Aujeszky's disease

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EMERGENCY ANIMAL DISEASE WATCH HOTLINE: 1800 675 888

The Emergency Animal 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.

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Pig in field.

1 Introduction

1.1 This manual

1.1.1 Purpose

This response strategy outlines the nationally agreed approach for the response to an incident – or suspected incident – of Aujeszky's disease in Australia. It has been developed to guide decision making and so support the implementation of an efficient, effective and coherent response.

1.1.2 Scope

This response strategy covers Aujeszky's disease caused by porcine alphaherpesvirus type 1.

This response strategy provides information about:

- the disease (Section 2)
- the implications for Australia, including potential pathways of introduction, social and economic effects, and the critical factors for a response to the disease (Section 3)
- the agreed 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)
- surveillance and establishing proof of freedom (Section 7).

The key features of Aujeszky's disease are described in the **Aujeszky's disease Fact Sheet (Appendix 1)**.

1.1.3 Development

The strategies in this document for the diagnosis and management of an outbreak of Aujeszky's disease are based on risk assessment. They are informed by the recommendations in the World Organisation for Animal Health (OIE) *Terrestrial animal health code* (Chapter 8.2) and the OIE *Manual of diagnostic tests and vaccines for terrestrial animals* (Chapter 3.1.2). The strategies and policy guidelines are for emergency situations and are not applicable to policies for imported animals or animal products.

This manual has been produced in accordance with the procedures described in the **AUSVETPLAN *Overview***, and in consultation with Australian national, state and territory governments; the relevant livestock industries; nongovernment agencies; and public health authorities, where relevant.

In this manual, text placed in square brackets [xxx] indicates that that aspect of the manual remains unresolved 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 Other documentation

This response strategy should be read and implemented in conjunction with:

- other AUSVETPLAN documents, including the operational, enterprise and management manuals; and any relevant guidance and resource documents. The complete series of manuals is available on the Animal Health Australia website[1]
- relevant nationally agreed standard operating procedures (NASOPs).[2] These procedures complement AUSVETPLAN and describe in detail specific actions undertaken during a response to an incident. NASOPs have been developed for use by jurisdictions during responses to emergency animal disease (EAD) incidents and emergencies
- relevant jurisdictional or industry policies, response plans, standard operating procedures and work instructions
- relevant Commonwealth and jurisdictional legislation and legal agreements (such as the Emergency Animal Disease Response Agreement – EADRA[3]), where applicable.

1.3 Training resources

EAD preparedness and response arrangements in Australia

The EAD Foundation Online course[4] provides livestock producers, veterinarians, veterinary students, government personnel and emergency workers with foundation knowledge for further training in EAD preparedness and response in Australia.

1 www.animalhealthaustralia.com.au/ausvetplan

2 www.animalhealthaustralia.com.au/nationally-agreed-standard-operating-procedures

3 www.animalhealthaustralia.com.au/eadra

4 www.animalhealthaustralia.com.au/online-training-courses

2 Nature of the disease

Aujeszky's disease is a viral disease primarily of domestic pigs and occasionally of wild animals. It affects the nervous, respiratory and reproductive systems. It is of greatest economic importance in pigs.

2.1 Aetiology

Aujeszky's disease is caused by porcine alphaherpesvirus type 1 of the family Herpesviridae. There is only one serotype, but strains vary with respect to virulence (from mild to severe), minimum infective dose and tissue tropism.

2.2 Susceptible species

The pig is the only natural host for Aujeszky's disease virus. Sporadic cases occur in horses, cattle, sheep, goats, dogs, cats, mink, foxes, deer, rabbits, mice and rats. The disease is invariably fatal in these other species.

2.2.1 Zoonotic potential

There have been no substantiated reports of human infection.

2.3 World distribution

For the latest information on the distribution of Aujeszky's disease, refer to the World Organisation for Animal Health (OIE) World Animal Health Information System.[5]

2.3.1 Distribution outside Australia

Aujeszky's disease occurs in most countries of Europe and Asia, in parts of the United States (feral pigs only), and in Central and South America. The prevalence in infected countries is 5–26%.

Canada, Denmark, Norway, Finland and Luxembourg are free from the disease, and the United Kingdom eradicated it during the 1980s. New Zealand declared itself free from Aujeszky's disease in 2000, following an eradication campaign in the 1990s.

2.3.2 Occurrence in Australia

Aujeszky's disease has never been diagnosed in Australia.

5 https://wahis.oie.int/#/home

2.4 Epidemiology

Aujeszky's disease is contagious in pigs and is mainly spread by the respiratory route. Spread from farm to farm can be expected to be slow, but within-farm spread will be relatively rapid.

2.4.1 Incubation period

The incubation period can be as short as 2–4 days in suckling pigs and 3–6 days in finishers. Excretion of virus begins 2–5 days after infection and can continue for at least 14 days. It may precede the onset of clinical signs (Pensaert & Kluge 1989).

OIE incubation period

The OIE *Terrestrial animal health code* (2021) does not describe an incubation period for Aujeszky's disease.

2.4.2 Persistence of agent and modes of transmission

General properties

Aujeszky's disease virus is a large virus with a lipid envelope, which is sensitive to many disinfectants, including detergents.

Environment (including windborne spread)

Aujeszky's disease virus is relatively thermostable compared with other herpesviruses. It has a half-life of 7 hours at 37 °C and the following survival characteristics (Pensaert & Kluge 1989):

- rapidly inactivated at 37 °C in sunlight and in dry conditions
- fairly stable infectivity at pH 5–9, but extreme acidity and alkalinity have a rapid inactivating effect
- survives for extended periods under winter conditions (below 4 °C)
- survives in contaminated straw and feeding troughs for 10–30 days at 24 °C or for up to 46 days at –20 °C; and on other fomites for 2–7 days at 25 °C (Schoenbaum et al 1991)
- survives in effluent for up to 3 days
- survives in well water and green pasture for up to 7 days (Kluge et al 1999).

Under certain favourable conditions in densely populated pig-farming areas, windborne spread of the virus from farm to farm can occur over distances of more than 2 km (Gloster et al 1984). The disease spread from northern Germany to Denmark in the air over a distance of 15–40 km and, in one case, 80 km (Christensen et al 1990). Windborne spread over substantial distances (up to 80 km) can be modelled and the distribution predicted (Christensen et al 1990).

The specific prerequisites for windborne spread are:

- large amounts of virus (ie large herds infected)
- the correct strain of virus
- appropriate environmental conditions (ie low temperature and high humidity)
- topography suitable for windborne spread
- close proximity of other pig herds (Pejsak & Truszczynski 2006).

It is highly unlikely that these favourable conditions would be met in Australia.

Live animals

The most important method of infection is via oral and nasal secretions. Aujeszky's disease virus is spread principally by nose-to-nose contact. Other methods of spread are via:

- semen or vaginal secretions (see below)
- transplacental infection
- the colostrum or in milk.

In general, pigs excrete virus oronasally during the 2–4-week period following the primary infection. Longer persistence with continuous excretion has been reported (6 months in one United States study) but is probably rare (Pensaert & Kluge 1989). However, a very high percentage of pigs become latent carriers for 1 year or longer, with intermittent virus excretion at times when the animal is stressed, such as at parturition. There is circumstantial evidence that some latently infected pigs may be undetected by conventional serological tests (Pejsak & Truszczynski 2006).

Most outbreaks originate from the introduction of infected pigs to susceptible herds.

Live wild (including feral) animals

Feral pigs can be infected by Aujeszky's disease virus, and it is therefore necessary to minimise contact between feral pigs and infected domestic pigs. Feral pigs in the area should be controlled and destroyed, if possible, and should be included in surveillance programs to help define the extent of any infection in the feral pig population. In the southeast of the United States, 19% of feral pigs are seropositive (van der Leek & Gibbs 1992).

Aujeszky's disease virus is less resistant in the environment than other porcine viruses, and there is no evidence of vector involvement in its maintenance. Both these factors may decrease the likelihood of Aujeszky's disease spread in feral pigs when the feral pigs occur at low density.

Transmission to other susceptible species, including cats, rats and mice, occurs via consumption of head or offal tissue. Very rarely has Aujeszky's disease virus been detected in muscle tissue. Animals other than pigs are generally regarded as 'dead-end' hosts, as infection in these animals is usually short and self-limiting. Most die after an illness of short duration, usually 2–3 days after the appearance of clinical signs.

Rats and wildlife may have some role as reservoirs, but this requires further study.

The virus has been spread from animals (eg cats and rodents) that have died from the disease and contaminated grain bins (Kluge et al 1999).

Animal products

Meat, meat products and casings, including use as animal feed

Aujeszky's disease virus can survive in offal (head and neck tissues, and thoracic and abdominal viscera); the survival time depends on the temperature at which the material is held (Pensaert & Kluge 1989). For example, offal would need to be treated to at least 62 °C to inactivate the virus (Turner et al 2000).

