

AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

Disease Strategy

Peste des petits ruminants

Version 3.0, 2009

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.

Primary Industries Ministerial Council

This disease strategy forms part of:

AUSVETPLAN Edition 3

This strategy will be reviewed regularly. Suggestions and recommendations for amendments should be forwarded to:

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DISEASE WATCH HOTLINE

1800 675 888

The Disease Watch Hotline is a toll-free telephone number that connects callers to the relevant state or territory officer to report concerns about any potential emergency disease situation. Anyone suspecting an emergency disease outbreak should use this number to get immediate advice and assistance.

Preface

This disease strategy for the control and eradication of peste des petits ruminants (PPR) is an integral part of the **Australian Veterinary Emergency Plan**, or **AUSVETPLAN (Edition 3)**. AUSVETPLAN structures and functions are described in the AUSVETPLAN **Summary Document**. The disease strategy provides information about the disease (Section 1); the relevant risk factors and their treatment, and the options for the management of a disease outbreak depending on the circumstances (Section 2); and the policy that will be adopted in the case of an outbreak (Sections 3 and 4).

This manual has been produced in accordance with the procedures described in the AUSVETPLAN **Summary Document** and in consultation with Australian national, state and territory governments and the sheep and goat industries.

PPR is included on the World Organisation for Animal Health (OIE) list of notifiable diseases as a sheep and goat disease. This obliges OIE member countries that had been free from the disease to notify the OIE within 24 hours of confirming the presence of PPR. OIE-listed diseases are diseases with the potential for international spread, significant mortality or morbidity within the susceptible species and/or potential for zoonotic spread to humans.¹

The strategies in this document for the diagnosis and management of an outbreak of PPR are based on the recommendations in the OIE *Terrestrial Animal Health Code*² and the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*.³

In Australia, PPR 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* (EAD Response Agreement).⁴

Where in this manual text has been placed in square brackets [xxx], this 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.

Detailed instructions for the field implementation of AUSVETPLAN are contained in the disease strategies, operational procedures manuals, management manuals and wild animal manual. 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.

¹ These criteria are described in more detail in Chapter 1.2 of the OIE *Terrestrial Animal Health Code* (http://www.oie.int/eng/normes/mcode/en_chapitre_1.1.2.htm).

² http://www.oie.int/eng/normes/mcode/en_chapitre_1.14.8.htm

³ http://www.oie.int/eng/normes/mmanual/2008/pdf/2.07.11_PPR.pdf

⁴ Information about the EAD Response Agreement can be found at <https://www.animalhealthaustralia.com.au/programs/eadp/eadra.cfm>

In addition, *Exotic Diseases of Animals: A Field Guide for Australian Veterinarians* by WA Geering, AJ Forman and MJ Nunn, Australian Government Publishing Service, Canberra, 1995 (to be updated) is a source for some of the information about the aetiology, diagnosis and epidemiology of the disease.

AUSVETPLAN manuals⁵

Disease strategies

Individual strategies for each of 30 diseases
Bee diseases and pests
Response policy briefs (for diseases not covered by individual manuals)

Operational procedures manuals

Decontamination
Destruction of animals
Disposal
Public relations
Valuation and compensation
Livestock management and welfare

Wild animal manual

Wild animal response strategy

Summary document

Enterprise manuals

Artificial breeding centres
Dairy processing
Feedlots
Meat processing
Poultry industry
Saleyards and transport
Zoos

Management manuals

Control centres management
(Parts 1 and 2)

Animal Emergency Management
Information System
Laboratory preparedness

⁵ The complete series of AUSVETPLAN documents is available on the internet at: http://www.animalhealthaustralia.com.au/programs/eadp/ausvetplan_home.cfm

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1 Nature of the disease

Peste des petits ruminants (PPR) is an acute or subacute viral disease of goats and sheep characterised by fever, necrotic stomatitis, enteritis, bronchopneumonia, high morbidity and high mortality. The disease spreads rapidly between in-contact animals. Clinical signs are very similar to those of rinderpest, a disease of cattle that is caused by a closely related virus.

1.1 Aetiology

PPR virus is a member of the genus *Morbillivirus* of the family *Paramyxoviridae*. Viruses in the same genus include the causative agents of canine distemper, phocine (seal) distemper, human measles, rinderpest and equine morbillivirus (Hendravirus) disease. The PPR virus was believed to have evolved from the rinderpest virus, but is now recognised as a distinct virus.

Four major genetic lineages of PPR virus are distinguishable by nucleic acid sequencing (Rossiter 2005). PPR virus antibody detection using competitive enzyme-linked immunosorbent assay (ELISA) is widely used to determine the geographic origin of field strains of PPR virus.

1.2 Susceptible species

1.2.1 Goats and sheep

Goats and sheep are the main natural hosts for PPR. Goats appear to be more susceptible and suffer a more severe clinical disease than sheep. In some cases, sheep living in close proximity to infected goats have remained clinically unaffected.

Different goat breeds, as well as individual animals, vary in their susceptibility to PPR. Among African breeds, the guinean breeds are more susceptible than sahelian breeds (Lefevre and Diallo 1990). European breeds are readily susceptible. Age is also important, with animals aged 3–18 months being more severely affected than adults or unweaned young.

If infection occurs in Australia, both sheep and goats will probably be severely affected because they would have no acquired immunity. However, it is possible that clinical signs may be less obvious in either species.

1.2.2 Other animals

Subclinical infection, with subsequent antibody production, has been reported in cattle by natural and experimental infection, but cattle do not transmit PPR virus.

Red deer, *Cervus elaphus*, have been infected in a natural outbreak. White-tailed deer, *Odocoileus virginianus*, are susceptible to experimental infection and may develop lesions similar to those seen in sheep and goats. Some deer may become

subclinically infected with virus and show no visible signs (Hamby and Dardiri 1976).

Pigs can be subclinically infected with PPR but they do not transmit the virus. They are not considered to be important in the epidemiology of PPR (Nawathe and Taylor 1979).

Antibody seroprevalence of up to 10% has been detected in camels with natural transmission of PPR virus under field conditions in Ethiopia (Abraham et al 2006). Experimental infection of camels in Saudi Arabia with PPR virus resulted in only subclinical infection or mild respiratory disease; infection was transmitted to other camels and goats but not to sheep (El-Hakim 2006).

1.2.3 Wild species

Although PPR has been observed in some species of gazelle, ibex, and wild sheep, wild animals do not seem to play a very important role in the epidemiology of PPR.

1.3 World distribution and occurrence in Australia

PPR is endemic in the sub-Saharan region of Africa, extending to the Arabian Peninsula, the Middle East and the Indian subcontinent. For the latest information on the distribution of PPR, refer to the website of the World Organisation for Animal Health (OIE) World Animal Health Information Database (WAHID).⁶

PPR has never been recorded in Australia.

