspector of stock. The permit may be completed via a webpage or in an approved place (such as a government office or commercial premises). A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. GPs may not be available until the relevant chief veterinary officer (CVO) gives approval for general movements, and this may not be available in the early stages of a response.

6.3.2 Special permit

Special permits (SpPs) are issued by the relevant government veterinarian or gazetted inspector of stock. They are used for higher risk movements, and therefore require formal application and
individual risk assessment. SpPs describe the requirements for movement of an animal (or group of animals), commodity or thing, for which a specific assessment has been conducted by the relevant government veterinarian or gazetted inspector of stock. A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements.

6.3.2.1 Emergency permit

An emergency permit is a special permit that specifies strict legal requirements for an otherwise high-risk movement of an animal, to enable emergency veterinary treatment to be delivered, to enable animals to be moved for animal welfare reasons, or to enable any other emergency movement under exceptional circumstances. These permits are issued on a case-by-case basis under the authorisation of the relevant CVO.

6.4 Recommended quarantine practices and movement controls

Effective quarantine and movement controls are essential to minimise spread of RVF virus by animals. Initially, stringent controls on the movement and congregation of susceptible livestock will be imposed. These may be relaxed once the situation has been fully assessed.

The results of the epidemiological investigation will determine whether continuing quarantine and movement controls are warranted. It is important to be aware of possible trade concerns about the movement of animals from the vicinity of the outbreak area to free areas, even if such movements carry negligible disease risk. Any movement restrictions placed on live animals might be influenced more by trade considerations than by disease risk. Affected jurisdictions may wish to act conservatively until the epidemiological investigation is complete, and the full extent of the disease risk and the trade risk is known.

Movement controls will be maintained to some degree until the disease is either eradicated or declared endemic. If a vaccination campaign is carried out, far fewer restrictions will apply to vaccinated animals (once their immunity is established) than to unvaccinated animals.

This section offers a guide for common movements of susceptible livestock and livestock transport vehicles; however, a risk assessment of the situation should also be done and any changes made to suit the situation.

For any movement of any item, steps should be taken to stop the mechanical movement of competent vectors with that item. Usually this would comprise use of knockdown or residual insecticidal treatments.

This precaution should be applied to all species — both those requiring a permit to move and those that are not subject to movement controls.

Commodity groups

Commodity groups for which no movement controls apply include animal products (milk, meat and meat products, wool and leather, etc) that have been subject to appropriate treatment at an approved processing facility (APF).
Commodity groups for which movement controls apply are:

- live ruminants (pregnant and nonpregnant)
- live ruminants for slaughter
- nonruminants
- ruminant reproductive material
- vehicles used for livestock transport
- raw milk and milk products
- untreated meat and meat products
- untreated animal byproducts
- untreated wool and fibres
- untreated hides and skins
- untreated carcasses
- specimens.

Control of vector movement

Infected vectors can be mechanically transferred in vehicles, containers, crates and so on. Treatment of vectors as part of movement controls is outlined in the movement control matrices in the following sections.

As well, a communication strategy should be considered to inform affected communities of strategies to reduce this risk so that people can take their own steps to prevent the spread of infected vectors — for example, spraying the interior of vehicles before leaving a transmission area (TA).

6.4.1 Live susceptible animals

Live ruminants and other susceptible animals not being sent to slaughter

Table 6.1 describes the recommended movement controls for live ruminants and other susceptible animals, apart from those being sent to slaughter, within and between declared areas.
**Table 6.1** Recommended movement controls for live ruminants and other susceptible animals not being sent to slaughter

<table>
<thead>
<tr>
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</tr>
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</table>

CA = control area; GP = general permit; OA = outside area; RA = restricted area; SpP = special permit; TA = transmission area

**Notes for Table 6.1**

**SpP1 conditions:**

- No evidence of clinical disease in animals being moved.
- Physical identification of animals (eg National Livestock Identification System [NLIS] or other ear tag, brand), with appropriate accompanying movement documentation (eg National Vendor Declaration [NVD], waybill, PigPass, Sheep Health Statement).
- Completed vaccination program plus 60 days from date of first vaccination, OR tested seropositive plus 60 days from date of test.
- Animals are not pregnant, or were immune as a result of vaccination or natural infection before mating.
- Vector control to stop adult competent vectors travelling with animals
  - animals treated to control vectors
  - livestock transport cleaned and treated for vectors
  - disinsection or vector suppression appropriate for the proposed movement.
- Agreed transport route, with no spelling en route.
- Destination advised and agreed.
- The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.
- Animals are not permitted to move again for a period of 60 days (ie they must remain resident at destination for a minimum of 60 days).
- Any animals that develop any clinical signs during the 60 days following movement must be reported to a government veterinary officer.

**SpP2 conditions:**

- No evidence of clinical disease in animals being moved.
- Animals fully vaccinated plus 14 days after last vaccination.
- Destination advised and agreed.
- Physical identification of animals (eg NLIS or other ear tag, brand), with appropriate accompanying movement documentation (eg NVD, waybill, PigPass, Sheep Health Statement)
- The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.
- Any animals that develop any clinical signs during the 60 days following movement must be reported to a government veterinary officer.

**GP1 conditions:**

- No evidence of clinical disease in animals being moved.
- Animals were born on the property or resident on the property for the consecutive 60 days immediately before movement.
- Physical identification of animals (eg NLIS or other ear tag, brand), with appropriate accompanying movement documentation (eg NVD, waybill, PigPass, Sheep Health Statement).
- The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.
- Any animals that develop any clinical signs during the 60 days following movement must be reported to a government veterinary officer.
- Animals are not permitted to move again for 60 days (ie they must remain resident at destination for a minimum of 60 days).

**Live ruminants and other susceptible animals being sent to slaughter**

Table 6.2 describes the recommended movement controls for live ruminants and other susceptible animals being sent for slaughter within and between declared areas. Care needs to be taken, because the slaughter of viraemic animals may result in human infection.
Table 6.2  Recommended movement controls for live ruminants and other susceptible animals being sent to slaughter

<table>
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<td>Allowed</td>
</tr>
</tbody>
</table>

CA = control area; GP = general permit; OA = outside area; RA = restricted area; SpP = special permit; TA = transmission area

Notes for Table 6.2

SpP3 conditions:

- No evidence of clinical disease in the TA within the previous 30 days.
- Vector control to stop adult competent vectors travelling with animals
  - animals treated to control vectors, and withholding period or export slaughter interval completed before slaughter
  - livestock transport cleaned and treated for vectors.
- Movement directly to abattoir (the abattoir must be an APF).
- Animals slaughtered as soon as possible.
- Physical identification of animals (eg NLIS or other ear tag, brand), with appropriate accompanying movement documentation (eg NVD, waybill, PigPass, Sheep Health Statement).
- The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.