Pigs are viraemic for only a short time, and the viability of the virus in meat is reduced by the pH changes after death. Virus was recovered from the carcass muscle of clinically affected pigs after storage at 1–2 °C for 72 hours (MacDiarmid 1991), but was inactivated in muscle, lymph node and bone marrow from an artificially infected hindquarter after 35 days at –18 °C (Durham et al 1980).

Although it can be isolated from the tissues of infected pigs after death (Heard 1980, Pensaert & Kluge 1989), Aujeszky's disease virus is not considered a high-risk contaminant of pigmeat products. It does not appear in the OIE review by Farez and Morley (1997) of 'potential animal health hazards of pork and pork products'. DAFF (2004) has reviewed the literature on infectivity of Aujeszky's disease virus in pigmeat, citing papers that report detection of very low virus titres in the muscle of experimentally infected pigs and the transmission of infection through the consumption of carcasses of infected animals. Offal presents a higher risk of disease transmission than meat.

The dose of virus necessary to infect pigs orally is much greater than the dose required for infection via the respiratory route (Wittmann & Rziha 1989).

Semen and embryos from live susceptible animals

Acutely infected boars can transmit virus through semen, and it would be expected that carriers would also intermittently excrete the virus in semen. Acutely and chronically infected sows can be expected to excrete the virus into the reproductive tract and have been shown to infect naive boars.

Although Aujeszky's disease virus has been reported to be capable of infecting embryos (Bolin et al 1982), embryo transfer has been successfully used to derive Aujeszky's disease virus–negative embryos from infected sows (James et al 1983).

For embryos derived in vivo, the International Embryo Technology Society (IETS) lists Aujeszky's disease in Category 1. This means that sufficient evidence has accrued to show that the risk of transmission is negligible provided that the embryos are properly handled between collection and transfer (according to the IETS Manual).[6] The IETS notes that trypsin treatment is required during embryo processing to ensure the removal of any residual Aujeszky's disease virus.

See also the **AUSVETPLAN enterprise manual *Artificial breeding centres***.

People

Humans are not carriers of Aujeszky's disease and have not been implicated in the spread of the disease other than by the use of contaminated equipment, such as hypodermic needles and syringes contaminated with blood from infected animals.

Vehicles, including empty livestock transport vehicles

Vehicular spread of the virus has not been documented.

Equipment, including personal items

The virus may survive on veterinary instruments. Spread via veterinary instruments within and between herds has been reported (Kluge et al 1999).

Arthropod vectors

Aujeszky's disease virus has no insect vectors. There are no reliable reports that the virus survives in or on birds, in biting insects or on flies beyond 24 hours, or that it is mechanically transmitted by them.

6 Manual of the International Embryo Transfer Society, IETS, Savoy, IL, USA (www.iets.org/Publications/IETS-Manual)

2.4.3 Factors influencing transmission

The emergence of Aujeszky's disease as a significant disease in many countries coincided with intensification of pig farming practices. The increased density of both animals and farms probably contributed to the spread of the disease over substantial distances as a result of the movement of breeding stock. A high percentage of pigs become latent carriers for a year or longer (see Section 2.4.2). Movement or importation of live animals can therefore be an important means of introduction of the disease to a new area.

Aujeszky's disease has been eliminated from herds in Denmark, England, New Zealand and the United States by a combination of measures, including movement controls, vaccination, testing and slaughter. For example, Aujeszky's disease has been successfully eliminated from infected farms by either:

- immediate depopulation (with salvage through an abattoir) where acute cases of disease are present and/or when more than 25% of the breeding herd is serologically positive; or
- progressive depopulation over a 7-month period to minimise the slaughter of pigs of unsaleable weight; or
- removal of serological reactors when these comprise less than 20–25% of the breeding herd.

In Denmark, infected herds with fewer than 25% reactors were tested every 28 days. Seropositive sows were removed after each test until there were two clear tests followed by a clear test 6 months later. The United Kingdom eradicated Aujeszky's disease by slaughtering either infected herds, or only seropositive pigs in herds with low prevalence and no evidence of spread of infection.

In New Zealand, most infected herds (50%) were depopulated or a test-and-removal program was used (30% of herds). Vaccination, test and removal were used in 15% of herds.

2.5 Diagnostic criteria

Since the clinical signs of Aujeszky's disease are not pathognomonic, presumptive diagnosis may be based initially on histopathology (ie nonsuppurative encephalomyelitis) and confirmed by positive serology, or virus or antigen detection in tissue or serum.

Aujeszky's disease may be diagnosed first in other species that are in close contact with pigs (eg cats, dogs or rodents), when sudden deaths with or without itching (pruritus) occur.

2.5.1 Clinical signs

Animals

Pigs

Clinical signs in pigs are dependent on the strain and dose of virus, and the age of pigs infected. The most severe disease occurs in young animals, and infection of adult pigs is often mild or inapparent. The first signs of infection in a herd may be reproductive failure (abortions, mummified foetuses and stillbirths), followed shortly after by disease in neonates.

In newly infected herds, the virus usually spreads rapidly through the whole herd. Clinical signs are most likely to be seen in newborn pigs and breeding sows. The disease mainly affects the respiratory and nervous systems, but respiratory signs were never a feature of Aujeszky's disease in the North Island of New Zealand, where the disease was manifest as a fatal neurological disorder of piglets, or as a reproductive disease in pregnant sows (Pannett et al 1999). Manifestation of clinical signs can vary

considerably according to the age of the pig: nervous signs are more commonly seen in younger pigs, whereas respiratory signs are usually observed in older animals. Itching is rarely seen as a clinical sign in pigs.

Clinical signs in pigs of different ages are as follows:

- Newborn. For piglets less than 2 weeks old, the case mortality rate may approach 100%, and death occurs within hours of the onset of clinical signs. Prostration is often the only clinical sign. Slightly older piglets show fever and variable signs of loss of appetite, vomiting and depression, with central nervous system (CNS) and respiratory involvement. The CNS signs consist of incoordination, abnormal 'goose-stepping' gait, drowsiness, muscular twitching, convulsions, involuntary eye movements and paralysis. The case mortality rate ranges from 20% to 100%. Deaths occur up to 1 week after the onset of signs but may be seen as early as 24 hours after the onset of clinical disease.
- Weaner pigs. The case mortality rate for weaner pigs is generally of the order of 5–10%. The clinical signs already described may be present, but respiratory signs are usually more prominent. These include coughing, sneezing, laboured breathing and conjunctivitis.
- Grower and finisher pigs. Respiratory disease is the most common clinical sign and may be mild but rapidly spreading. Morbidity rates may be very high and approach 100%, but, if the infection is uncomplicated, case mortality rates are low (1–2%).
- Adults. Although infection of adult pigs is often mild or inapparent, severe outbreaks have been reported. The virus can cross the placenta. If sows are infected earlier than the 13th day of pregnancy, there is likely to be embryonic resorption. At later stages of pregnancy, there may be abortion, mummified fetuses, stillbirths or the birth of weak, trembling pigs. Retrospective analysis of herd records to detect changes in farrowing rates, or numbers weaned per litter and numbers sold per sow per year, may give an indication of the time of infection. In New Zealand (MacDiarmid 1992), Singapore and the United Kingdom, the clinical signs were, for many years, unremarkable, as pigs may seroconvert without any clinical signs if infected by very low doses of the virus. A retrospective serological survey in New Zealand after the first Aujeszky's disease diagnosis indicated that the virus had been present for at least 3 years without causing recognisable clinical disease (Oliver 1989).

Cattle and sheep

The disease is almost invariably fatal in cattle and sheep. The most striking clinical feature is intense itching of a localised area or areas of skin, innervated by one or more spinal nerves. This leads to licking, rubbing or gnawing so severe as to lead to self-mutilation. After a day or so, the animal is prostrate but is still capable of rising and walking unsteadily. The animal becomes progressively weaker over the next 12–24 hours and develops rhythmic convulsions, bellowing, grinding of the teeth, pharyngeal paralysis, rapid shallow breathing and cardiac irregularities. Consciousness is maintained until near death, which usually occurs about 2 days after the onset of signs.

Dogs and cats

The clinical signs in dogs and cats are similar to those in ruminants. There is intense itching and self-mutilation. The animal may emit plaintive whimperings and howls. Paralysis of the pharynx and profuse salivation may simulate rabies; hence the alternative name, pseudorabies. There may be rhythmic convulsions. Death occurs within 24–48 hours in dogs and often more rapidly in cats. In Singapore, diagnosis of Aujeszky's disease was often preceded by deaths of cats in piggeries (note that Singapore no longer has pig farms). Several fatal cases of nervous disease in dogs were reported in New Zealand.

Rodents

Rats and mice are dead-end hosts because these species do not transmit the virus. On farms where the disease is present, increased numbers of dead rodents are frequently evident.

Respiratory disease is a common clinical sign.

2.5.2 Pathology

Gross lesions

At postmortem examination in pigs, gross lesions are often minimal or absent. There may be purulent inflammation of the nasal lining, pharyngitis, tonsillitis, and areas of fluid retention, congestion or consolidation in the lungs. In the CNS, the meninges may be congested. Lymph nodes may be mildly congested and contain some tiny, flat, red or purple haemorrhages. Occasionally, there are small white–yellow necrotic foci in the liver and spleen of affected animals or aborted fetuses.