1.4 Diagnostic criteria

PPR should be suspected when goats or sheep are affected with an acute febrile diarrhoea accompanied by erosions of the mouth lining and high morbidity and mortality. If rapid spread from animal to animal is occurring, and animals of all ages are sick and dying, then the picture is highly suggestive of PPR.

1.4.1 Clinical signs

Goats

The clinical disease is acute, with a sudden onset of fever, peaking on the second or third day at 40–42°C, before slowly returning to normal. The fever usually lasts 3–5 days.

With the onset of fever, the animals suffer loss of appetite and become severely depressed. An early watery nasal discharge develops and may become profusely catarrhal, containing mucus and pus. This can lead to encrustation, blocking of the

⁶ <http://www.oie.int/wahid-prod/public.php?page=home>

nostrils and respiratory distress. The nasal lining may become necrotic. Conjunctivitis with discharge from the eyes causes matting of the eyelids.

The mouth lining is slightly engorged, with small, red, necrotic mouth lesions appearing within a few hours of the onset of fever (Scott 1981), although Dardiri et al (1976) reported 3–4 days between fever and the appearance of erosions. Small areas of necrosis usually first appear on the lining of the lower gums. In severe cases, these spread rapidly to the dental pad, hard palate, cheeks and buccal papillae and tongue (including the anteriodorsal area). The necrotic tissue sloughs, leaving irregular shallow erosions and remnant tags of necrotic epithelium. In some animals, the mouth lesions may be mild and heal within 48 hours. Such animals are likely to recover.

Most animals develop severe diarrhoea or dysentery about 2–3 days after the development of mouth lesions, resulting in rapid dehydration and loss of weight. Secondary bacterial infections are common. Pregnant animals may abort. Death usually occurs after a course of 4–12 days.

The morbidity rate in susceptible animals is usually 60–90%. The case mortality rate may be as low as 10%, depending on the PPR strain and the host species and breed (Wohlsein and Saliki 2006), but may range up to 90%.

Peracute cases may be seen in goats. These involve fever and sudden death, with no other signs. At postmortem examination, the only signs may be congestion of the ileocaecal valve and bronchopneumonia.

A subclinical or inapparent form is common in some regions due to the innate resistance of local breeds. The disease lasts 10–15 days with variable signs, often including respiratory distress.

Sheep

The clinical signs in sheep are the same as in goats but generally less severe. The disease may be present in goats without affecting sheep living in close proximity.

1.4.2 Pathology

Gross lesions

Postmortem findings in acute cases include a dehydrated carcass with faecal soiling; necrotic lesions in the mouth and nose; congestion of the ileocaecal valve; linear engorgement and blackening (zebra striping) of folds of the caecum, proximal colon and rectum; enlarged spleen; and oedema of lymph nodes, especially the mesenteric lymph nodes. The rumen, reticulum and omasum rarely show lesions. Unlike in rinderpest, primary bronchopneumonia is a common finding that is specific for the virus and important diagnostically (Brown et al 1991). Pleuritis and hydrothorax may be found.

Microscopic lesions (histopathology)

Distinct changes similar to many morbillivirus infections are seen histologically, including multinucleated giant cells, especially in the lungs, and eosinophilic intranuclear and/or intracytoplasmic inclusion bodies.

1.4.3 Laboratory tests

Specimens required

Virus is present for approximately 10 days after the onset of fever and can be isolated during the acute stage of the disease when clinical signs are still apparent.

Swabs of the conjunctival sac, and from the nasal, buccal and rectal mucosae, as well as clotted and whole blood (with EDTA anticoagulant), should be submitted. Lymph node or spleen biopsies should also be considered. Specimens for virus isolation are best taken from animals with a high temperature and before diarrhoea has started (for example, from the early, less obvious cases).

At postmortem, fresh samples of spleen, lymph nodes and affected sections of alimentary tract mucosa should be collected for virus isolation. Samples of tonsil, tongue, spleen, lung, lymph nodes and affected parts of the alimentary tract should be collected for histopathology. Postmortem samples should be collected only from animals slaughtered for the purpose or very fresh carcasses.

Transport of specimens

Specimens should initially be sent to the state or territory diagnostic laboratory. From there, they will be forwarded to the CSIRO Australian Animal Health Laboratory (CSIRO-AAHL), Geelong, for emergency disease testing. This should be done after the necessary clearance has been obtained from the chief veterinary officer (CVO) of the state or territory of the disease outbreak and after the CVO of Victoria has been informed about the transport of the specimens to Geelong.

Unpreserved tissue, blood and swab specimens should be chilled and forwarded with water ice or frozen gel packs. If delays of more than 72 hours are anticipated, specimens should be frozen and forwarded packed in dry ice. For further information, see the **Laboratory Preparedness Manual**.

Laboratory diagnosis [TO BE UPDATED]

AAHL tests

Tests available at CSIRO-AAHL for the laboratory confirmation of diagnosis of PPR are shown in Table 1.1. They include virus isolation; histopathology of affected oral mucosa, intestines and lungs; polymerase chain reaction and ELISA; and electron microscopy.

Table 1.1 Laboratory tests currently available at CSIRO-AAHL for the diagnosis of PPR

Test	Specimen required	Test detects	Time taken to obtain result
Virus isolation	Tissue/whole EDTA blood	Virus	5–7 days
Histopathology	Tissue samples	Microscopic changes	2 days
Electron microscopy	Tissue samples	Virus	1 day
Animal inoculation tests	Virus isolate	Host range	10 days

Source: Information provided by CSIRO-AAHL, 1995 (refer to CSIRO-AAHL for most up-to-date information).

Other tests

Tests developed overseas but not currently used in Australia include an immunocapture ELISA test specific for PPR antigen. Rinderpest and PPR antibodies can be distinguished by either cross-virus serum neutralisation tests, the competitive ELISA using monoclonal antibodies (Anderson et al 1991), or differential immunohistochemical staining. However, it is unlikely that both diseases would occur in Australia at the same time.

1.4.4 Differential diagnosis

The following diseases should be considered in a differential diagnosis of PPR:

- rinderpest
- bluetongue
- foot-and-mouth disease
- contagious bovine pleuropneumonia
- heartwater
- pasteurellosis
- other exanthematous conditions (ie involving eruptions on the surface of the body).

Many reports in the literature of rinderpest in small ruminants are now thought to be descriptions of PPR. Some strains of rinderpest can cause clinical disease – transient fever, sometimes accompanied by slight ocular and nasal discharges – in sheep and goats, but usually these animals are affected subclinically (Wohlsein and Saliki 2006).

1.4.5 Treatment of infected animals

There is no specific treatment for PPR.

1.5 Resistance and immunity

Susceptible sheep and goats of all ages and breeds can be infected with PPR virus and develop the acute disease. In countries free from the disease, the introduction of PPR into the totally susceptible population is likely to produce high morbidity and mortality, and the disease is likely to spread rapidly. However, there is always the possibility of mild disease as a result of lower susceptibility of individual animals or groups.