SpP4 conditions:

- No evidence of clinical disease in animals being moved.
- Vector control to stop adult competent vectors travelling with animals
  - animals treated to control vectors, and withholding period or export slaughter interval completed before slaughter
  - livestock transport cleaned and treated for vectors.
- Movement directly to abattoir (the abattoir must be an APF).
- Animals slaughtered as soon as possible.
- Physical identification of animals (eg NLIS or other ear tag, brand), with appropriate accompanying movement documentation (eg NVD, waybill, PigPass, Sheep Health Statement).
• The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.

**SpP5 conditions:**

As for SpP3 plus:

• Animals fully vaccinated plus 14 days after last vaccination, OR seropositive plus 60 days after date of test.

**GP2 conditions:**

• No evidence of clinical disease in animals being moved.
• Animals were born on the property or resident on the property for the consecutive 60 days immediately before movement.
• Physical identification of animals (eg NLIS or other ear tag, brand), with appropriate accompanying movement documentation (eg NVD, waybill, PigPass, Sheep Health Statement).
• The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.
• Animals consigned to an abattoir must be slaughtered within 48 hours.

**Emergency permit for movement to slaughter**

• Where emergency movements are required, these should be assessed on a case-by-case basis.
• The permit must accompany the livestock during movement, and the person responsible for the livestock must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.

### 6.4.2 Semen and embryos from live susceptible animals

Table 6.3 describes the recommended movement controls for ruminant reproductive material within and between declared areas.
Table 6.3  Recommended movement controls for ruminant reproductive material

<table>
<thead>
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</tbody>
</table>

CA = control area; GP = general permit; OA = outside area; RA = restricted area; SpP = special permit; TA = transmission area

**Notes for Table 6.3**

**SpP6 conditions:**
- Reproductive material is collected in a way that meets industry standards and satisfies International Embryo Transfer Society (IETS) requirements.
- Reproductive material is collected at licensed or accredited premises, consistent with IETS requirements.
- All donors are tested in agreement with IETS and World Organisation for Animal Health (OIE) requirements.

**GP3 conditions:**
- No evidence of clinical disease in animals on the premises.
- Donor animals were born on the property or resident on the property for the consecutive 60 days immediately before movement.
- All material moving must be individually identified and specified on the permit for traceability and other purposes.
- The permit must accompany the material during movement, and the person responsible for the material must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.
- Any donor animals that develop any clinical signs during the 60 days following collection must be reported to a government veterinary officer.

6.4.3 Meat and meat products

Meat, meat products and carcases derived from animals from lower-risk premises (at-risk premises — ARPs) within the TA, or any premises within the RA, CA or OA, do not present a significant food safety risk; therefore, movement of these products would generally be allowed from APFs.

Meat, meat products and carcases derived from animals from higher-risk premises within the TA should be subject to maturation at an APF at a temperature of more than 2 °C for a minimum
of 24 hours post-slaughter. Following this processing, the meat, meat products and carcases are allowed to be distributed without restrictions.

No meat, meat products or carcases of susceptible animals, including field-shot animals, from premises that are not registered abattoirs or commercial meat processing enterprises should be moved within or out of the TA, RA or CA.

6.4.4 Milk and dairy products

Table 6.4 describes the recommended movement controls for raw milk within and between declared areas.

Pasteurised milk and product from pasteurised milk is allowed to be distributed without restrictions.

Table 6.4  Recommended movement controls for raw milk

<table>
<thead>
<tr>
<th>From</th>
<th>TA</th>
<th>RA</th>
<th>CA</th>
<th>OA</th>
</tr>
</thead>
<tbody>
<tr>
<td>TA</td>
<td>Prohibited, except under SpP7</td>
<td>Prohibited, except under SpP7</td>
<td>Prohibited</td>
<td>Prohibited</td>
</tr>
<tr>
<td></td>
<td>Prohibited, except under SpP8</td>
<td>Prohibited, except under SpP8</td>
<td>Prohibited</td>
<td>Prohibited</td>
</tr>
<tr>
<td>RA</td>
<td>Prohibited, except under SpP9</td>
<td>Prohibited, except under SpP9</td>
<td>Prohibited</td>
<td>Prohibited</td>
</tr>
<tr>
<td>CA</td>
<td>Prohibited, except under GP4</td>
<td>Prohibited, except under GP4</td>
<td>Allowed</td>
<td>Allowed</td>
</tr>
<tr>
<td>OA</td>
<td>Prohibited, except under GP4</td>
<td>Prohibited, except under GP4</td>
<td>Allowed</td>
<td>Allowed</td>
</tr>
</tbody>
</table>

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; GP = general permit; IP = infected premises, OA = outside area; RA = restricted area; SP = suspect premises; SpP = special permit; TA = transmission area; TP = trace premises

Notes for Table 6.4

SpP7 conditions:

- For disposal of milk only.
- Milk must be decontaminated before leaving the premises.
• Agreed transport route, with no stops to other premises en route.
• Destination advised and agreed.

**SpP8 conditions:**

• For movement of raw milk to APFs (where agreed biosecurity protocols are in force) only.
• No evidence of clinical disease in animals up to and including the day of transport of raw milk.
• Agreed transport route, with stops permitted at other premises of similar status en route.
• Milk must be pasteurised at destination.
• Destination advised and agreed.

**SpP9 conditions:**

• No evidence of clinical disease in animals up to and including the day of transport of raw milk.
• Agreed transport route, with stops permitted at other premises of similar status en route.
• Milk must be pasteurised at destination.
• Destination advised and agreed.

**GP4 conditions:**

• No evidence of clinical disease in animals up to and including the day of transport of raw milk.
• Animals were born on the property or resident on the property for the consecutive 60 days immediately before movement.
• All raw milk moving must be specified on the permit for traceability and other purposes.
• The permit must accompany the raw milk during movement, and the person responsible for the raw milk must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.

### 6.4.5 Hides, skins, wool and other fibres

Table 6.5 describes the recommended movement controls for unprocessed hides, skins, wool and fibres within and between declared areas.