In all species other than pigs, the predominant and sometimes the only nervous system lesions are found in the spinal cord. Lesions consist of oedema, congestion and haemorrhage. These lesions are most severe in the section of the dorsal horn and dorsal root ganglia that innervate the area of skin affected by itching. CNS lesions are similar to those in pigs, but are much milder.

Microscopic lesions

In affected animals, there is a diffuse, nonsuppurative (not involving neutrophils) inflammation of the brain, spinal cord and spinal nerves. Brain lesions are most common in the cerebral and cerebellar cortexes, but they also occur in the pons, thalamus and medulla. Grey and white matter are both affected. There is marked perivascular cuffing (white cell accumulation), glial cell proliferation, and varying degrees of nerve cell necrosis. Cowdry type A intranuclear inclusion bodies occur in glial cells, but are by no means plentiful. There are areas of meningitis, particularly adjacent to lesions. In the lungs, there may be oedema and interstitial pneumonia. Necrotic foci may be present in the tonsils, liver, kidneys, spleen and associated lymph nodes. There is nerve cell degeneration and moderate cellular infiltration.

2.5.3 Differential diagnosis

The following diseases and conditions should be considered in a differential diagnosis of Aujeszky's disease:

- classical and African swine fever
- porcine reproductive and respiratory syndrome
- enterovirus encephalomyelitis (highly virulent strain)
- swine influenza
- Nipah virus disease
- streptococcal meningoencephalitis
- hypoglycaemia
- haemagglutinating encephalomyelitis virus
- encephalomyocarditis
- organic arsenic and mercury poisoning
- salt poisoning
- other respiratory diseases (actinobacillosis, enzootic pneumonia and pasteurellosis, streptococcosis)
- enterovirus encephalomyelitis (milder strains)
- other diseases causing stillbirths and/or abortions (eg parvovirus disease, leptospirosis)
- porcine myocarditis syndrome
- congenital tremors
- rabies (cats and dogs)
- scrapie (sheep and goats)
- bovine spongiform encephalopathy (cattle)
- any other conditions causing signs of persistent itching.

2.5.4 Laboratory tests

Samples required

Fresh specimens

Specimens required for detection and characterisation of the agent, serological testing and histopathology are as follows:

- identification of agent
  - fresh tissues (2 g of each tissue) collected aseptically postmortem and forwarded unpreserved – spleen, tonsils, lymph nodes and distal ileum; lung, kidney and liver may be included principally for differential diagnostic workup
- serological testing
  - sera from animals suspected of having chronic disease (30 samples)
  - sera from sows suspected to have had piglets with chronic disease
- histopathology
  - a full range of tissues (including the brain and spinal cord) in neutral-buffered formalin.

From all species, one half of the brain should be collected aseptically after longitudinal section. From all species except pigs, the skin and subcutaneous tissue at the site of itching should also be collected.

Nasal swabs should be collected from live pigs for testing.

From pigs, samples of lung, spleen, pharyngeal mucosa and tonsil should also be collected aseptically. From live pigs, nasal swabs should be collected and submitted in virus transport medium.

Heparinised blood and blood samples for serum (about 10 mL) should be collected from convalescent and recovered animals. Serum antibodies are detected 7–10 days after infection.

Preserved specimens

The other half of the brain, together with cervical, thoracic and lumbar segments of the spinal cord, should be fixed in neutral-buffered formalin. Specimens of tonsil, mesenteric lymph nodes, spleen, liver and kidney should also be collected in neutral-buffered formalin. If circumstances permit, a whole pig should be submitted to the laboratory.

Transport of specimens

Specimens should be submitted in accordance with agreed state or territory protocols. Specimens should initially be forwarded to the state or territory laboratory for appropriate analysis, and assessment of whether further analysis will be required by the CSIRO Australian Centre for Disease Preparedness (CSIRO-ACDP), Geelong.

If the state or territory laboratory deems it necessary, duplicate samples of the specimens should be forwarded to CSIRO-ACDP 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 (for the first case). Sample packaging and consignment for delivery to CSIRO-ACDP should be coordinated by the relevant state or territory laboratory.

For further information, see the **AUSVETPLAN management manual *Laboratory preparedness***.

Packing specimens for transport

Unpreserved tissue specimens should be chilled and forwarded on ice or frozen gel packs. However, if transit is likely to take more than 24 hours, glycerol buffer (pH 7.4) should be added to the specimens. Alternatively, the specimens may be frozen and forwarded on dry ice. If they are sent on dry ice, the containers used should be gas tight because carbon dioxide will acidify the samples.

2.5.5 Laboratory diagnosis

Diagnosis is based on the direct detection of antigen or viral DNA in tissues, virus isolation in tissue culture and/or the measurement of antibodies in serum. Immunoperoxidase tests on formalin-fixed tissue are also available and very effective in detecting Aujeszky's disease virus; they are particularly useful as a retrospective diagnostic test.

Virus neutralisation and enzyme-linked immunosorbent assay (ELISA) tests are used to detect antibody in serum. Commercially available ELISA tests are highly sensitive and useful in the initial screening of sera (Pejsak & Truszczynski 2006), although they are not as specific as virus neutralisation, which would be used to confirm positive ELISA results. ELISA tests, using blood samples collected on paper discs, were successfully used by New Zealand in its eradication program. This technique was as sensitive as testing serum samples and led to significant cost savings.

Detection of viral DNA by quantitative real-time polymerase chain reaction (PCR) is the preferred screening method for agent detection. This assay is highly sensitive, gives rapid results and can be scaled up to high-volume testing. Testing is on fresh tissues; tonsil, pharyngeal mucosa, brain stem and cerebrum are preferred. Viral antigen can also be detected in tissues from affected pigs – this might be more sensitive than virus isolation for tissues collected some time previously. Virus can also be isolated from the trigeminal ganglia of latently infected pigs by tissue culture co-cultivation, following detection of viral genome using PCR techniques.

If vaccination is used in an eradication program, antibody caused by natural infection can be discriminated from antibody caused by vaccination using gene deletion vaccines and their companion ELISA kits. The kits detect antibody to the protein encoded by the deleted gene. Such kits were used successfully in New Zealand (Motha et al 1997) in problem herds where vaccination was used.

CSIRO-ACDP tests

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

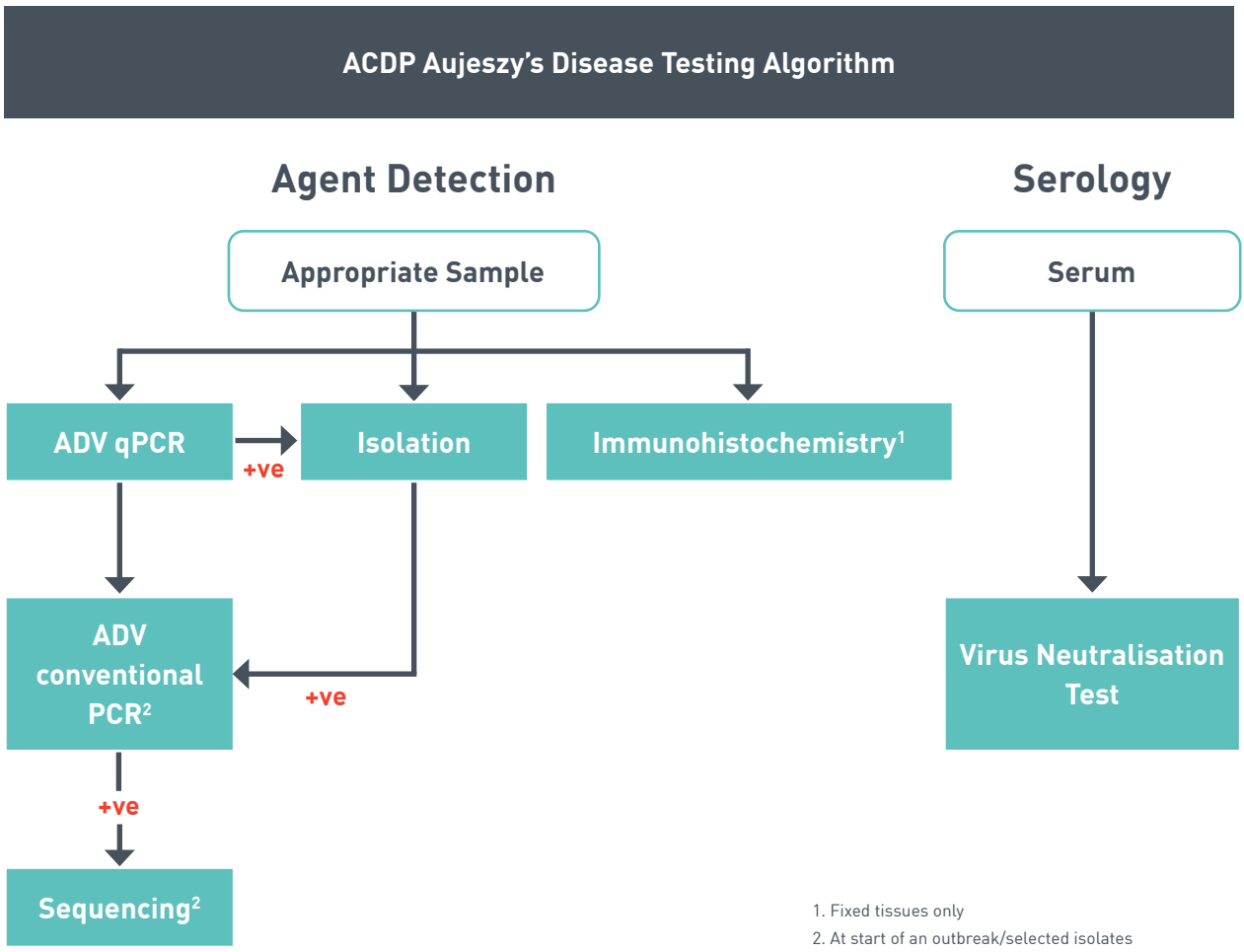

Figure 2.1 The current approach to diagnostic testing at CSIRO-ACDP

Table 2.1 Laboratory tests currently available at CSIRO-ACDP for the diagnosis of Aujeszky's disease