1.5.1 Innate and passive immunity

Breeds of goats show varying degrees of resistance to PPR (see Section 1.2). Maternal immunity provides protection for 3–4 months.

1.5.2 Active immunity

Infection with PPR provides lifelong immunity in recovered animals.

1.5.3 Vaccination

A homologous attenuated PPR virus vaccine is recommended by the OIE for use in countries following the 'OIE pathway' for rinderpest surveillance in order to avoid confusion. The vaccine is produced at the Institut d'Élevage et Médecine Vétérinaire in France, and gives lifelong immunity against virulent PPR virus in goats.

New PPR recombinant marker vaccines are under development that will enable differentiation between infected and vaccinated animals for serosurveillance (Diallo et al 2007). However, two of these are recombinant vaccines using attenuated capripox virus.

1.6 Epidemiology

Our knowledge of the epidemiology of PPR is fragmentary, but some assumptions can be made from the information available for rinderpest.

1.6.1 Incubation period

The incubation period is usually 4–6 days but may range between 3 and 10 days.

The OIE *Terrestrial Animal Health Code* gives a maximum incubation period, for regulatory purposes, of 21 days.

1.6.2 Persistence of agent

General properties

PPR virus is sensitive to a wide range of disinfectants due to its large size, lipid-containing virus envelope and sensitivity to both acid and alkali conditions. In general, the alkalis (sodium carbonate, sodium hydroxide), and the halogens (chloride) are suitable for disinfecting buildings, wooden structures, concrete surfaces, equipment and vehicles. For personal disinfection, citric acid, alcohols and iodophors are suitable. Further information, including dilution rates, is available in the **Decontamination Manual**.

Environment

All members of the *Paramyxoviridae* family are very heat sensitive (Diallo et al 2007). Information for PPR virus is not available, but it is assumed that the survival characteristics (eg pH, temperature) of PPR virus are similar to those of rinderpest virus. These are as follows:

- a half-life of 5 minutes in cattle blood, spleen or lymph node at 56°C;

- survival in culture for at least 4 months at -20°C, 8 weeks at 4°C, 1 week at 20-25°C and >2.6 days at 37°C;
- rapid inactivation at temperatures above 70°C (but there is no confirmation that rinderpest virus is destroyed by pasteurisation in milk);
- greatest stability (at 4°C) at a pH of 7.2-7.9, with a half life of 3.7 days; the virus was rapidly inactivated below pH 4.0 or above pH 11.0 (Rossiter 2005); and
- rapid inactivation by ultraviolet light and desiccation within 4 days.

Live animals

Virus is present in all secretions and excretions from infected animals for approximately 10 days after the onset of fever. Animals that have been infected with PPR either die or acquire firm immunity. There appears to be no chronic carrier state.

Animal products and byproducts

Information is not available for PPR virus but it is assumed that, like rinderpest virus, it would be rapidly inactivated by the putrefaction in the carcass of an animal dying from PPR or by a pH of 5.5 in hung meat. Rinderpest virus is reported to remain infectious in salted or frozen meat for several months and may also persist for some time in refrigerated meat (NZMAF 1991ab). In the case of PPR, such persistence would not be important in spreading the disease, because the cycle back to sheep or goats is unlikely to be completed; pigs are not susceptible to infection.

Rinderpest virus can be present in milk from 1-2 days before clinical signs develop and for as long as 45 days after recovery. Goat or sheep milk may be similarly infected with PPR virus.

1.6.3 Modes of transmission

Live animals

Infection spreads to new areas by the movement of infected animals. Transmission between animals is usually by direct contact. Infected animals shed virus in expired air, in all secretions and excretions (including semen and urine) at the onset of the fever, and in the faeces at the onset of diarrhoea. Most infection is through short-range aerosol spread from sneezing and coughing. Infection is primarily acquired via the respiratory system.

At night under cool conditions, infection can be spread via aerosols over a distance of about 10 metres.

Animal products and byproducts

PPR virus may be present in the milk of infected animals. Feeding this milk to kids or lambs may therefore spread the infection.

Equipment and personnel

The virus survives poorly outside the host, making indirect transmission of virus by fomites most unlikely.

Vectors

Insects are not known to spread PPR.

Semen and embryos

The virus is present in semen and embryos and is likely to be transmitted in this manner (see the **Artificial Breeding Centres Manual**). Due to insufficient information on the likely transmission of PPR virus, the International Embryo Transfer Society has been unable to make a recommendation regarding the safety of in vivo derived embryos.

1.7 Manner and risk of introduction to Australia

Since PPR virus survives poorly outside the host, the most likely route of introduction of the virus into Australia is by the importation of infected sheep or goats. However, importation of small ruminants from endemic countries is not permitted, so the risk of introduction is remote. The illegal introduction of contaminated semen or embryos would present a risk.

It is unlikely that the virus would survive in sheep transport ships returning to Australia from the Middle East.

1.8 Social and economic effects

An outbreak of PPR in Australia would be expected to cause high mortality on the infected premises. The implementation of a stamping-out policy may not lead to the loss of many more stock on infected premises than from the disease itself.

An uncontrolled outbreak of PPR would cause serious stock and financial losses in the goat and sheep industries and local communities. Job losses both on farms and in support industries could follow.

If PPR became endemic, there would be continuing costs and losses due to animal mortalities, stamping out and the cost of preventative vaccination. Movement restrictions on livestock and products within the restricted area and control area (see Section 4) would cause loss of market opportunities and associated financial losses to nonaffected properties in the area and to support industries, such as the stock transport industry. Some industries not directly affected by PPR, such as the cattle industry, may also be affected by movement restrictions.

An outbreak of PPR would affect both local and export markets. Australia would lose its export markets for live sheep and goats and their products, at least in the short term until disease-free zones were well defined and accepted. If the disease spread, greater losses would be involved. However, not all products may be prohibited by Australia's trading partners.

The value of exports to the Australian sheep industry is approximately \$8500 million (ABARE 2007). This is made up of:

- wool: \$6735 million
- mutton: \$458 million
- lamb: \$749 million
- skins: \$356 million
- live sheep: \$289 million.

1.9 Criteria for proof of freedom

Under the OIE *Terrestrial Animal Health Code*, Australia would be considered free from PPR 6 months after the destruction of the last affected animal if a stamping-out policy is practised, with or without vaccination. In order to demonstrate that the disease has been successfully contained and eradicated, it is essential that Australia embarks on a systematic and accurate disease surveillance program during those 6 months (see Appendix 1 for details).

Farmers, veterinarians and meat workers must be alert and report suspicion of disease, and these reports must be rigorously followed up. Dead animals from repopulated properties must be autopsied and appropriate samples taken for virus testing.