Hides, skins, wool and fibres that have been appropriately treated are allowed to be distributed without restriction.
Table 6.5  Recommended movement controls for unprocessed hides, skins, wool and fibres

<table>
<thead>
<tr>
<th>To→</th>
<th>TA</th>
<th>RA</th>
<th>CA</th>
<th>OA</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>From</td>
<td>↓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TA</td>
<td>IP</td>
<td>Prohibited, except under SpP10</td>
<td>Prohibited, except under SpP10</td>
<td>Prohibited</td>
</tr>
<tr>
<td></td>
<td>DCP, SP, TP, ARP</td>
<td>Prohibited, except under SpP11</td>
<td>Prohibited, except under SpP11</td>
<td>Prohibited</td>
</tr>
<tr>
<td>RA</td>
<td></td>
<td>Prohibited, except under SpP12</td>
<td>Prohibited, except under SpP12</td>
<td>Prohibited</td>
</tr>
<tr>
<td>CA</td>
<td></td>
<td>Prohibited, except under GP5</td>
<td>Prohibited, except under GP5</td>
<td>Allowed</td>
</tr>
<tr>
<td>OA</td>
<td></td>
<td>Prohibited, except under GP5</td>
<td>Prohibited, except under GP5</td>
<td>Allowed</td>
</tr>
</tbody>
</table>

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; GP = general permit; IP = infected premises, OA = outside area; RA = restricted area; SP = suspect premises; SpP = special permit; TA = transmission area; TP = trace premises

Notes for Table 6.5

SpP10 conditions:

- For disposal of hides, skins, wool or fibre only.
- Agreed transport route, with no stops to other premises en route.
- Destination advised and agreed.

SpP11 conditions:

- For movement of unprocessed hides, skins, wool and fibre to APFs for appropriate treatment.
- No evidence of clinical disease in animals at antemortem or postmortem inspection.
- Animals were conveyed to the abattoir under the appropriate special permit.
- Agreed transport route, with no stops to other premises en route.
- Destination advised and agreed.

SpP12 conditions:

- No evidence of clinical disease in animals at antemortem or postmortem inspection.
- Animals were conveyed to the abattoir under the appropriate special permit.
- Agreed transport route, with stops permitted at other premises of similar status en route.
- Destination advised and agreed.
GP5 conditions:

- No evidence of clinical disease in animals at antemortem or postmortem inspection.
- Animals were born on the property or resident on the property for the consecutive 60 days immediately before movement.
- All product moving must be individually identified and specified on the permit for traceability and other purposes.
- The permit must accompany the product during movement, and the person responsible for the product must retain a copy of the permit, consistent with the legal requirements of the jurisdiction.

6.4.6 Other animal byproducts

Movements of animal byproducts derived from animals from higher-risk premises within the TA would only be allowed to an APF within the TA for disposal (which may include rendering).

Animal byproducts derived from animals from lower-risk premises (ARPs) within the TA, or any premises within the RA, CA or OA, do not present a significant food safety risk or risk of spread of the disease; therefore, movement of these products would generally be allowed from APFs.

No animal byproducts of susceptible animals, including field-shot animals, from premises that are not registered abattoirs or commercial meat processing enterprises should be moved within or out of the TA, RA or CA.

6.4.7 Empty livestock transport vehicles and associated equipment

For vehicles transporting live animals, cleaning and treating for vectors involves cleaning to remove manure after each load, then treating with an appropriate insecticide that is effective against vectors. Disinfection of containers, crates and so on involves removing blood and body fluids, then treating with an appropriate insecticide that is effective against vectors. For details of appropriate insecticide treatments, refer to the Decontamination Manual.

Table 6.6 describes the requirements for treatment of empty vehicles, containers, crates and other things by transport operators. On presentation of a decontaminated vehicle, container, crate or other thing to an inspector, the operator can apply for a decontamination certificate. (Refer to Appendix 2 for further information on decontamination and disinsection procedures.)
6.4.8 People and nonsusceptible animals

Care must be taken to avoid transport of infected vectors with any movement of nonsusceptible animals (birds, reptiles and amphibians).

Vehicles transporting nonsusceptible animals should meet the requirements for livestock transport if they have had any contact with susceptible animals.

6.4.9 Specimens

Specimens should be collected according to Section 2.5.5, and packed and transported according to guidelines of the International Air Transport Association.

6.4.10 Animal movements for emergency (including welfare) reasons

For emergency veterinary treatment of susceptible animals, the first preference is for veterinarians to visit the property.

If a susceptible animal has to be transported for emergency veterinary treatment, the animal should be treated with an insecticide before movement. At the destination, an attempt should be made to control vectors.

If other emergency animal welfare movements are required (eg because of lack of food or water, or overcrowding), these should be assessed and permits issued on a case-by-case basis.
7 Procedures for surveillance and proof of freedom

7.1 Surveillance

A statistically valid sample of animals from herds within the restricted area (RA), including the transmission area (TA), must be sampled weekly until 30 days following the last confirmed case. Thereafter, the samples may be collected monthly for the next 12 months and quarterly for a further 2 years.

In a widespread outbreak where vaccination is used, because of the sheer logistics, the amount of sampling may have to be reduced until no more clinical cases are being detected. In this case, the monthly sampling may begin at this time.

The statistical formulae for sampling rate have not been determined, although the need for a confidence limit of 95% or higher can be assumed. To some extent, the sampling rate will depend on livestock density, climate and insect populations in the RA.

Surveillance of vectors may be carried out as described in Section 4.3.3 and Appendix 1.

Sentinel animals

In an isolated outbreak where the index farm has been slaughtered out, sentinel animals will be placed on the farm 6 weeks after destocking. However, if transovarial transmission in an insect population is considered a possibility, this period could be extended to up to 1 year.

The time of full restocking can only be decided after all epidemiological factors have been taken into account. In a worst-case scenario, this could be as long as 3 years after destocking. This would be in the case of a small isolated outbreak where Aedes species mosquitoes are abundant but where there is no apparent spread to other farms and virus is not isolated from any trapped insects. The 3-year period would be to ensure that virus was not maintained in the area by transovarial transmission in the mosquito population.

7.2 Proof of freedom

Following an outbreak of Rift Valley fever (RVF), surveillance will be required to demonstrate that infection has been eradicated from the population. Proof of freedom may also be needed to satisfy trading partners and regain access to international markets. The World Organisation for Animal Health (OIE) Terrestrial Animal Health Code (Chapter 8.14) lists the criteria for a country or zone to be considered free from RVF virus infection. Reinstatement of Australia’s official RVF-free status would be on the basis of self-declaration to the OIE, as per Article 1.6.1 of the Terrestrial Code.
Appendix 1

PROCEDURES FOR VECTOR MONITORING AND CONTROL

Monitoring

Vector monitoring to identify the species of vector present, and their distribution and relative abundance should be one of the first steps in a response to a vector-borne disease. PCR testing of trapped vectors may indicate whether they are carrying disease agents. Vector monitoring could also indicate the effectiveness of disinsectation and vector-control strategies.