Test	Specimen required	Test detects	Time taken to obtain result
Agent detection			
qPCR	Fresh tissue	Viral DNA	4–5 hours
Agent characterisation			
Virus isolation and identification	Fresh tissue	Virus	3–6 days
PCR and sequencing	Fresh tissue, whole EDTA blood or virus isolate	Viral DNA	2–3 days
Serology			
Virus neutralisation test	Serum	Antibody	4–5 days

EDTA = ethylenediaminetetraacetic acid; PCR = polymerase chain reaction; qPCR = quantitative real-time polymerase chain reaction
Source: Information provided by the then CSIRO-AAHL, 2011 (refer to CSIRO-ACDP for the most up-to-date information)

2.6 Resistance and immunity

Innate immunity

Immunity is age related. Piglets suckling immune sows are protected by colostral immunity for about 6–8 weeks, depending on the level of sow immunity. Maternally derived antibody can persist for up to 4 months.

Acquired immunity

Pigs that have recovered from infection are immune to further exposure. During periods of stress, recovered asymptomatic pigs may excrete virus.

2.7 Vaccination

Vaccines based on attenuated virus, inactivated virus and gene-deleted virus have been developed. Attenuated ('live') vaccines are considered to be more effective than inactivated or killed vaccines (Vannier et al 1991). Vaccines effectively protect pigs against clinical disease and significantly reduce the quantity and duration of viral shedding, but do not prevent latent infections. Transmission of Aujeszky's disease virus may occur from latently infected, vaccinated pigs within a herd. A disadvantage with inactivated or attenuated vaccines is that the serological response following their use is indistinguishable from that following natural infection.

Gene-deleted vaccines, sometimes referred to as marker vaccines, have been genetically engineered to remove some non-essential glycoprotein genes. The absence of these surface proteins (eg gG, gE, gC) in gene-deleted vaccines gives them an advantage over conventional whole virus vaccines in that it is possible to distinguish noninfected vaccinated animals from those with field infection. There remains a concern that the recombination of gene-deleted vaccines might lead to a virulent virus if an animal is vaccinated with two different sorts of vaccines. However, extensive field use of gene-deleted vaccines during Aujeszky's disease outbreaks has not resulted in recombination.

A glycoprotein I (gE) deleted vaccine (Geskypur) was successfully used in the New Zealand eradication program (Motha et al 1997).

2.8 Treatment of infected animals

Treatment of infected animals is inappropriate and ineffective.

3 Implications for Australia

3.1 Potential pathways of introduction

The most significant risk of entry of Aujeszky's disease into Australia is through illegal entry – via passengers on ships or aircraft, or via post – of genetic material and infected pig products that are swill-fed to domestic pigs or accessed by feral pigs and rodents. (Swill feeding is illegal in Australia.) There is a risk from garbage discarded by fishing vessels or yachts.

3.2 Social and economic effect

Losses to individual producers and to the industry as a whole could be substantial if the disease is allowed to proceed uncontrolled over the long term. The costs could include lost production (piglet mortality) and costs of ongoing control (vaccination). The cost of endemic disease has justified eradication in a number of countries.

There could be spillover effects. Sheep, cattle, cats and dogs are sporadically affected, with fatal results. This could cause social disharmony in Australia where the reputation of veterinary services to eliminate spillovers and to eradicate animal diseases is high.

Although Australia has a relatively small export market for pigmeat and live pigs, an outbreak of Aujeszky's disease could seriously affect that market.

3.3 Critical factors for an Australian response

The critical factors for a response to Aujeszky's disease in Australia include the following:

- Pigs are the only natural hosts, but the disease may also be seen in ruminants, and in dogs, cats and rodents.
- The clinical signs of Aujeszky's disease are not pathognomonic and may be inapparent, and the disease may lie undetected for a considerable time before a diagnosis is made.
- Pigs that have recovered from infection are immune to further exposure; during periods of stress, recovered asymptomatic pigs may excrete virus.
- Vaccines effectively protect pigs against clinical disease, and significantly reduce the quantity and duration of viral shedding, but do not prevent latent infections.
- The most likely method of entry of Aujeszky's disease to Australia is via illegal movements of infected pigs in the remote north, or the illegal importation of genetic material or offal.
- Movement controls will prevent spread from herd to herd, especially if agreed industry biosecurity protocols are followed after the initial diagnosis.

4 Policy and rationale

4.1 Introduction

Aujeszky's disease is a World Organisation for Animal Health (OIE)–listed disease that has significant production effects, and is important in the trade of pigs and pig products.

4.1.1 Summary of policy

The response policy with regard to an outbreak of Aujeszky's disease will be determined by how early the outbreak is detected, the extent of the outbreak, the location of affected premises, the prevalence and severity of clinical signs within infected premises, and whether feral pigs are involved.

The default policy is to control and eradicate the disease in the shortest possible time using stamping out, supported by a combination of strategies, including:

- *early recognition* and laboratory confirmation of cases
- *quarantine and movement controls* over pigs and pig products (including offal) in declared areas, to minimise spread of infection
- *tracing and surveillance* (based on epidemiological assessment) to determine the source and extent of infection (including, as necessary, in feral pigs), and subsequently to provide proof of freedom from the disease
- *disposal* of destroyed pigs and decontamination of premises
- *treatment or destruction and disposal* of pig products likely to be contaminated, to reduce the source of infection
- *decontamination* of fomites (facilities, equipment and other items) to eliminate the pathogen
- *welfare management* to handle overcrowding of affected piggeries
- *use of abattoirs and rendering plants* for destruction and disposal, where possible
- recall of suspect pig products
- *zoning/compartmentalisation* to define infected and disease-free areas and premises
- *industry support* to increase understanding of the issues, to facilitate cooperation and to address animal welfare issues
- a public awareness campaign.

The default policy will apply if Aujeszky's disease is not known to be widespread, the infected/suspect population is discrete and able to be controlled, and the destruction and disposal of infected herds are manageable.

A modified stamping-out policy will apply if circumstances allow the safe slaughter (for human consumption) of pigs and processing capacity is available at approved abattoirs. Vaccination may be

used in certain circumstances – for example, to reduce the level of virus in certain populations and to protect genetically valuable herds. This policy will be supported by similar strategies to those listed above.

If Aujeszky's disease is considered to be widespread when diagnosed, or continues to spread despite the application of stamping out or modified stamping out, and is considered not to be eradicable (if, for example, it is found in feral pigs), the policy for long-term control of the disease will be determined following consultation between the government and the pig industry. The policy adopted may involve vaccination, increased biosecurity and long-term compartmentalisation.

4.1.2 Case definition

For the purpose of this manual, a case of Aujeszky's disease is defined as laboratory-confirmed infection with porcine alphaherpesvirus type 1 in a susceptible animal with or without clinical signs.

Notes:

- Positive serology in the absence of detection of porcine alphaherpesvirus type 1, with no clinical or epidemiological evidence supporting infection, does not constitute a definition of a case.
- AUSVETPLAN case definitions guide when a response to an emergency animal disease (EAD) incident should be undertaken. AUSVETPLAN case definitions do not determine when international reporting of an EAD incident is required.
- At the time of an outbreak, revised or subsequent case definitions may be developed with the agreement of the Consultative Committee on Emergency Animal Diseases (CCEAD).

4.1.3 Cost-sharing arrangement

In Australia, Aujeszky's disease is included as a Category 4 emergency animal disease in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses (EAD Response Agreement – EADRA).[7] When cost sharing of the eligible response costs of an incident is agreed, Category 4 diseases are those for which costs will be shared 20% by government and 80% by industry.

4.1.4 Criteria for proof of freedom

After an outbreak, it will be desirable to prove freedom to Australia's trading partners in order to maintain or re-establish access to export markets.

Re-establishment of freedom will require a well-planned and documented serosurveillance program of piggeries within a 10-km radius of the previously infected premises. The survey should only be implemented after at least 6 months has elapsed since the pivotal property was determined free from Aujeszky's disease.