A sentinel restocking program is unnecessary because the virus will survive for only a short period in the environment. A farm could be safely restocked 15 days after destruction and disposal of the last clinical case. After restocking, premises would be placed under surveillance.

2 Principles of control and eradication

2.1 Critical factors assessed in formulating response policy

Features of peste des petits ruminants (PPR):

- PPR is confined to sheep and goats.
- PPR is rapidly spread by direct contact. It has a short incubation period and a high mortality rate, so the disease should become apparent soon after introduction in a closely settled area.
- Infection spreads to new areas by the movement of infected animals.
- Tests are available for rapid detection, and the diagnosis of acute cases should be relatively simple.
- Recovered animals show solid immunity, and there is no known chronic carrier state in recovered animals.
- The virus survives for only a short time in the environment and is rapidly inactivated by disinfectants.
- A safe, reliable vaccine is available but, at present, distinguishing vaccinated from field-infected animals is difficult.
- There are no public health implications.

Features of susceptible populations:

- There is a low likelihood of undetected outbreaks in remote parts of Australia, where stock populations are sparse, or where less susceptible species such as sheep are infected subclinically.
- Disease may establish in feral goat or camel populations.
- Smallholders have little knowledge of disease control issues and the need to report illness in their animals.
- Fear of repercussions may deter smallholders from reporting disease.
- The first infected premises identified may not be the index case.
- The expected severe market disruption will reduce the value of all related industries.

2.2 Options for control and eradication

Managing the risks of PPR would be based on the identified critical factors:

- registration of all commercial and noncommercial livestock holdings, with biosecurity programs being compulsory;
- early recognition and laboratory confirmation of cases to determine the extent of infection, using quickly instituted serosurveillance and animal tracing (using the National Livestock Identification System, where available), based on an epidemiological assessment;

- rapid imposition of effective quarantine on infected and potentially infected premises to prevent direct and indirect contact between infected and at-risk animals;
- elimination of infection from infected premises and infected animal populations by the rapid destruction of animals, the sanitary disposal of carcasses and decontamination;
- swift declaration and effective policing of control areas to prevent movements of animals carrying or potentially carrying PPR virus;
- elimination of infection from possibly infected feral animal populations by the rapid destruction of animals and the sanitary disposal of carcasses;
- implementation of appropriate zones and compartments;
- possible use of ring vaccination – infected animals would need to be able to be distinguished from vaccinated animals; and
- gaining of smallholder support.

The policy to be implemented is described in Section 3.

3 Policy and rationale

3.1 Introduction

Summary of policy

Peste des petits ruminants (PPR) is an OIE-listed disease that has the potential for rapid spread and serious production loss and deaths within sheep and goat flocks. The disease is important for trade in sheep, goats and their products.

PPR is an Animal Health Australia Category 2 disease under the government-industry EAD Response Agreement for cost-sharing arrangements. Category 2 diseases are those for which costs will be shared 80% by government and 20% by industry.

The policy with regard to an outbreak of PPR is to eradicate the disease in the shortest possible time, while limiting economic impact, using *stamping out* supported by a combination of strategies, including:

- ☞ *early recognition* and laboratory confirmation of cases;
- ☞ *quarantine and movement controls* of animals, products and other potentially contaminated items in declared areas, to minimise spread of infection;
- ☞ *disposal* of destroyed animals and animal products likely to be contaminated, to remove the source of infection;
- ☞ *tracing and surveillance* (based on epidemiological assessment) to determine the source and extent of infection, and subsequently to provide proof of freedom from PPR;
- ☞ *decontamination and/or disposal* of fomites (facilities, equipment and other items) to eliminate the pathogen;
- ☞ *zoning/compartmentalisation* to define infected and disease-free premises and areas, and to assist in regaining market access; and
- ☞ *an awareness campaign* to facilitate cooperation from the industry and the community.

Although vaccination has been used overseas to protect animals against PPR, it is unlikely that vaccine would be used in Australia.

The chief veterinary officer (CVO) in the state or territory in which the outbreak occurs is responsible for developing an Emergency Animal Disease Response Plan for the particular outbreak.

The Consultative Committee on Emergency Animal Diseases (CCEAD), convened for the incident, assesses the response plan drawn up by the affected jurisdiction's CVO for technical soundness and consistency with AUSVETPLAN, and endorses

or seeks modifications to it. Overall operational management of the incident rests with the CVO of the affected jurisdiction, with oversight by the CCEAD.

The National EAD Management Group (NMG), also convened for the specific incident, decides on whether cost sharing will be invoked (following advice from the CCEAD) and manages the national policy and resourcing needs.

For further details, refer to the **Summary Document**.

CVOs will implement disease control measures as agreed in the EAD Response Plan and in accordance with relevant legislation. They will make ongoing decisions on follow-up disease control measures in consultation with the CCEAD and the NMG, based on epidemiological information about the outbreak.

For information on the responsibilities of the state or territory disease control headquarters and local disease control centres, see the **Control Centres Management Manual**.

3.2 Control and eradication policy

The policy is to eradicate the disease in the shortest possible time using **stamping out** and quarantine and movement controls.

Tracing and surveillance to determine the extent of the infection and to define the free area are essential. Because the disease could be transferred to feral goats, these animals need to be included in any survey.

Public awareness and liaison with industry, the media and the public are key strategies.

3.2.1 Stamping out

As soon as possible after the diagnosis of PPR, all sheep, goats and camels on an infected premises (IP) will be destroyed and disposed of, preferably on the premises. Action on properties to which dangerous contacts have been traced will depend on circumstances. If a dangerous contact premises (DCP) contains relatively few susceptible animals in addition to the dangerous contact animals, all will be destroyed. If, on the other hand, there is a large number of stock, with clear separation of groups, then only the dangerous contact animals need to be destroyed; the in-contact animals will be quarantined and observed for any signs of disease. This approach is possible because the virus survives for only a few days outside the host.

The same approach might be able to be applied to animals on an IP that are completely separated from infected animals, have had no contact with them, and are not showing any signs of disease. Such action would reduce compensation costs, and operational costs or losses for the producer.

The following risk factors will be considered in making a decision on whether animals are to be destroyed:

- results of transmission experiments at the Australian Animal Health Laboratory (AAHL);

- degree of contact that may have occurred with infected animals;
- whether the disease will die out anyway if the mob is isolated from other animals;
- risks from other susceptible species in contact populations (eg feral goats);
- the likely compensation bill;
- the level of intervention required to control the disease in feral animal populations to avoid re-infection; and
- resources available.

3.2.2 Quarantine and movement controls

Strict quarantine and control of the movements of animals, animal products, people and other things will be used to prevent the spread of disease from the most dangerous premises to other premises. This will involve the declaration of IPs, DCPs and suspect premises (SPs), and the establishment of a restricted area (RA) and a control area (CA). Declaration of these areas will ensure that the disease areas and disease-free areas are well defined for domestic and international recognition and the continuation of trade. The RA must include any feral goat herds that may have had contact with infected or dangerous contact animals.