At the national level, facilities for monitoring are limited, so resources need to be deployed to achieve maximum effect. Advice must be taken from specialists in this area.

Because of the broad spectrum of genera and species of biting insects from which RVF virus has been isolated, all blood-sucking insects should be considered as potential vectors, although mosquitoes will be the prime suspects.

Carbon dioxide–baited light traps have been used for vector sampling in a number of African studies. Health and local government authorities in most Australian states and territories currently use similar traps for arbovirus and adult mosquito monitoring programs. The preference would be to base monitoring on sampling of adult mosquitoes using carbon dioxide–baited traps. CSIRO uses light traps designed to collect Culicoides biting midges, and should be able to supply adequate numbers of these. The actual numbers of traps used will depend on the area to be sampled. Analysis of collections will be limited by the availability of staff with appropriate expertise.

Larval mosquito sampling can be considerably more time consuming than adult sampling and is often less reliable as a measure of prevalence.

If collections are to be processed for virus isolation, insects will need to be collected live. If they are purely for population analysis, they should be placed into 70% ethanol. The technology to allow virus isolation from specimens preserved in alcohol is currently being refined.

Collections should aim to provide information on:

- all the potential vector species present
- the relative abundance of these species
- breeding sites of these species.

Much of this type of information may be available from health and local government authorities, which routinely conduct arbovirus disease control programs.

Control

The main aim of any vector control program must be breaking the transmission cycle by rapidly reducing the numbers of all insects that are capable of taking up virus from vertebrate hosts. The main types of insecticide application to control adult insects are:

- ultra-low volume (ULV) application from the ground
- ULV application from the air
• thermal fogs or mists from the ground
• systemic or topical treatment of livestock.

The principal mosquito control measure would most likely be ground-based ULV spraying of adult mosquitoes using malathion (Maldison®). The efficiency of such treatment depends on:

• identification and elimination of significant breeding sites of the important vector species
• the prevailing weather
• machinery access (for ground-based spraying)
• environmental concerns, especially if treating urban and adjacent areas.

Similar measures are probably appropriate for the control of adult biting midges. Local government authorities in many mosquito-prone areas own or have access to machinery suitable for the control measures above.

Aerial application of insecticides may be necessary because of access difficulties or the need to cover large areas quickly. However, costs are considerably greater than for ground-based application.

Control of peri-domestic species, such as *Aedes aegypti* (present in Queensland only), *A. notoscriptus* and *Culex quinquefasciatus*, may require more resources, to mobilise house owners and landowners, and to provide sufficient personnel and equipment for rapid control. Indoor spraying might be needed to eradicate these species.

Larval mosquito control would be based on application (low-volume spray or granule) of temephos insecticides (Abate®) or the more environmentally benign *Bacillus thuringiensis* var. *israelensis* (Bti)–based products. Malathion could be considered as a back-up insecticide for larval control.

Appropriate protection should be provided for spray operators, and use of such protection should be compulsory. Staff must follow recommended safety guidelines when using insecticides, and adequate first-aid measures must be on hand. When systemic or topical insecticides are used, the requisite withholding periods must be observed.

A control program should also include promotion of personal protection measures, such as use of repellents (products containing up to 20% DEET [N’N diethyl-m-toluamide] are the most effective) and long, loose clothing, and avoidance of areas where and when vectors are prevalent.
Appendix 2

PRINCIPLES OF DISINSECTATION

Disinsectation means the destruction of insect pests, usually with a chemical agent.

During an EAD response in Australia, disinsectation may be useful:

- to support movement controls
- to suppress or eliminate vectors within a defined or declared area
- to assist disease control on a premises.

Supporting movement controls

The following techniques may be used, together with measures such as vector-free housing:

- individual animal treatment — for example, systemic application of ivermectin, topical application of a chemical to animals for quick and short-term knockdown, treatment or spraying of the immediate airspace around animals with an insecticide such as permethrin
- vehicle and equipment treatment — for example, pretreatment with a residual chemical (eg permethrin), use of rapid knockdown spray just before movement
- environmental control to reduce vector numbers in areas where stock, vehicles or equipment are held before movement — for example, use of residual sprays (with environmental agency approval) or light traps (as used by the National Arbovirus Monitoring Program).

Vector suppression

The techniques used, or the application of these techniques, may depend on whether vector eradication or vector suppression in an area is required.

Another consideration is how long the area needs to be free (or nearly free) from vectors and whether this is feasible — removing vectors may create a ‘vacuum’ that is reinfested from surrounding areas.

For environmental control in an area, residual sprays, knockdown sprays, or compounds that inhibit growth or breeding may be useful, but use of these chemicals would need approval from the relevant environmental agency. Light traps (as used by the National Arbovirus Monitoring Program) could be used to monitor progress.

For treatment of individual animals, all animals, or a percentage of animals (calculated from epidemiological information) would need to be treated. A long-term control program would be required (eg through use of ivermectin or other long-acting compounds, or a program of regular spraying or dipping with a suitable chemical).

Movement controls would be required to prevent vectors moving into the area with livestock.

Vector suppression can be expensive compared with merely treating animals before movement. The benefits of such techniques therefore need to be assessed in relation to their costs, likely
effectiveness, ease of application, legal authority and chemical availability before they are advocated.

**Assisting disease control**

Treatment of livestock with ivermectin and/or insect repellants may protect animals following vaccination until immunity develops.

Ivermectin will be effective in controlling midges for approximately 2 weeks after dosing. Since a viraemic animal may remain infective for up to 50–60 days, more than one dose of ivermectin may be needed if there is a risk of a viraemic animal being present.

Use of vector-proof housing may be considered for valuable animals.

**Other issues to consider**

Emergency use permits may be required if the chemical or compound is not specifically registered for use against all insect species.

For pretreatment of vehicles, containers and transports with a residual insecticide, the Australian Quarantine and Inspection Service’s *Guidelines for Disinsection of Aircraft* note that a residual covering is achieved using a 2% permethrin emulsion that is sprayed over the surface to wet stage (not run-off). Phenothrin is also mentioned as a chemical to use. [Pyrethroids could also be a possibility.]

For treatment of airspace, the *Guidelines for Disinsection of Aircraft* advise use of 2% permethrin in an aerosol sprayed into an airspace and left for 5 minutes before opening or further actions.