A survey outside this area may also be necessary to substantiate claims for country-free status.

See Section 7 for further details on proof of freedom.

4.1.5 Governance

Governance arrangements for the response to EADs are outlined in the ***AUSVETPLAN Overview***.

Information on the responsibilities of a state coordination centre and local control centre is available in the **AUSVETPLAN management manual *Control centres management*, Parts 1 and 2**.

7 Information about the EAD Response Agreement can be found at www.animalhealthaustralia.com.au/eadra.

4.2 Public health implications

Aujeszky's disease has no public health implications.

4.3 Control and eradication policy

Following the initial diagnosis of Aujeszky's disease and the identification of an infected premises (IP), the priorities are firstly to implement quarantine and movement controls, and then to determine the extent of the outbreak – the size and number of infected herds, and disease prevalence within herds – through tracing and surveillance.

Different control and eradication options are applicable, depending on the type and magnitude of the risks that need to be managed. These will be influenced by how early an outbreak is detected, the extent to which the disease has spread when initially diagnosed, the virulence of the virus, the location of affected premises, the prevalence of infection within IPs, and whether feral pigs are involved.

The default policy, to control and then eradicate the disease through stamping out, will apply if Aujeszky's disease is not known to be widespread, the infected and suspect population is discrete and able to be controlled, and the destruction and disposal of infected herds are manageable.

A modified stamping-out policy (see Section 4.3.14) will apply if circumstances allow the safe slaughter of pigs (including seropositive animals not showing clinical signs) for human consumption, provided that processing capacity is available at approved abattoirs.

Pigs on a property in NSW, Australia.

Vaccination may be used in certain circumstances – for example, to reduce the level of virus in certain populations and to protect genetically valuable herds.

Provided that quarantine and movement controls are promptly implemented on IPs, the disease will be able to be contained while the tracing and surveillance program is implemented, which may take some weeks.

4.3.1 Epidemiological assessment

Epidemiological investigation or assessment draws on multiple sources of information to build understanding of the disease and how it is behaving in an outbreak. This helps inform response decision making.

The key objectives for an epidemiological assessment will be to identify:

- the spatial distribution of infected and free animal populations
- potential vectors involved, including as potential amplifying hosts
- the source of infection
- the prevalence of infection
- pathways of spread and the likely size of the outbreak
- risk factors for the presence of infection and susceptibility to disease (including weather and insect populations).

Epidemiological assessment, and tracing and surveillance activities (see Section 4.3.3) in an EAD response are interrelated activities. Early findings from tracing and surveillance will be inputs into the initial epidemiological assessment (eg considering spatial distribution of infection). The outcomes of the initial epidemiological assessment will then guide decisions on subsequent tracing and surveillance priorities.

The outcomes of the epidemiological assessment will also be used to guide the selection of other appropriate response measures (including the application of movement controls) and assess the progress of disease control measures.

Ongoing epidemiological assessment is important for any EAD response to aid evaluation of the continued effectiveness and value of response measures. Ongoing epidemiological assessment will consider the outcomes of tracing and surveillance activities, and will contribute evidence to support any later claims of disease freedom.

4.3.2 Quarantine and movement controls

Section 5 and Section 6 for details on declared premises and areas, and recommended quarantine and movement controls.

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 IP (see Section 5).

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 6.3 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

It is important that tracing and surveillance are carried out thoroughly within the RA and CA, as the clinical signs of Aujeszky's disease may be unremarkable. Clinical inspections, an examination of herd reproduction records and serological testing will be necessary.

Tracing

Trace-back and trace-forward should involve tracing of movements of live pigs, and semen and embryos, over a period of several months; the period will depend on the type of herd involved.

Table 4.1 shows the activities required and the priorities.

Table 4.1 Tracing and surveillance

Tracing	Herd type	Activity	Priority
Trace back	Properties that exported live pigs or semen to IPs	Bh, C	2
Trace forward	DCPs/SPs in restricted area	Bm, C	3
	Herd imported breeders from IPs	A, Bh, C	1
	Herd imported nonbreeders from IPs	A, Bm, C	3
	Herd imported pigs from gatherings of pigs that included pigs from IPs	Bl, C	4
	Herd imported semen from IPs	Bh	3
Activity key: A = serological testing of identifiable imports B = serological testing of random samples with Bh (high intensity), Bm (medium intensity) or Bl (low intensity) C = examination of clinical and production records		**Priority key:** 1 = highest priority; 4 = lowest priority	

DCP = dangerous contact premises; IP = infected premises; SP = suspect premises
Note: See Section 7 for further details on surveillance.

Surveillance

Serological testing, to determine herd and individual prevalences, will be prioritised to herds that have received animals from an IP, and to animals that originated from an IP or have had contact with such animals or pigs from dangerous contact premises (DCPs) and suspect premises (SPs).

The level of serological testing will be determined by:

- the number of introduced animals
- the time since introduction
- the degree of direct contact between introduced and other pigs in the herd
- the extent to which the flow of pigs through the herd compares with 'all-in-all-out'
- the herd size.

Surveillance of feral pig populations may need to be considered, depending on the situation. If it is required, relevant wild animal management experts should be involved and the **AUSVETPLAN operational manual *Wild animal response strategy*** consulted.

Certification of a premises (including artificial breeding centres) as free from Aujeszky's disease would be based on serological monitoring – two negative tests at an interval of 2 months, annual retests, absence of clinical signs and appropriate biosecurity (including testing or certification of introductions). For the OIE recommendation on Aujeszky's disease-free establishment, refer to Chapter 8.2 in the OIE *Terrestrial animal health code*.[8]

4.3.4 Zoning and compartmentalisation for international trade

Where it is not possible to establish and maintain disease freedom for the entire country, establishing and maintaining disease-free subpopulations, through zoning and/or compartmentalisation,[9] may be considered.

In the case of a limited disease outbreak, a containment zone[10] may be established around the areas where the outbreak is occurring, with the purpose of maintaining the disease-free status of the rest of the country outside the containment zone.

All zoning applications would need to be prepared by the Australian Government in conjunction with the relevant jurisdiction(s) and agreed to by the CCEAD. Compartmentalisation applications would require input from the relevant industries. Recognition of both zones and compartments must be negotiated between the Australian Government and individual overseas trading partners. Zoning and compartmentalisation would require considerable resources that could otherwise be used to control an outbreak. Careful consideration will need to be given to prioritising these activities, because the resulting competition for resources could delay the quick eradication of the disease and recognition of disease freedom.

Agreements between trading partners take time to develop, consider and finalise, because of the need to provide detailed information on activities such as biosecurity, surveillance, traceability and diagnostics to support 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 disease-free

8 www.oie.int/index.php?id=169&L=0&htmfile=chapitre_aujeszky.htm

9 With zoning, disease-free subpopulations are defined primarily on a geographical basis. With compartmentalisation, disease-free subpopulations are defined primarily by management practices (such as the biosecurity plan and surveillance practices of enterprises or groups of enterprises).

10 The OIE defines a 'containment zone' as an infected zone within a previously free country or zone, which includes all suspected or confirmed cases that are epidemiologically linked and where movement control, biosecurity and sanitary measures are applied to prevent the spread of, and to eradicate, the infection or infestation. The Australian Government Department of Agriculture and Water Resources commissioned a report on what would be required for the establishment of containment zones in Australia. This report is available at www.ausvet.com.au/wp-content/uploads/2019/03/Containment-zones-formatted.pdf.

zone in Australia. Trading partners may not accept a zoning or compartmentalisation proposal, regardless of the information provided. Eradication of disease may be achieved before zoning or compartmentalisation applications are finalised.

General guidelines for zoning and compartmentalisation are in Chapter 4.4 of the OIE *Terrestrial animal health code*.

4.3.5 Vaccination

General considerations

Importation of Aujeszky's disease vaccines is subject to the issuing of import permit(s) from the Australian Government Department of Agriculture, Water and the Environment. 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 National Management Group based on the recommendation of the CCEAD.

Specific considerations

Vaccination prevents clinical disease but not infection. Vaccinated animals shed less virus, suffer limited invasion of tissues and do not transmit virus across the placenta. Vaccination may be used to reduce the prevalence of infection in infected herds if a modified approach to eradication is adopted.

Various vaccines have been shown to be effective, but a gene-deleted vaccine is the vaccine of choice. The ELISA (enzyme-linked immunosorbent assay) serological test can differentiate between naturally infected animals and animals that have been inoculated with the gene-deleted vaccine. It is important that only one gene-deleted vaccine is approved, although recombination is unlikely to occur in the field. The use of a single vaccine will help to minimise the number of ELISA tests necessary for diagnosis.

Vaccination could be considered for breeding animals in herds with a high prevalence of infection, ensuring that all breeders and all growers that have lost their natural immunity (>10–12 weeks of age) are vaccinated.

4.3.6 Treatment of infected animals

The treatment of infected animals is ineffective and will not be undertaken.