The movement of susceptible animals into and out of IPs and DCPs will be prohibited except under permit. Movement of some products out of IPs and DCPs may be allowed under permit and after treatment. Quarantine and movement controls will also be imposed on SPs for at least 30 days, with the movement of animals allowed only under permit.

Movement controls on animals and products from the RA and CA will be strict while the disease is still believed to be spreading but will ease once the infection is contained and under control. No movement will be permitted from an IP of personnel, vehicles or equipment (unless they undergo decontamination) until 4 days after the last animal is destroyed. Sheep and goats may be sent for immediate slaughter for human consumption after the disease is controlled and it has been demonstrated that transmission has ceased on the IP (ie that the animals are no longer viraemic). They must go direct to an abattoir in the RA or CA and must not be held in the lairage any longer than the minimum time required for meat hygiene purposes (24 hours).

Wool or fibre will be permitted to leave IPs and DCPs if it can be shown that it was harvested well before the time the infection was deemed to have arrived on the premises and that no subsequent contact with infected animals or things was possible, or that a sufficient passage of time (say, 30 days) had rendered it risk free. It may also be treated to render it safe.

See Section 4 for further details on declared areas and on quarantine and movement controls.

3.2.3 Tracing and surveillance

Tracing and surveillance will be used to determine the distribution of the disease and the disease-free areas. Feral goats and camels, if present, will be included in the survey.

Trace-back will include all movements of sheep and goats, their products, people and things (including transport vehicles) onto the premises during the 21 days before the first case on the initial IP. Trace-forward will include all movements off the IP since 30 days before the first case.

Ruminants (especially cattle) not for slaughter will be identified for possible later serological testing.

See Appendix 1 for further details on surveillance.

3.2.4 Zoning and compartmentalisation

The major part of Australia could be declared a disease-free zone for both domestic and international trade purposes after the extent of initial spread has been defined by scientifically based surveillance. Due to the nature of the disease, disease-free premises may be able to be established in infected areas using the principles of compartmentalisation.

3.2.5 Vaccination

If a disease outbreak outstrips the resources available to control it by stamping out, ring vaccination may be used to provide a buffer zone of immune animals around the disease area until the outbreak can be brought under control.

If the disease becomes more widespread than anticipated, it may be necessary to use vaccine more extensively to assist with the continuing stamping-out strategy.

See Section 1.5.3 for further details on vaccination.

3.2.6 Treatment of infected animals

Infected or other susceptible animals will not be treated.

3.2.7 Treatment of animal products

Certain animal products from the RA will be permitted to be moved after they have been treated.

Because meat is not infectious for humans, animals from free premises within the RA and CA and animals not showing clinical signs on IPs and DCPs may move direct to slaughter for local consumption. The carcasses must not be chilled quickly but must be hung to ensure that the normal decrease in pH can occur to a level that will destroy the PPR virus.

Sheep and goat milk and milk products from IPs will be destroyed and disposed of as appropriate. Milk and milk products that have left IPs during the 5 days before the first case will be traced and suitably heat treated. Marketing of milk from non-exposed animals on DCPs will be permitted, subject to heat treatment for milk powder, since pasteurisation alone may not inactivate PPR virus.

Although it is unlikely that any virus on skins, wool or fibre would remain infective and spread disease, such material from IPs will be treated in most cases by spraying with a suitable disinfectant. Other products may be subject to treatment, depending on the stage of infection on different properties.

3.2.8 Disposal of animals and animal products

Carcases will be buried, composted or burned, or allowed to decompose provided that they are protected from scavengers such as dogs or feral pigs. Feedstuff and bedding that may have been contaminated will also be buried, composted or burned.

The urgency for burial is not as great as for a highly infectious disease such as foot-and-mouth disease, but care should be taken to ensure proper disposal. For more details, see the **Disposal Manual**.

3.2.9 Decontamination

Vehicles that carry infected or suspect animals, and people leaving the IPs and DCPs, will be decontaminated. Although PPR virus does not survive outside the animal for more than a few days, decontamination is necessary for equipment, buildings, pens and other fomites with which infected or suspect animals may have had contact. Paddocks that cannot be disinfected will be 'spelled' for at least 15 days.

3.2.10 Wild animal and vector control

Feral goats and camels will need to be surveyed if they are present in the vicinity of the IP(s) and may have had contact with domestic sheep and goats. Because the eradication of feral goats or camels is unlikely to be achievable, a buffer area to contain the disease will be formed around the feral populations, either by depopulating the area of goats and sheep, or by ring vaccination.

It is unlikely that wild deer will become infected or play any part in the spread of PPR. However, as PPR has occurred in deer overseas (see Section 1.2.3), some clinical or serological surveillance of any deer in the area may need to be undertaken. If signs are found, wild deer in the immediate area will be controlled.

For more details on goat control, see the **Wild Animal Response Strategy**.

Vectors do not play any role in the transmission of PPR.

3.2.11 Public awareness and media

A media campaign will emphasise the importance of inspecting sheep and goats regularly and of reporting suspicious lesions and unusual deaths promptly. The campaign will provide facts on the disease, control measures, movement restrictions and the safety of products (as PPR is not a zoonosis).

For further information, see the **Public Relations Manual**.

3.2.12 Public health implications

There are no public health implications.

3.3 Other policies

It is likely that an outbreak of PPR would be eradicated. If the size of an outbreak outstripped the resources available for control, and ring vaccination of all sheep and goats was not able to contain the disease, then PPR would have to be considered as being established in the sheep and goat populations.

Endemic PPR would be controlled by vaccination of all sheep and goats with an appropriate vaccine in areas where the disease occurred. Farmers would have to live with sporadic outbreaks and losses and with the need to vaccinate. Vaccination of the entire susceptible population should result in the virus dying out, thus allowing discontinuation of vaccination after only a couple of years.

3.4 Funding and compensation

PPR is classified as a Category 2 emergency animal disease under the EAD Response Agreement between the governments of Australia and the livestock industries.

Category 2 diseases have the potential to cause major national socioeconomic consequences through very serious international trade losses, national market disruptions and very severe production losses in the livestock industries that are involved. Category 2 also includes diseases that may have slightly lower national socioeconomic consequences, but also have significant public health and/or environmental consequences. For this category, the costs will be shared 80% by governments and 20% by the relevant industries (refer to the EAD Response Agreement for details).⁷

Information on the cost-sharing arrangements can be found in the **Summary Document** and in the **Valuation and Compensation Manual**.