**Further information**

Veterinary Medicines Directorate: www.gov.uk/government/organisations/veterinary-medicines-directorate
PROCEDURES FOR VACCINATION

A formalin-inactivated tissue culture (BHK21 cells)–grown vaccine is available from the Veterinary Research Institute, Onderstepoort, South Africa. This inactivated RVF vaccine is registered with the South African Government (registration number G1349 in terms of South Africa’s Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act 36 of 1947). It is an adjuvanted vaccine made up in an equal volume of Alhydrogel (aluminium hydroxide gel). South Africa holds a strategic reserve of 2 million doses of the vaccine. The vaccine must meet innocuity and potency requirements as defined by the OIE Terrestrial Code.

The inactivated vaccine is given subcutaneously at a dose of 2 mL to cattle and 1 mL to sheep or goats. In a disease outbreak situation, animals are revaccinated 3–4 weeks after the primary vaccination. In an endemic situation, revaccination can be performed 2–3 months after the primary vaccination and then annually to maintain a high level of immunity. Calves and lambs born from immune animals can only be effectively vaccinated after 6 months of age (Tweddle 2009).

Note:

- The Onderstepoort vaccine is likely to meet OIE requirements.
- No vaccine is at present available in Australia.
- No vaccine is approved for human use in Australia.
Glossary

Disease-specific terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ecchymotic haemorrhage</td>
<td>Small round spots or purplish discolouration caused by bleeding or bruising in the skin or mucous membrane.</td>
</tr>
<tr>
<td>Haemagglutination inhibition test</td>
<td>A serological test for the presence of antibody in a sample by its ability to inhibit agglutination of red blood cells.</td>
</tr>
<tr>
<td>Immunoglobulin</td>
<td>Antibody proteins</td>
</tr>
<tr>
<td>- IgG</td>
<td>The main form of immunoglobulin produced in response to an antigen. It is mainly found in body fluids.</td>
</tr>
<tr>
<td>- IgM</td>
<td>High-molecular weight immunoglobulin; IgM antibodies are the first to be synthesised and released in response to a primary antigenic stimulation.</td>
</tr>
<tr>
<td>Macula (adj: macular)</td>
<td>A small, yellow area of the retina specialised for high-acuity vision.</td>
</tr>
<tr>
<td>Meningoencephalitis</td>
<td>Inflammation of the brain, spinal cord and spinal nerves.</td>
</tr>
<tr>
<td>Petechial haemorrhages</td>
<td>Tiny flat red or purple spots in the skin or mucous membrane caused by bleeding from small blood vessels.</td>
</tr>
<tr>
<td>Vector competence</td>
<td>The ability of a blood-sucking insect to become infected with an arbovirus after ingestion of an infective blood meal, and to transmit the virus subsequently when feeding on a vertebrate host.</td>
</tr>
</tbody>
</table>