4.3.7 Treatment of animal products and byproducts

Pigs and other susceptible species showing central nervous system signs will be killed on the property for humane reasons. Pathological samples may be collected and dispatched.

Under a modified stamping-out policy, seropositive pigs not showing clinical signs from IPs, DCPs or SPs may be salvaged through approved abattoirs, subject to condemnation and rendering of all offal. Clinically affected animals detected at antemortem or postmortem inspection will be condemned and tissues subjected to rendering at approved temperatures.

4.3.8 Destruction of animals

Stamping out

Stamping out may be considered if tracing and surveillance show that the disease is limited and confined, and/or there is a high prevalence in the breeding herd, such that systematic eradication is likely to be prolonged and costly to individual producers and a major disruption to commercial operations.

Stamping out will be undertaken on all IPs and DCPs through the rapid destruction of pigs. On DCPs, it may involve all pigs or only selected pigs, depending on the size of the pig holding, the level of contact and the risk of spread of disease.

On IPs, all pigs will be destroyed. On DCPs, the following will be destroyed (as a minimum):

- pigs originating from an IP
- pigs having access to the faeces, urine and/or secretions of pigs moved from an IP.

All pigs on smallholdings (IPs and DCPs) will be destroyed.

All pig products (meat and offal) on IPs will be destroyed, and pig products originating from IPs will be recalled and destroyed. Product on DCPs and SPs may be destroyed, or may be retained for an agreed period of time (depending on the agreed incubation period) and released for further heat processing following negative results from monitoring. Game products (meat and offal) from possibly infected feral pig populations may need to be recalled and destroyed, depending on the known extent of infection.

Efficient and humane procedures will be employed to kill pigs, without moving them from the site (see the **AUSVETPLAN operational manual *Destruction of animals***). Welfare considerations will be taken into account in setting priorities for destruction.

There is no requirement for sentinel animals. After depopulation, restocking with animals from disease-free herds may begin after decontamination is complete. The breeding herd should be monitored serologically 30 days after restocking.

4.3.9 Disposal of animals, and animal products and byproducts

If movement of market-weight pigs to approved abattoirs is not possible, the pigs will be killed on the property. Animals killed on the property will be disposed of using a disposal option that is suitable for the disease and the site – see the **AUSVETPLAN operational manual *Disposal***.

If semen or embryos (not handled according to International Embryo Technology Society guidelines) are on the property, they will be disposed of.

4.3.10 Decontamination

Although fomites do not play a major role in the spread of Aujeszky's disease, areas where the disease has been detected will be decontaminated. Vehicles that have carried animals from infected farms will also be decontaminated. Sunlight will effectively inactivate the virus within 48 hours in open areas, although this would be expected to take longer in overcast weather or on moist green pasture.

Routine cleaning with detergents (including household detergents), followed by disinfection with any of the common disinfectants, will eliminate the virus (see Section 2.4.2). Refer to the **AUSVETPLAN operational manual *Decontamination*** for specific details of recommended disinfectants.

4.3.11 Wild animal management

Reduction in rodent numbers should be part of the decontamination program on infected farms.

Feral pigs present a risk to the domestic pig population if they are able to gather in any significant numbers close to, or are able to interact with pigs on, a commercial farm. The best way of protecting farms is to erect a pig-proof fence around the farm. Alternatively, a localised control and monitoring program can be established around the property to detect the presence of feral pigs and to control the pigs detected. Depopulation may be feasible in the case of a very localised outbreak in feral pigs.

For further details on wild animal control, refer to the **AUSVETPLAN operational manual *Wild animal response strategy***, which includes a decision-making key to assist responses to EADs when wild animals may be implicated or pose a risk of disease transmission.

4.3.12 Vector management

Vector control is not applicable to Aujeszky's disease.

4.3.13 Public awareness and media

The industry, the media and the public will need to be fully informed of the nature of Aujeszky's disease and the control programs that will be adopted, to allay any concerns and to attempt to maintain demand for pig products. There should be ongoing liaison with all groups to ensure the flow of correct information and to maintain confidence in the product. Some opposition to the eradication strategies and concerns about the safety of the product are likely and may affect consumption.

Animal welfare concerns would need to be considered in any disease eradication campaign. An aggressive stamping-out strategy would cause concerns among some sectors of the public that apparently healthy animals are being slaughtered, especially given that there are effective vaccines that could be used in a control campaign. Misinformation and misunderstanding about the use of vaccine would need to be addressed.

A media campaign must emphasise the importance of farmers inspecting susceptible animals regularly, and reporting suspicious lesions and unusual deaths promptly. The ban on swill feeding should be reinforced, as well as the need to prevent contact between domestic and feral pigs.

Public awareness programs should emphasise that, although a wide range of species can be affected, close contact with pigs is necessary for infection to occur, and spread between other species is extremely rare.

4.3.14 Other strategies

A decision on the appropriate policy to be adopted will be made after an epidemiological investigation has determined whether Aujeszky's disease is widespread and whether there is a high likelihood that the disease has become established. If clinical signs are unremarkable and there is evidence that the disease is widespread, the risk of the disease spreading to other farms while the investigation is being conducted is acceptable (based on the risks of severe economic loss and industry disruption from conducting immediate stamping out on all IPs).

A policy using **modified stamping out** with slaughter for human consumption will be adopted following the widespread detection of Aujeszky's disease in domestic pigs (commercial and/or smallholdings). Modified stamping out aims to salvage as many animals as possible with minimal cost of control measures; it relies on the low likelihood of Aujeszky's disease spreading between farms applying

reasonable biosecurity. The policy may include:

- immediate depopulation – with salvage of some animals through abattoirs – when acute cases are present and/or when more than 25% of the breeding herd is serologically positive
- progressive depopulation over a period of months to take into consideration the presence of unsaleable pigs at the time of detection of disease; under this strategy, all sows will be culled after weaning litters and, initially, finishers will be removed as they reach the normal slaughter weight for the property
- culling seropositive reactors when they comprise less than 20–25% of the breeding herd, provided that segregation can be achieved between replaced and nonreplaced animals.

Vaccination using a gene-deleted vaccine may be used in certain circumstances – for example, to reduce the level of virus in certain populations while progressive depopulation is carried out, and to protect genetically valuable herds.

If it is likely that rapid stamping out will exhaust cost-shared resources (eg if a very large piggery is the initial IP), the policy will be to slaughter (for human consumption) to reduce the prevalence, and increase biosecurity on the premises, until stamping out is practicable. Animal welfare issues will need to be managed.

If it is highly likely that Aujeszky's disease has become established in domestic pigs and/or is broadly present in feral pigs, and the disease continues to spread despite the application of a stamping-out or modified stamping-out policy, the **policy for long-term control** (and possible eradication) of the disease will be determined following consultation between the government and the pig industry. The policy adopted may involve increased biosecurity and long-term compartmentalisation in the commercial industry, with slaughter for human consumption. Vaccination at the discretion of owners may be an appropriate strategy, and application of the OIE recommendations for disease-free zones may also be appropriate (Article 8.2.2 of the Terrestrial Code).

The accompanying strategies described in Section 4.3 will be applicable. IPs will still be subject to quarantine and movement controls, and vaccination will play a major role in disease control, together with testing and removal of infected animals. Tracing and surveillance will be used to help determine the extent of the disease and to help define disease-free premises and areas.

Increased industry liaison and education of producers to improve management practices will be important. All-in-all-out marketing and decreasing pig density are two strategies that should be followed.

The ongoing costs of control may need further review.

4.4 Funding and compensation

Details of the cost-sharing arrangements can be found in the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses.[11] Details of the approach to the valuation of, and compensation for, livestock and property in disease responses can be found in the **AUSVETPLAN operational manual *Valuation and compensation***.

11 www.animalhealthaustralia.com.au/eadra

5 Guidelines for classifying declared areas and premises

When an emergency animal disease (EAD) incident is first suspected, the premises involved would undergo a clinical and/or epidemiological investigation. If the case definition, as defined in the relevant AUSVETPLAN response strategy, is met (ie the index case[12]), the relevant chief veterinary officer (CVO) or their delegate will determine the premises classification and may declare the premises an infected premises (IP).

After the identification of the first IP, a restricted area (RA) and a control area (CA) may be declared.[13] A transmission area (TA) may also be defined, if appropriate. All premises within these areas will be classified. At the beginning of an EAD incident, the initial premises classifications would be IP, at-risk premises (ARP), premises of relevance (POR), unknown status premises (UP) and zero susceptible species premises (ZP).

Any premises within the RA or CA will have only one classification at any one time. After an epidemiological investigation, clinical assessment, risk assessment or completion of control measures, a premises may be reclassified.

Once the first IP has been identified, intelligence gathering through veterinary epidemiological investigations would quickly lead to the identification of suspect premises (SPs) and trace premises (TPs). These would be high priorities for follow-up investigation by the relevant state or territory authorities. In a worst-case scenario, an SP could become an IP; therefore, SPs need to be investigated as a matter of very high priority. Similarly, investigation and risk assessment of a TP might identify it as an IP, dangerous contact premises (DCP) or dangerous contact processing facility (DCPF). An SP and a TP might also be assessed as negative and qualified as SP-AN or TP-AN, and eventually reclassified as an ARP, POR or ZP.