⁷ Information about the EAD Response Agreement can be found at <https://www.animalhealthaustralia.com.au/programs/ealp/eadra.cfm>

4 Recommended quarantine and movement controls

4.1 Guidelines for classifying declared areas

A declared area is a part of a country with defined boundaries that is subject to mandatory disease control measures (such as animal movement controls, animal destruction, decontamination) under emergency animal disease legislation. Types of declared areas include restricted area, control area, infected premises, dangerous contact premises and suspect premises, but not all classifications are relevant to all diseases.

4.1.1 Declared premises

Infected premises

A premises classified as an infected premises (IP) will be a defined area (which may be all or part of a property) in which peste des petits ruminants (PPR) or PPR virus exists, or is believed to exist. An IP will be subject to quarantine served by notice and to eradication and control procedures.

Dangerous contact premises

Premises classified as dangerous contact premises (DCPs) will be those that contain animals, animal products, waste or other items that have recently been introduced from an IP (up to 21 days before the premises were declared infected) and are likely to be infected or contaminated, or any of these items that may have been in substantial contact with people, vehicles or equipment that have been associated with an IP within 21 days of visiting the DCP.

Premises classified as DCPs will be:

- all neighbouring premises on which sheep or goats have been sharing a common fence-line with infected animals on an IP for the 21 days before the appearance of clinical signs and where it is considered necessary to impose disease control measures; and
- all premises to which sheep or goats have moved from an IP since 21 days before the appearance of clinical signs on the IP and where it is considered necessary to impose disease control measures.

These premises will remain under quarantine and close, regular surveillance until 42 days after the last contact with the IP. Release from quarantine will require satisfactory surveillance and final inspection.

Suspect premises

Premises classified as suspect premises (SPs) will be those that contain animals that have possibly been exposed to PPR virus, such that quarantine and surveillance, but not pre-emptive slaughter, are warranted; OR animals not known to have been exposed to PPR virus but showing clinical signs requiring differential diagnosis.

Premises classified as SPs will be:

- all other premises owned or managed in conjunction with an IP;
- other neighbouring properties containing sheep or goats;
- all premises where it is considered that disease could possibly have spread to sheep or goats from an IP by way of the movement of people, vehicles, equipment or feedstuff during the 21 days before the first appearance of clinical signs; and
- other premises containing animals with suspicious signs.

Subject to satisfactory surveillance, premises will be designated as SPs for 30 days only.

'Suspect premises' is a temporary classification because the premises contains animals that are suspected of having the disease. High priority should be given to clarifying the status of the suspect animals so that the SP can be reclassified either as an IP and appropriate quarantine and movement controls implemented, or as free from disease, in which case no further disease control measures are required.

4.1.2 Declared areas

Restricted area

A restricted area (RA) will be a relatively small declared area (compared with a *control area*) around IPs that is subject to intense surveillance and movement controls. Movement into and out of the area will be allowed only under permit (see Table 4.2). Multiple RAs may exist within one control area (CA).

The RA 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 or SP. This distance will vary with the size and nature of the potential source of disease agent, but will be at least 1 km around the IP, depending on the density of premises, and there should be at least two stockproof barriers between the two. The RA should also include an area substantially greater than the home range of any susceptible feral species that may come into contact with the IPs or DCPs. The boundary could be the perimeter fence of the IP if the IP is in an isolated location. The boundary in a densely populated area will take into account the distribution of susceptible animals; traffic patterns to markets, service areas and abattoirs; and areas that constitute natural barriers to movement.

Control area

The CA will be a larger declared area around the RA(s) and, initially, possibly as large as a state or territory, where restrictions will reduce the risk of disease spreading from the RA(s). The boundary of the CA will be adjusted as confidence about the extent of the outbreak increases but must remain consistent with the OIE Terrestrial Code chapters on surveillance and zoning (chapters 1.4 and 4.3). In general, surveillance and movement controls will be less intense than in the RA, and animals and products may be permitted to move under permit from the area.

The declaration of a CA helps to control the spread of the outbreak from within the RA. The CA is a buffer zone between the RA and the rest of the industry. The boundary does not have to be circular or parallel to that of the RA but should be at

least 10 km from the boundary of the RA, and there should be at least two stockproof barriers between the two. The CA must also substantially exceed the home range of any susceptible feral animals that may enter the area. This type of control area allows reasonable commercial activities to continue.

4.2 Movement controls for PPR

4.2.1 Declared premises

Table 4.1 shows the movement controls that will apply to IPs, DCPs and SPs in the event of a PPR incident.

Table 4.1 Movement controls for declared premises

Quarantine/movement controls	Infected and dangerous contact premises	Suspect premises
<i>Movement out of:</i>		
- sheep and goats	Prohibited; non-exposed animals may be allowed under permit for immediate slaughter once transmission has ceased	As for IPs/DCPs
- other susceptible animals	Allowed under permit, subject to appropriate decontamination or for slaughter for human consumption	As for IPs/DCPs
- skins, wool/fibre	Allowed under permit	No restrictions
- sheep and goat milk	Prohibited from IPs but may be allowed from non-exposed animals on DCPs under permit subject to processing	No restrictions
- crops and grains	Allowed under permit, subject to condition that it is not to be used for stockfeed	Subject to permit if it is to be used for stockfeed
- meat	Allowed under permit	No restrictions
<i>Movement in and out of:</i>		
- people	Allowed under permit, subject to appropriate decontamination	As for IPs/DCPs
- vehicles and equipment	Allowed under permit, subject to appropriate decontamination	No restrictions

Movement in of:

- susceptible animals	Allowed under permit for restocking purposes, after decontamination finished	As for IPs/DCPs
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4.2.2 Declared areas

Table 4.2 shows the movement controls that will apply to RAs and CAs in the event of a PPR incident.

Table 4.2 Movement controls for declared areas

Quarantine/ movement control	Restricted area (if declared)	Control area (if declared)
<i>Movement out of:</i>		
- sheep and goats	Prohibited; non-exposed animals may be moved under permit for immediate slaughter at an abattoir in the RA or CA	As for RA
- other susceptible animals	Unrestricted, but cattle are subject to permit listing identification requirements	As for RA
- people	Allowed, subject to appropriate decontamination	Unrestricted
- sheep and goat milk and fibre products	Milk from infected and in-contact cattle to be destroyed. Allowed for processing from non-exposed animals, subject to permit.	Unrestricted
- vehicles and equipment	Allowed, subject to appropriate decontamination	Unrestricted
<i>Movement within of:</i>		
- susceptible animals	Allowed, subject to permit	As for RA
<i>Movement through of:</i>		
- susceptible animals	Allowed, subject to permit	As for RA
<i>Movement in of:</i>		
- susceptible animals	Allowed under permit for restocking purposes	As for RA
<i>Movement along stock routes, rights of way:</i>	Prohibited	May be allowed under permit

Risk enterprises:

- abattoirs	May continue to operate under permit but may not freeze sheep or goat meat	As for RA
- artificial breeding centres	May continue to operate under permit	As for RA
- dairy factories	May continue to operate under permit, but sheep or goat milk must be heat treated	As for RA
<i>Sales, shows, etc:</i>	Prohibited if sheep or goats involved	As for RA

4.3 Criteria for issuing permits

When conducting a risk assessment regarding the issue of a permit, the officer should take into account the following:

- status of the originating and destination premises;
- species of animal;
- confidence in animal tracing and surveillance;
- destination and use of the animals or products;
- likelihood of contamination of the equipment/product/material (ability to decontaminate); and
- security of transport.