Standard AUSVETPLAN terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Animal byproducts</td>
<td>Products of animal origin that are not for consumption but are destined for industrial use (eg hides and skins, fur, wool, hair, feathers, hooves, bones, fertiliser).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
</tr>
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</tr>
<tr>
<td>Animal Health Committee</td>
<td>A committee whose members are the Australian and state and territory CVOs, the Director of the CSIRO Australian Animal Health Laboratory, and the Director of Environmental Biosecurity in the Australian Government Department of the Environment. The committee provides advice to the National Biosecurity Committee on animal health matters, focusing on technical issues and regulatory policy (formerly called the Veterinary Committee). See also National Biosecurity Committee</td>
</tr>
<tr>
<td>Animal products</td>
<td>Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.</td>
</tr>
<tr>
<td>Approved processing facility</td>
<td>An abattoir, knackery, milk processing plant or other such facility that maintains increased biosecurity standards. Such a facility could have animals or animal products introduced from lower risk premises under a permit for processing to an approved standard.</td>
</tr>
<tr>
<td>At-risk premises (ARP)</td>
<td>A premises in a restricted area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, dangerous contact premises, dangerous contact processing facility, suspect premises or trace premises.</td>
</tr>
<tr>
<td>Australian Chief Veterinary Officer</td>
<td>The nominated senior veterinarian in the Australian Government Department of Agriculture who manages international animal health commitments and the Australian Government’s response to an animal disease outbreak. See also Chief veterinary officer</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>AUSVETPLAN</td>
<td>Australian Veterinary Emergency Plan. A series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.</td>
</tr>
<tr>
<td>Chief veterinary officer (CVO)</td>
<td>The senior veterinarian of the animal health authority in each jurisdiction (national, state or territory) who has responsibility for animal disease control in that jurisdiction. See also Australian Chief Veterinary Officer</td>
</tr>
<tr>
<td>Compartmentalisation</td>
<td>The process of defining, implementing and maintaining one or more disease-free establishments under a common biosecurity management system in accordance with OIE guidelines, based on applied biosecurity measures and surveillance, in order to facilitate disease control and/or trade.</td>
</tr>
<tr>
<td>Compensation</td>
<td>The sum of money paid by government to an owner for livestock or property that are destroyed for the purpose of eradication or prevention of the spread of an emergency animal disease, and livestock that have died of the emergency animal disease. See also Cost-sharing arrangements, Emergency Animal Disease Response Agreement</td>
</tr>
<tr>
<td>Consultative Committee on Emergency Animal Diseases (CCEAD)</td>
<td>The key technical coordinating body for animal health emergencies. Members are state and territory CVOs, representatives of CSIRO-AAHL and the relevant industries, and the Australian CVO as chair.</td>
</tr>
<tr>
<td>Control area (CA)</td>
<td>A legally declared area where the disease controls, including surveillance and movement controls, applied are of lesser intensity than those in a restricted area (the limits of a control area and the conditions applying to it can be varied during an incident according to need).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tbody>
</table>
| Cost-sharing arrangements                           | Arrangements agreed between governments (national and states/territories) and livestock industries for sharing the costs of emergency animal disease responses.  
  See also Compensation, Emergency Animal Disease Response Agreement |
<p>| Dangerous contact animal                             | A susceptible animal that has been designated as being exposed to other infected animals or potentially infectious products following tracing and epidemiological investigation. |
| Dangerous contact premises (DCP)                    | A premises, apart from an abattoir, knackery or milk processing plant (or other such facility), that, after investigation and based on a risk assessment, is considered to contain a susceptible animal(s) not showing clinical signs, but considered highly likely to contain an infected animal(s) and/or contaminated animal products, wastes or things that present an unacceptable risk to the response if the risk is not addressed, and that therefore requires action to address the risk. |
| Dangerous contact processing facility (DCPF)         | An abattoir, knackery, milk processing plant or other such facility that, based on a risk assessment, appears highly likely to have received infected animals, or contaminated animal products, wastes or things, and that requires action to address the risk. |
| Declared area                                        | A defined tract of land that is subjected to disease control restrictions under emergency animal disease legislation. There are two types of declared areas: restricted area and control area. |
| Decontamination                                      | Includes all stages of cleaning and disinfection.                                                                                       |
| Depopulation                                         | The removal of a host population from a particular area to control or prevent the spread of disease.                                       |
| Destroy (animals)                                    | To kill animals humanely.                                                                                                               |
| Disease agent                                        | A general term for a transmissible organism or other factor that causes an infectious disease.                                             |</p>
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Disease Watch Hotline</td>
<td>24-hour freecall service for reporting suspected incidences of exotic diseases — 1800 675 888.</td>
</tr>
<tr>
<td>Disinfectant</td>
<td>A chemical used to destroy disease agents outside a living animal.</td>
</tr>
<tr>
<td>Disinfection</td>
<td>The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; applies to premises, vehicles and different objects that may have been directly or indirectly contaminated.</td>
</tr>
<tr>
<td>Disinsectation</td>
<td>The destruction of insect pests, usually with a chemical agent.</td>
</tr>
<tr>
<td>Disposal</td>
<td>Sanitary removal of animal carcasses, animal products, materials and wastes by burial, burning or some other process so as to prevent the spread of disease.</td>
</tr>
<tr>
<td>Emergency animal disease</td>
<td>A disease that is (a) exotic to Australia or (b) a variant of an endemic disease or (c) a serious infectious disease of unknown or uncertain cause or (d) a severe outbreak of a known endemic disease, and that is considered to be of national significance with serious social or trade implications. See also Endemic animal disease, Exotic animal disease</td>
</tr>
<tr>
<td>Emergency Animal Disease Response Agreement</td>
<td>Agreement between the Australian and state/territory governments and livestock industries on the management of emergency animal disease responses. Provisions include participatory decision making, risk management, cost sharing, the use of appropriately trained personnel and existing standards such as AUSVETPLAN.  See also Compensation, Cost-sharing arrangements</td>
</tr>
<tr>
<td>Endemic animal disease</td>
<td>A disease affecting animals (which may include humans) that is known to occur in Australia.</td>
</tr>
<tr>
<td>Enterprise</td>
<td>See Risk enterprise</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>-------------------------------------------</td>
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</tr>
<tr>
<td>Enzyme-linked immunosorbent assay (ELISA)</td>
<td>A serological test designed to detect and measure the presence of antibody or antigen in a sample. The test uses an enzyme reaction with a substrate to produce a colour change when antigen–antibody binding occurs.</td>
</tr>
<tr>
<td>Epidemiological investigation</td>
<td>An investigation to identify and qualify the risk factors associated with the disease. See also Veterinary investigation</td>
</tr>
<tr>
<td>Epidemiology</td>
<td>The study of disease in populations and of factors that determine its occurrence.</td>
</tr>
<tr>
<td>Exotic animal disease</td>
<td>A disease affecting animals (which may include humans) that does not normally occur in Australia. See also Emergency animal disease, Endemic animal disease</td>
</tr>
<tr>
<td>Exotic fauna/feral animals</td>
<td>See Wild animals</td>
</tr>
<tr>
<td>Fomites</td>
<td>Inanimate objects (eg boots, clothing, equipment, instruments, vehicles, crates, packaging) that can carry an infectious disease agent and may spread the disease through mechanical transmission.</td>
</tr>
<tr>
<td>General permit</td>
<td>A legal document that describes the requirements for movement of an animal (or group of animals), commodity or thing, for which permission may be granted without the need for direct interaction between the person moving the animal(s), commodity or thing and a government veterinarian or inspector. The permit may be completed via a webpage or in an approved place (such as a government office or commercial premises). A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. See also Special permit</td>
</tr>
<tr>
<td>In-contact animals</td>
<td>Animals that have had close contact with infected animals, such as noninfected animals in the same group as infected animals.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<td>------------------------------------</td>
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</tr>
<tr>
<td>Incubation period</td>
<td>The period that elapses between the introduction of the pathogen into the animal and the first clinical signs of the disease.</td>
</tr>
<tr>
<td>Index case</td>
<td>The first case of the disease to be diagnosed in a disease outbreak.</td>
</tr>
<tr>
<td></td>
<td>See also Index property</td>
</tr>
<tr>
<td>Index property</td>
<td>The property on which the index case is found.</td>
</tr>
<tr>
<td></td>
<td>See also Index case</td>
</tr>
<tr>
<td>Infected premises (IP)</td>
<td>A defined area (which may be all or part of a property) on which animals meeting the case definition are or were present, or the causative agent of the emergency animal disease is present, or there is a reasonable suspicion that either is present, and that the relevant chief veterinary officer or their delegate has declared to be an infected premises.</td>
</tr>
<tr>
<td>Local control centre (LCC)</td>
<td>An emergency operations centre responsible for the command and control of field operations in a defined area.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>Routine collection of data for assessing the health status of a population or the level of contamination of a site for remediation purposes.</td>
</tr>
<tr>
<td></td>
<td>See also Surveillance</td>
</tr>
<tr>
<td>Movement control</td>
<td>Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.</td>
</tr>
<tr>
<td>National Biosecurity Committee (NBC)</td>
<td>The NBC was formally established under the Intergovernmental Agreement on Biosecurity (IGAB). The IGAB was signed on 13 January 2012, and signatories include all states and territories except Tasmania. The NBC provides advice to the Agriculture Senior Officials Committee and the Agriculture Ministers’ Forum on national biosecurity issues, and on the IGAB.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>--------------------------------------------------</td>