All premises classifications are subject to change as a result of a modification in the case definition(s) or investigation(s) as the incident response proceeds.

Classifications should be applied with information needs of managers in mind. They should assist managers to monitor and report progress. Premises classifications to be used should be agreed early in a response, so that control centre personnel can apply the correct and consistent classifications and definitions from the outset of the investigation and response.

5.1 Declared areas

Declared areas are areas declared under state or territory legislation. They comprise restricted areas (RAs), which are subject to strict disease control measures, and control areas (CAs), which are disease-free buffers between an RA and the parts of Australia that are free of disease (the outside area – OA).

12 The first case to come to the attention of investigators

13 This is invariably the case with highly contagious diseases (eg foot-and-mouth disease, equine/avian/swine influenza, classical swine fever) but may not apply to less contagious diseases (eg Hendra virus, anthrax, Australian bat lyssavirus).

All premises within declared areas are subject to classification for disease control management and monitoring purposes.

A particular property (or premises) must fit clearly into only one premises classification at a given time. The classifications and their abbreviations are (in alphabetical order):

- approved disposal site (ADS)
- approved processing facility (APF)
- at-risk premises (ARP)
- dangerous contact premises (DCP)
- dangerous contact processing facility (DCPF)
- infected premises (IP)
- premises of relevance (POR)
- resolved premises (RP)
- suspect premises (SP)
- trace premises (TP)
- unknown status premises (UP)
- zero susceptible species premises (ZP).

In addition to these premises definitions, the following 'qualifiers' may be used to describe the outcome of a recent investigation, epidemiological risk assessment or other activity on premises where the status of the premises has not changed:

- assessed negative (AN)
- vaccinated (VN)
- sentinels on site (SN).

For example, an ARP that has been determined by the relevant jurisdictional authority as being 'assessed negative' should be recorded as 'ARP-AN', and an IP that has had a completed vaccination program should be recorded as 'IP-VN'.[14]

Not all classifications may be needed in a particular EAD response.

Classification of premises provides a framework for authorities to exercise legal powers over such premises, facilitates product tracking, and serves as a communication tool for reporting nationally and internationally on progress in the response.

Refer to the **AUSVETPLAN guidance document *Declared areas and allocation of premises classifications in an EAD response*** for more detail on declared areas.

5.1.1 Restricted area (RA)

An RA is a relatively small legally declared area around IPs and DCPs that is subject disease controls, including intense surveillance and movement controls.

An RA will be a relatively small declared area[15] (compared with a CA) drawn with at least 3 km radius around all IPs and DCPs, and including as many SPs, TPs and DCPFs as practicable. Based on risk assessment, the RA is subject to intense surveillance and movement controls. The purpose of the RA is to minimise the spread of the EAD. The RA does not need to be circular but can have an irregular

14 Some jurisdictions might have a date associated with the 'assessed negative' qualifier

15 As defined under relevant jurisdictional legislation

perimeter, provided that the boundary is initially an appropriate distance from the nearest IP, DCP, DCPF, SP or TP. Multiple RAs may exist within one CA.

The boundaries will be modified as new information becomes available, including from an official surveillance program. The actual distance in any one direction will be determined by factors such as terrain, the pattern of livestock movements, livestock concentrations, the weather (including prevailing winds), the distribution and movements of relevant wild (including feral) animals, and known characteristics of the disease agent. In practice, major geographic features and landmarks, such as rivers, mountains, highways and roads, are frequently used to demarcate the boundaries of the RA. Although it would be convenient to declare the RA on the basis of local government areas, this may not be practical, as such areas can be larger than the particular circumstances require.

5.1.2 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 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 10 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 out of the area.

5.2 Declared premises

5.2.1 Premises status classifications

Infected premises (IP)

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 CVO or their delegate has declared to be an infected premises.

Suspect premises (SP)

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).

Trace premises (TP)

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).

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.

Approved processing facility (APF)

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.

Approved disposal site (ADS)

A premises that has zero susceptible livestock and that has been approved as a disposal site for animal carcasses or potentially contaminated animal products, wastes or things.

At-risk premises (ARP)

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.

Premises of relevance (POR)

A premises in a control 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.

Resolved premises (RP)

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.

Unknown status premises (UP)

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

Zero susceptible species premises (ZP)

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

5.2.2 Qualifiers

Please also refer to the **AUSVETPLAN guidance document *Declared areas and allocation of premises classifications in an EAD response*** for more detail on qualifiers.

Assessed negative (AN)

AN is a qualifier that may be applied to ARPs, PORs, SPs, TPs, DCPs or DCPFs. The qualifier may be applied following surveillance, epidemiological investigation, and/or laboratory assessment/diagnostic testing and indicates that the premises is assessed as negative at the time of classification. SPs, TPs, DCPs or DCPFs, once assessed negative, can progress through the SP-AN, TP-AN, DCP-AN or DCPF-AN status 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.

Sentinels on site (SN)

SN is a qualifier that may be applied to IPs and DCPs to indicate that sentinel animals are present on the premises as part of response activities (ie before it can be assessed as an RP).

The qualifier should not be applied to premises that have been resolved and have been allowed to restock (regardless of the stocking density chosen for initial restocking).

Vaccinated (VN)

The VN qualifier 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 the EAD in question.

However, depending on the legislation, objectives and processes within a jurisdiction, the VN qualifier may be used 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.

The AN and VN qualifiers may be used together if surveillance, an epidemiological assessment and/or laboratory assessment/diagnostic testing support the premises being assessed as negative, and susceptible animals on the premises have also been vaccinated against the EAD.

5.3 Resolving premises and reclassifying declared areas

5.3.1 Reclassifying declared areas

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 12 days[16] has elapsed since predetermined disease control activities and risk assessment were completed on the last IP or DCP in the area or a risk assessment supports reclassification.
- 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.

Pigs roam on a property in Victoria, Australia.

16 The minimum period uses, or is based on, the disease-specific incubation periods defined by the OIE – two incubation periods is a common guideline.

Lifting of restrictions is a process managed by the relevant CVO under jurisdictional legislation and consistent with the most current agreed Emergency Animal Disease Response Plan (EADRP). When the appropriate conditions are satisfied, an affected 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 more than one jurisdiction is affected, 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.

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.

6 Movement controls

6.1 Guidelines for issuing permits

In an emergency animal disease (EAD) event, quarantine and movement controls must strike a balance between quick and effective disease control and business continuity. Therefore, it is not appropriate to simply prohibit all movement of animals and products. On the other hand, diligence needs to be applied to minimise the risk of further spread of the disease.

Recommended quarantine and movement controls in each AUSVETPLAN response strategy provide guidance on which movements can be allowed and under what conditions. This is based on an analysis of the disease risks that are presented by a specific movement, of a specific commodity, at a specific time during the EAD response phase. Each disease strategy will indicate whether a proposed movement is:

- allowed (under normal jurisdictional, including interstate, requirements)
- prohibited – except under the conditions of a general, special or emergency permit
- prohibited.

Sow and piglets on a property in the Northern Territory, Australia.

Permits may not be available until the relevant chief veterinary officer (CVO) provides approval for movements, and this may not be available in the early stages of a response. 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.

6.2 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 – NVDs).

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 CVO gives approval for general movements, and this may not be available in the early stages of a response.

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.

Emergency permit

An emergency permit is an SpP 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.

Other movement requests

Movements not reflected within any of the movement control matrixes or narratives may be considered by the relevant jurisdictional CVO on a risk-assessed case-by-case basis.

6.3 Recommended movement controls

The initial detection of an infected premises (IP) will require immediate implementation of quarantine to try to contain the disease within the confines of the IP. Follow-up measures of tracing and surveillance will assist in determining further action and will readily identify further IPs, dangerous contact premises (DCPs) and suspect premises (SPs). Movement controls will be implemented as soon as restricted areas (RAs) and control areas (CAs) are declared.

Quarantine will include measures to prevent contact with wild pigs, to eliminate or exclude rodents, to prevent movement of pigs to other premises, and to prevent people and fomites that may present a risk from coming into contact with other piggeries.

Movement of clinically affected animals to other pig-producing premises or saleyards will not be permitted, but movement of animals that are free from clinical signs direct to immediate slaughter will be allowed. Destruction and sanitary disposal of clinically affected animals should occur on the IP but may be permitted at an approved abattoir under supervision.

Early in a response to Aujeszky's disease, the affected jurisdiction(s) will reinforce the message that swill feeding is illegal. Therefore, movements of meat products within the RA and CA would generally be allowed, under permit (see Section 6.3.3).

An **area matrix** showing movement controls has been developed for each risky commodity (see the following sections), and **premises matrices** would be developed as necessary.

Although the default policy for Aujeszky's disease is to control and eradicate the disease in the shortest possible time, a modified stamping-out policy might be applied in situations where circumstances allow the safe slaughter of pigs (for human consumption) at approved abattoirs. To facilitate slaughter, an RA should include an approved abattoir, if possible.