Appendix 1 Procedures for surveillance and proof of freedom

The OIE requirements for proof of freedom from PPR are described in article 14.8.2 of the OIE Terrestrial Code.

PPR can be detected from physical examination of susceptible flocks, but evidence of freedom needs to be supported by serological testing. Properties considered to be at risk are all those in the RA, as well as any other properties that may have been designated DCPs or SPs by tracing of people, fomites, etc. Surveillance procedures for each type of declared area are as follows.

Infected premises

Daily physical surveillance of sheep and goats will be required for a period of 15 days, then weekly inspections for a further 2 weeks.

On IPs (and DCPs that have been destocked), restocking will be allowed after 15 days. On IPs where some ruminants or pigs remain, serological evidence that no infection is present after the slaughter of the infected mob will be required before restocking. Surveillance visits of all restocked premises should be made fortnightly for 2 months.

Suspect or dangerous contact premises

Daily physical surveillance of sheep and goats will be required for a period of 15 days, followed by weekly inspections for a further 2 weeks. These animals should be included in later serosurveillance.

Restricted area

On other properties in the RA, surveillance visits should be made as soon as possible after detection of the first IP in the RA and then 1, 2, 3 and 4 weeks later.

At surveillance visits, every group of sheep and goats must be inspected and numbers accounted for. In extensive grazing areas, where the degree of contact between groups of animals in a flock may be low, care must be taken to ensure that all groups of animals are present and healthy.

Once the disease has been contained, all flocks within the RA should be serologically sampled to provide a 95% confidence level that the disease is not present at a 10% prevalence. Flocks giving seropositive results should be further tested for evidence of infection.

Control area

All reports of disease will need to be investigated. Random sampling should be carried out about 1 month after the last IP has been restocked and then 2 months later.

Appendix 2 Features of PPR

Disease and cause

Peste des petits ruminants (PPR; literally 'plague of little ruminants') is a viral disease of sheep and goats that closely resembles rinderpest in cattle. The disease spreads rapidly among in-contact animals, with high rates of infection and death. The disease is caused by a virus belonging to the family *Paramyxoviridae*.

Species affected

Sheep and goats are the main natural hosts of PPR virus. Goats appear to be more susceptible and suffer more severely than sheep. Pigs and cattle may be subclinically infected by the virus. Humans are not affected.

Distribution

PPR is endemic in the sub-Saharan region of Africa, extending into the Arabian Peninsula, the Middle East and the Indian subcontinent. The disease has never been recorded in Australia.

Key signs

Acute cases show sudden onset of fever, peaking at 40–42°C, severe depression and loss of appetite. Copious nasal discharges may become thick and yellow, forming a crust and blocking the nostrils, causing respiratory distress. The eyes also become infected, with the eyelids matting together. Tissues in the mouth swell, and ulcers form on the lower gums, dental pad, hard palate, cheeks and tongue. In mild cases, these erosions may heal within 48 hours. Severe diarrhoea develops within 2–3 days of the appearance of lesions in the mouth, resulting in severe dehydration and emaciation. Bronchopneumonia, evidenced by coughing, is common. Pregnant animals may abort. Deaths usually occur within 4–12 days of the onset of fever (Rossiter 2005). Affected animals either die or develop effective immunity.

Spread

Spread of PPR between areas is usually by movement of infected animals. The incubation period is 4–6 days. The virus is present in all secretions and excretions of incubating and sick animals, and transmission is by direct contact or infected respiratory aerosols over short distances. Infection rates in susceptible animals are between 60% and 90%. Case mortality rate may be as low as 10%, depending on the PPR strain and the host species and breed (Wohlsein and Saliki 2006), but may range up to 90%. Indirect transmission on fomites is unlikely, and animals do not appear to become chronic carriers.

Persistence of the virus

PPR virus remains in all secretions and excretions for about 10 days after the onset of fever. It is inactivated by the putrefaction of the carcass and by a pH of 5.5 in hung meat, but remains viable at 4°C for at least 8 days and infective in salted and frozen meat for several months. The virus has a poor survival rate outside the host. It is rapidly inactivated by UV light, inactivated by drying out within 4 days, and sensitive to a wide range of disinfectants.

Glossary

Animal byproducts	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).
Animal Health Committee	A committee comprising the CVOs of Australia and New Zealand, Australian state and territory CVOs, Animal Health Australia, and a CSIRO representative. The committee provides advice to PIMC on animal health matters, focusing on technical issues and regulatory policy (formerly called the Veterinary Committee). <i>See also</i> Primary Industries Ministerial Council (PIMC)
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture, Fisheries and Forestry who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. <i>See also</i> Chief veterinary officer
AUSVETPLAN	<i>Australian Veterinary Emergency Plan</i> . 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.
Chief veterinary officer (CVO)	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. <i>See also</i> Australian Chief Veterinary Officer
Compensation	The sum of money paid by government to an owner for stock that are destroyed and property that is compulsorily destroyed because of an emergency animal disease. <i>See also</i> Cost-sharing arrangements, Emergency Animal Disease Response Agreement
Consultative Committee on Emergency Animal Diseases (CCEAD)	A committee of state and territory CVOs, representatives of CSIRO Livestock Industries and the relevant industries, and chaired by the Australian CVO. CCEAD convenes and consults when there is an animal disease emergency due to the introduction of an emergency animal disease of livestock, or other serious epizootic of Australian origin.

Control area	A declared area in which the conditions applying 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 outbreak according to need). <i>See Section 4 for further details</i>
Cost-sharing arrangements	Arrangements agreed between governments (national and states/territories) and livestock industries for sharing the costs of emergency animal disease responses. <i>See also Compensation, Emergency Animal Disease Response Agreement</i>
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	Premises that contain dangerous contact animals or other serious contacts. <i>See Section 4 for further details</i>
Declared area	A defined tract of land that is subjected to disease control restrictions under emergency animal disease legislation. Types of declared areas include <i>restricted area, control area, infected premises, dangerous contact premises and suspect premises</i> . <i>See Section 4 for further details</i>
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 slaughter animals humanely.
Disease agent	A general term for a transmissible organism or other factor that causes an infectious disease.
Disease Watch Hotline	24-hour freecall service for reporting suspected incidences of exotic diseases – 1800 675 888 .
Disinfectant	A chemical used to destroy disease agents outside a living animal.
Disinfection	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.
Disposal	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.