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</tr>
<tr>
<td>National management group (NMG)</td>
<td>A group established to approve (or not approve) the invoking of cost sharing under the Emergency Animal Disease Response Agreement. NMG members are the Secretary of the Australian Government Department of Agriculture as chair, the chief executive officers of the state and territory government parties, and the president (or analogous officer) of each of the relevant industry parties.</td>
</tr>
<tr>
<td>Native wildlife</td>
<td>See Wild animals</td>
</tr>
<tr>
<td>Operational procedures</td>
<td>Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.</td>
</tr>
<tr>
<td>Outside area (OA)</td>
<td>The area of Australia outside the declared (control and restricted) areas.</td>
</tr>
<tr>
<td>Owner</td>
<td>Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).</td>
</tr>
<tr>
<td>Polymerase chain reaction (PCR)</td>
<td>A method of amplifying and analysing DNA sequences that can be used to detect the presence of viral DNA.</td>
</tr>
<tr>
<td>Premises</td>
<td>A tract of land including its buildings, or a separate farm or facility that is maintained by a single set of services and personnel.</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Premises of relevance (POR)</td>
<td>A premises in a control area that contains a live susceptible animal(s) but is considered at the time of classification not to be an infected premises, suspect premises, trace premises, dangerous contact premises or dangerous contact processing facility.</td>
</tr>
<tr>
<td>Prevalence</td>
<td>The proportion (or percentage) of animals in a particular population affected by a particular disease (or infection or positive antibody titre) at a given point in time.</td>
</tr>
<tr>
<td>Primary case</td>
<td>The first actual case of the disease.</td>
</tr>
<tr>
<td>Quarantine</td>
<td>Legal restrictions imposed on a place or a tract of land by the serving of a notice limiting access or egress of specified animals, persons or things.</td>
</tr>
<tr>
<td>Resolved premises (RP)</td>
<td>An infected premises, dangerous contact premises or dangerous contact processing facility that has completed the required control measures and is subject to the procedures and restrictions appropriate to the area in which it is located.</td>
</tr>
<tr>
<td>Restricted area (RA)</td>
<td>A relatively small legally declared area around infected premises and dangerous contact premises that is subject to disease controls, including intense surveillance and movement controls.</td>
</tr>
<tr>
<td>Risk enterprise</td>
<td>A defined livestock or related enterprise that is potentially a major source of infection for many other premises. Includes intensive piggeries, feedlots, abattoirs, knackeries, saleyards, calf scales, milk factories, tanneries, skin sheds, game meat establishments, cold stores, artificial insemination centres, veterinary laboratories and hospitals, road and rail freight depots, showgrounds, field days, weighbridges, garbage depots.</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>The proportion of truly positive units that are correctly identified as positive by a test. <em>See also</em> Specificity</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Sentinel animal</td>
<td>Animal of known health status that is monitored to detect the presence of a specific disease agent.</td>
</tr>
<tr>
<td>Seroconversion</td>
<td>The appearance in the blood serum of antibodies (as determined by a serology test) following vaccination or natural exposure to a disease agent.</td>
</tr>
<tr>
<td>Serosurveillance</td>
<td>Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.</td>
</tr>
<tr>
<td>Serotype</td>
<td>A subgroup of microorganisms identified by the antigens carried (as determined by a serology test).</td>
</tr>
<tr>
<td>Serum neutralisation test</td>
<td>A serological test to detect and measure the presence of antibody in a sample. Antibody in serum is serially diluted to detect the highest dilution that neutralises a standard amount of antigen. The neutralising antibody titre is given as the reciprocal of this dilution.</td>
</tr>
<tr>
<td>Slaughter</td>
<td>The humane killing of an animal for meat for human consumption.</td>
</tr>
<tr>
<td>Special permit</td>
<td>A legal document that describes the requirements for movement of an animal (or group of animals), commodity or thing, for which the person moving the animal(s), commodity or thing must obtain prior written permission from the relevant government veterinarian or inspector. A printed version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. &lt;br&gt;See also General permit</td>
</tr>
<tr>
<td>Specificity</td>
<td>The proportion of truly negative units that are correctly identified as negative by a test. &lt;br&gt;See also Sensitivity</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Stamping out</td>
<td>The strategy of eliminating infection from premises through the destruction of animals in accordance with the particular AUSVETPLAN manual, and in a manner that permits appropriate disposal of carcasses and decontamination of the site.</td>
</tr>
<tr>
<td>State coordination centre (SCC)</td>
<td>The emergency operations centre that directs the disease control operations to be undertaken in that state or territory.</td>
</tr>
<tr>
<td>Surveillance</td>
<td>A systematic program of investigation designed to establish the presence, extent or absence of a disease, or of infection or contamination with the causative organism. It includes the examination of animals for clinical signs, antibodies or the causative organism.</td>
</tr>
<tr>
<td>Susceptible animals</td>
<td>Animals that can be infected with a particular disease.</td>
</tr>
<tr>
<td>Suspect animal</td>
<td>An animal that may have been exposed to an emergency disease such that its quarantine and intensive surveillance, but not pre-emptive slaughter, is warranted. or An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.</td>
</tr>
<tr>
<td>Suspect premises (SP)</td>
<td>Temporary classification of a premises that contains a susceptible animal(s) not known to have been exposed to the disease agent but showing clinical signs similar to the case definition, and that therefore requires investigation(s).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Swill</td>
<td>Also known as ´prohibited pig feed´, material of mammalian origin, or any substance that has come in contact with this material; it does not include:</td>
</tr>
<tr>
<td></td>
<td>- milk, milk products or milk byproducts, either of Australian provenance or legally imported for stockfeed use into Australia</td>
</tr>
<tr>
<td></td>
<td>- material containing flesh, bones, blood, offal or mammal carcases that is treated by an approved process</td>
</tr>
<tr>
<td></td>
<td>- a carcass or part of a domestic pig, born and raised on the property on which the pig or pigs that are administered the part are held, that is administered for therapeutic purposes in accordance with the written instructions of a veterinary practitioner</td>
</tr>
<tr>
<td></td>
<td>- material used under an individual and defined-period permit issued by a jurisdiction for the purposes of research or baiting.</td>
</tr>
<tr>
<td>Swill feeding</td>
<td>Also known as ´feeding prohibited pig feed´, includes:</td>
</tr>
<tr>
<td></td>
<td>- feeding, or allowing or directing another person to feed, prohibited pig feed to a pig</td>
</tr>
<tr>
<td></td>
<td>- allowing a pig to have access to prohibited pig feed</td>
</tr>
<tr>
<td></td>
<td>- the collection and storage or possession of prohibited pig feed on a premises where one or more pigs are kept</td>
</tr>
<tr>
<td></td>
<td>- supplying to another person prohibited pig feed that the supplier knows is for feeding to any pig.</td>
</tr>
<tr>
<td>Trace premises (TP)</td>
<td>Temporary classification of a premises that contains susceptible animal(s) that tracing indicates may have been exposed to the disease agent, or contains contaminated animal products, wastes or things, and that requires investigation(s).</td>
</tr>
<tr>
<td>Term</td>
<td>Definition</td>
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</tr>
<tr>
<td>Tracing</td>
<td>The process of locating animals, persons or other items that may be implicated in the spread of disease, so that appropriate action can be taken.</td>
</tr>
<tr>
<td>Unknown status premises (UP)</td>
<td>A premises within a declared area where the current presence of susceptible animals and/or risk products, wastes or things is unknown.</td>
</tr>
<tr>
<td>Vaccination</td>
<td>Inoculation of individuals with a vaccine to provide active immunity.</td>
</tr>
<tr>
<td>Vaccine</td>
<td>A substance used to stimulate immunity against one or several disease-causing agents to provide protection or to reduce the effects of the disease. A vaccine is prepared from the causative agent of a disease, its products, or a synthetic substitute, which is treated to act as an antigen without inducing the disease.</td>
</tr>
<tr>
<td>– adjuvanted</td>
<td>A vaccine in which one or several disease-causing agents are combined with an adjuvant (a substance that increases the immune response).</td>
</tr>
<tr>
<td>– attenuated</td>
<td>A vaccine prepared from infective or ‘live’ microbes that are less pathogenic but retain their ability to induce protective immunity.</td>
</tr>
<tr>
<td>– gene deleted</td>
<td>An attenuated or inactivated vaccine in which genes for non-essential surface glycoproteins have been removed by genetic engineering. This provides a useful immunological marker for the vaccine virus compared with the wild virus.</td>
</tr>
<tr>
<td>– inactivated</td>
<td>A vaccine prepared from a virus that has been inactivated (‘killed’) by chemical or physical treatment.</td>
</tr>
<tr>
<td>– recombinant</td>
<td>A vaccine produced from virus that has been genetically engineered to contain only selected genes, including those causing the immunogenic effect.</td>
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<tr>
<td>Term</td>
<td>Definition</td>
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<tr>
<td>Vector</td>
<td>A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A <em>biological</em> vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A <em>mechanical</em> vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.</td>
</tr>
<tr>
<td>Veterinary investigation</td>
<td>An investigation of the diagnosis, pathology and epidemiology of the disease. <em>See also</em> Epidemiological investigation</td>
</tr>
<tr>
<td>Viraemia</td>
<td>The presence of viruses in the blood.</td>
</tr>
<tr>
<td>Wild animals</td>
<td></td>
</tr>
<tr>
<td>– native wildlife</td>
<td>Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).</td>
</tr>
<tr>
<td>– feral animals</td>
<td>Animals of domestic species that are not confined or under control (eg cats, horses, pigs).</td>
</tr>
<tr>
<td>– exotic fauna</td>
<td>Nondomestic animal species that are not indigenous to Australia (eg foxes).</td>
</tr>
<tr>
<td>Zero susceptible species premises (ZP)</td>
<td>A premises that does not contain any susceptible animals or risk products, wastes or things.</td>
</tr>
<tr>
<td>Zoning</td>
<td>The process of defining, implementing and maintaining a disease-free or infected area in accordance with OIE guidelines, based on geopolitical and/or physical boundaries and surveillance, in order to facilitate disease control and/or trade.</td>
</tr>
<tr>
<td>Zoonosis</td>
<td>A disease of animals that can be transmitted to humans.</td>
</tr>
</tbody>
</table>
Abbreviations