Emergency animal disease	<p>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.</p> <p><i>See also</i> Endemic animal disease, Exotic animal disease</p>
Emergency Animal Disease Response Agreement	<p>Agreement between the Australian and state/territory governments and livestock industries on the management of emergency animal disease responses. Provisions include funding mechanisms, the use of appropriately trained personnel and existing standards such as AUSVETPLAN.</p> <p><i>See also</i> Compensation, Cost-sharing arrangements</p>
Endemic animal disease	<p>A disease affecting animals (which may include humans) that is known to occur in Australia.</p> <p><i>See also</i> Emergency animal disease, Exotic animal disease</p>
Enterprise	<p><i>See</i> Risk enterprise</p>
Enzyme-linked immunosorbent assay	<p>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.</p>
Epidemiological investigation	<p>An investigation to identify and qualify the risk factors associated with the disease.</p> <p><i>See also</i> Veterinary investigation</p>
Exotic animal disease	<p>A disease affecting animals (which may include humans) that does not normally occur in Australia.</p> <p><i>See also</i> Emergency animal disease, Endemic animal disease</p>
Exotic fauna/feral animals	<p><i>See</i> Wild animals</p>
Fomites	<p>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.</p>
In-contact animals	<p>Animals that have had close contact with infected animals, such as non-infected animals in the same group as infected animals.</p>
Incubation period	<p>The period that elapses between the introduction of the pathogen into the animal and the first clinical signs of the disease.</p>
Index case	<p>The first or original case of the disease to be diagnosed in a disease outbreak on the index property.</p>

Index property	The property on which the first or original case (index case) in a disease outbreak is found to have occurred.
Infected premises	A defined area (which may be all or part of a property) in which an emergency disease exists or is believed to exist, or in which the infective agent of that emergency disease exists or is believed to exist. An infected premises is subject to quarantine served by notice and to eradication or control procedures. <i>See</i> Section 4 for further details
Local disease control centre (LDCC)	An emergency operations centre responsible for the command and control of field operations in a defined area.
Monitoring	Routine collection of data for assessing the health status of a population. <i>See also</i> Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National management group (NMG)	A group established to direct and coordinate an animal disease emergency. NMGs may include the chief executive officers of the Australian Government and state or territory governments where the emergency occurs, industry representatives, the Australian CVO (and chief medical officer, if applicable) and the chairman of Animal Health Australia.
Native wildlife	<i>See</i> Wild animals
OIE Terrestrial Code	OIE <i>Terrestrial Animal Health Code</i> . Reviewed annually at the OIE meeting in May and published on the internet at: http://www.oie.int/eng/normes/mcode/a_summry.htm
OIE Terrestrial Manual	OIE <i>Manual of Diagnostic Tests and Vaccines for Terrestrial Animals</i> . Describes standards for laboratory diagnostic tests and the production and control of biological products (principally vaccines). The current edition is published on the internet at: http://www.oie.int/eng/normes/mmanual/a_summry.htm
Operational procedures	Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.
Owner	Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).
Premises	A tract of land including its buildings, or a separate farm or facility that is maintained by a single set of services and personnel.

Prevalence	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.
Primary Industries Ministerial Council (PIMC)	The council of Australian national, state and territory and New Zealand ministers of agriculture that sets Australian and New Zealand agricultural policy (formerly the Agriculture and Resource Management Council of Australia and New Zealand). <i>See also</i> Animal Health Committee
Quarantine	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.
Restricted area	A relatively small declared area (compared with a control area) around an infected premises that is subject to intense surveillance and movement controls. <i>See</i> Section 4 for further details
Risk enterprise	A defined livestock or related enterprise, which 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.
Sensitivity	The proportion of affected individuals in the tested population that are correctly identified as positive by a diagnostic test (true positive rate). <i>See also</i> Specificity
Sentinel animal	Animal of known health status that is monitored to detect the presence of a specific disease agent.
Seroconversion	The appearance in the blood serum of antibodies (as determined by a serology test) following vaccination or natural exposure to a disease agent.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
Serotype	A subgroup of microorganisms identified by the antigens carried (as determined by a serology test).
Serum neutralisation test	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.

Specificity	The proportion of nonaffected individuals in the tested population that are correctly identified as negative by a diagnostic test (true negative rate). <i>See also</i> Sensitivity
Spell	To keep unused for a period of time until there is no risk of disease agent remaining.
Stamping out	Disease eradication strategy based on the quarantine and slaughter of all susceptible animals that are infected or exposed to the disease.
State or territory disease control headquarters	The emergency operations centre that directs the disease control operations to be undertaken in that state or territory.
Surveillance	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.
Susceptible animals	Animals that can be infected with a particular disease.
Suspect animal	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. <i>or</i> An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises	Temporary classification of premises containing suspect animals. After rapid resolution of the status of the suspect animal(s) contained on it, a suspect premises is reclassified either as an infected premises (and appropriate disease control measures taken) or as free from disease. <i>See</i> Section 4 for further details
Tracing	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.
Vaccination	Inoculation of healthy individuals with weakened or attenuated strains of disease-causing agents to provide protection from disease.

Vaccine	Modified strains of disease-causing agents that, when inoculated, stimulate an immune response and provide protection from disease.
- attenuated	A vaccine prepared from infective or 'live' microbes that have lost their virulence but have retained their ability to induce protective immunity.
- inactivated	A vaccine prepared from a virus that has been inactivated ('killed') by chemical or physical treatment.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A <i>biological</i> vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A <i>mechanical</i> vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.
Veterinary investigation	An investigation of the diagnosis, pathology and epidemiology of the disease. <i>See also</i> Epidemiological investigation
Viraemia	The presence of viruses in the blood.
Wild animals	
- native wildlife	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).
- feral animals	Domestic animals that have become wild (eg cats, horses, pigs).
- exotic fauna	Nondomestic animal species that are not indigenous to Australia (eg foxes).
Zoning	The process of defining disease-free and infected areas in accord with OIE guidelines, based on geopolitical boundaries and surveillance, in order to facilitate trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

AAHL	Australian Animal Health Laboratory
AUSVETPLAN	Australian Veterinary Emergency Plan
CA	control area
CCEAD	Consultative Committee on Emergency Animal Diseases
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	chief veterinary officer
DCP	dangerous contact premises
EAD	emergency animal disease
EDTA	ethylenediaminetetraacetic acid
ELISA	enzyme-linked immunosorbent assay
IP	infected premises
NMG	national management group
OIE	World Organisation for Animal Health (Office International des Epizooties)
PPR	peste des petits ruminants
RA	restricted area
SP	suspect premises

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Video/training resources

Animal Health Australia training information:

https://www.animalhealthaustralia.com.au/training/ead_training.cfm

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