Disease-specific abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLIS</td>
<td>National Livestock Identification System</td>
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<tr>
<td>NVD</td>
<td>National Vendor Declaration</td>
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<tr>
<td>RVF</td>
<td>Rift Valley fever</td>
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</tbody>
</table>

Standard AUSVETPLAN abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full title</th>
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<tbody>
<tr>
<td>AAHL</td>
<td>Australian Animal Health Laboratory</td>
</tr>
<tr>
<td>AN</td>
<td>assessed negative</td>
</tr>
<tr>
<td>APF</td>
<td>approved processing facility</td>
</tr>
<tr>
<td>ARP</td>
<td>at-risk premises</td>
</tr>
<tr>
<td>AUSVETPLAN</td>
<td>Australian Veterinary Emergency Plan</td>
</tr>
<tr>
<td>CA</td>
<td>control area</td>
</tr>
<tr>
<td>CCEAD</td>
<td>Consultative Committee on Emergency Animal Diseases</td>
</tr>
<tr>
<td>CSIRO</td>
<td>Commonwealth Scientific and Industrial Research Organisation</td>
</tr>
<tr>
<td>CVO</td>
<td>chief veterinary officer</td>
</tr>
<tr>
<td>DCP</td>
<td>dangerous contact premises</td>
</tr>
<tr>
<td>DCPF</td>
<td>dangerous contact processing facility</td>
</tr>
<tr>
<td>EAD</td>
<td>emergency animal disease</td>
</tr>
<tr>
<td>EADRA</td>
<td>Emergency Animal Disease Response Agreement</td>
</tr>
<tr>
<td>EADRDP</td>
<td>Emergency Animal Disease Response Plan</td>
</tr>
<tr>
<td>EDTA</td>
<td>ethylenediaminetetraacetic acid (anticoagulant for whole blood)</td>
</tr>
<tr>
<td>ELISA</td>
<td>enzyme-linked immunosorbent assay</td>
</tr>
<tr>
<td>GP</td>
<td>general permit</td>
</tr>
<tr>
<td>IETS</td>
<td>International Embryo Transfer Society</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full title</td>
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<td>-------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>IP</td>
<td>infected premises</td>
</tr>
<tr>
<td>LCC</td>
<td>local control centre</td>
</tr>
<tr>
<td>NASOP</td>
<td>nationally agreed standard operating procedure</td>
</tr>
<tr>
<td>NMG</td>
<td>National Management Group</td>
</tr>
<tr>
<td>OA</td>
<td>outside area</td>
</tr>
<tr>
<td>OIE</td>
<td>World Organisation for Animal Health</td>
</tr>
<tr>
<td>PCR</td>
<td>polymerase chain reaction</td>
</tr>
<tr>
<td>POR</td>
<td>premises of relevance</td>
</tr>
<tr>
<td>RA</td>
<td>restricted area</td>
</tr>
<tr>
<td>RP</td>
<td>resolved premises</td>
</tr>
<tr>
<td>SCC</td>
<td>state coordination centre</td>
</tr>
<tr>
<td>SP</td>
<td>suspect premises</td>
</tr>
<tr>
<td>SpP</td>
<td>special permit</td>
</tr>
<tr>
<td>TP</td>
<td>trace premises</td>
</tr>
<tr>
<td>UP</td>
<td>unknown status premises</td>
</tr>
<tr>
<td>ZP</td>
<td>zero susceptible species premises</td>
</tr>
</tbody>
</table>
References


Further reading


**Training resources**

See the **Summary Document** for a full list of training resources.