Refer to **Appendix 3** for movement permit conditions.

6.3.1 Live susceptible animals

Pigs

Because of the risk of transmitting Aujeszky's disease, **movement of live pigs from high-risk premises** is prohibited, except for pigs being moved for slaughter, under permit. Movement of pigs out of the RA is prohibited. Movement of live pigs into an RA is restricted, to minimise the number of susceptible animals within the RA, and is for slaughter only.

Table 6.1 describes the recommended movement controls for live pigs within and between declared areas.

Table 6.1 Recommended movement controls for live pigs

<table>
<tr><th colspan="2" rowspan="2">To →
 From ↓</th><th colspan="2">RA</th><th colspan="2">CA</th><th rowspan="2">OA</th></tr>
<tr><th>IP/DCP/ SP/ TP</th><th>ARP/DCPF</th><th>SP/TP</th><th>POR</th></tr>
<tr><td rowspan="2">RA</td><td>IP/ DCP/ SP/ TP</td><td rowspan="2">Prohibited</td><td>Prohibited, except under SpP – conditions a, f, g, h, i, l, m, n, o</td><td colspan="2" rowspan="2">Prohibited</td><td rowspan="2">Prohibited</td></tr>
<tr><td>ARP</td><td>Prohibited, except under SpP – conditions b, f, g, h, i, l, m</td></tr>
<tr><td rowspan="2">CA</td><td>SP/ TP</td><td rowspan="2">Prohibited</td><td rowspan="2">Prohibited, except under SpP – conditions c, f, g, h, i, l, m</td><td colspan="2">Prohibited</td><td rowspan="2">Prohibited</td></tr>
<tr><td>POR</td><td>Prohibited</td><td>Prohibited, except under GP – conditions d, f, h, i, m</td></tr>
<tr><td colspan="2">OA</td><td>Prohibited</td><td>Prohibited, except under SpP — conditions c, f, g, h, i, l, m</td><td>Prohibited</td><td>Prohibited, except under GP – conditions d, f, h, i, m</td><td>Allowed (under normal jurisdictional, including interstate, requirements)</td></tr>
</table>

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; DCPF = dangerous contact processing facility; GP = general permit; IP = infected premises; OA = outside area; POR = premises of relevance; RA = restricted area; SP = suspect premises; SpP = special permit; TP = trace premises

Ruminants

Aujeszky's disease can affect ruminants, although the disease is invariably fatal in these species. Every effort should be made to prevent contact between infected pigs and ruminants. The movement of ruminants poses a relatively low risk of spread of the virus.

Table 6.2 shows the recommended movement controls for ruminants within and between declared areas.

Table 6.2 Recommended movement controls for ruminants

To → From ↓	RA	CA	OA
RA	Prohibited, except under GP – conditions f, g, h, i, l, m	Prohibited, except under GP – conditions f, g, h, i, l, m	Prohibited, except under GP – conditions f, g, h, i, l, m
CA	Prohibited, except under GP – conditions f, g, h, i, l, m	Prohibited, except under GP – conditions f, g, h, i, l, m	Prohibited, except under GP – conditions f, g, h, i, l, m
OA	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)

CA = control area; GP = general permit; OA = outside area; RA = restricted area

6.3.2 Semen and embryos from live susceptible animals

Pig semen

Since Aujeszky's disease can be transmitted by semen, movement of semen from high-risk premises and out of the RA will be prohibited. To enable business continuity, semen sourced from properties in the CA and outside area (OA) can be moved into the RA and CA under permit.

Table 6.3 describes the recommended movement controls for pig semen within and between declared areas.

Table 6.3 Recommended movement controls for pig semen

To → From ↓		RA		CA		OA
		IP/DCP/ SP/TP	ARP	SP/TP	POR	
RA	IP/DCP/ SP/TP	Prohibited		Prohibited		Prohibited
	ARP					
CA	SP/TP	Prohibited		Prohibited		Prohibited
	POR	Prohibited, except under SpP – conditions j, p, q		Prohibited, except under SpP – conditions j, p, q		
OA		Prohibited, except under GP – conditions j, p, q		Prohibited, except under GP – conditions j, p, q		Allowed (under normal jurisdictional, including interstate, requirements)

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

In vivo–derived pig embryos

The risk of spread of Aujeszky's disease virus by embryos is very low if the embryos are collected and handled appropriately.

Table 6.4 describes the recommended movement controls for pig embryos within and between declared areas.

Table 6.4 Recommended movement controls for in vivo–derived pig embyros

To → From ↓	RA	CA	OA
RA	Prohibited, except under GP – conditions j, q, r	Prohibited, except under GP – conditions j, q, r	Prohibited, except under GP – conditions j, q, r
CA	Prohibited, except under GP – conditions j, q, r	Prohibited, except under GP – conditions j, q, r	Prohibited, except under GP – conditions j, q, r
OA	Prohibited, except under GP – conditions j, q, r	Prohibited, except under GP – conditions j, q, r	Allowed (under normal jurisdictional, including interstate, requirements)

CA = control area; GP = general permit; OA = outside area; RA = restricted area

6.3.3 Meat and meat products

The risks from pigmeat and offal are addressed primarily through movement controls on live pigs going to slaughter and the fact that swill feeding to pigs is illegal. Because Aujeszky's disease is not a zoonosis, disease concerns are limited to disease in pigs arising from the diversion of pigmeat or offal for pig feed.

Table 6.5 describes the recommended movement controls for fresh/frozen pigmeat and offal within and between declared areas.

Table 6.5 Recommended movement controls for fresh/frozen pigmeat and offal

To → From ↓	RA	CA	OA
RA	Prohibited, except under SpP – conditions h, s, t, u	Prohibited, except under SpP – conditions h, s, t, u	Prohibited, except under SpP – conditions h, s, t, u
CA	Prohibited, except under GP – conditions h, t, u	Prohibited, except under GP – conditions h, t, u	Prohibited, except under GP – conditions h, t, u
OA	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)

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

6.3.4 Waste products and effluent

Pig effluent can transmit Aujeszky's disease virus; therefore, movement of piggery wastes from high-risk premises and out of the RA is generally prohibited. The exception is from IPs, after depopulation, to properties without susceptible livestock (ZPs) and under permit. To maintain business continuity, piggery wastes from the OA may be moved onto a ZP within the RA under permit.

Table 6.6 shows the recommended movement controls for pig waste products and effluent within and between declared areas.

Table 6.6 Recommended movement controls for waste products and effluent

<table>
<tr><th colspan="2" rowspan="2">To →
 From ↓</th><th colspan="2">RA</th><th colspan="2">CA</th><th rowspan="2">OA</th></tr>
<tr><th>IP/DCP/ SP/TP/ ARP</th><th>ZP (within RA)</th><th>SP/TP</th><th>POR</th></tr>
<tr><td rowspan="3">RA</td><td>IP</td><td rowspan="3">Prohibited</td><td>Prohibited, except under SpP – conditions e, f, h, k, t, u</td><td colspan="2" rowspan="2">Prohibited</td><td>Prohibited</td></tr>
<tr><td>DCP/ SP/TP</td><td>Prohibited</td><td rowspan="2">Prohibited</td></tr>
<tr><td>ARP</td><td>Prohibited, except under SpP – conditions e, f, h, k, t, u</td><td>Prohibited</td><td>Prohibited, except under SpP – conditions e, f, h, k, t, u</td></tr>
<tr><td rowspan="2">CA</td><td>SP/TP</td><td colspan="2" rowspan="2">Prohibited</td><td colspan="2">Prohibited</td><td>Prohibited</td></tr>
<tr><td>POR</td><td>Prohibited</td><td>Prohibited, except under GP – conditions e, h, t, u</td><td>Prohibited, except under GP – conditions e, h, t, u</td></tr>
<tr><td colspan="2">OA</td><td>Prohibited</td><td>Allowed (under normal jurisdictional, including interstate, requirements)</td><td colspan="2">Allowed (under normal jurisdictional, including interstate, requirements)</td><td>Allowed (under normal jurisdictional, including interstate, requirements)</td></tr>
</table>

ARP = at-risk premises; CA = control area; DCP = dangerous contact premises; GP = general permit; IP = infected premises; OA = outside area; POR = premises of relevance; RA = restricted area; SP = suspect premises; SpP = special permit; TP = trace premises; ZP = zero susceptible species premises

6.3.5 Vehicles, including empty livestock transport vehicles and associated equipment

Aujeszky's disease virus does not survive for long periods in the environment and can be readily killed with detergents; therefore, routine decontamination of vehicles is sufficient to reduce the risk of virus spread.

Table 6.7 shows the recommended movement controls for empty pig transport vehicles and associated equipment within and between declared areas.

Table 6.7 Recommended movement controls for empty pig transport vehicles and equipment

To → From ↓	RA	CA	OA
RA	Prohibited, except under SpP – condition h	Prohibited, except under SpP – condition h	Prohibited, except under SpP – condition h
CA	Prohibited, except under GP – condition h	Prohibited, except under GP – condition h	Prohibited, except under GP – condition h
OA	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)	Allowed (under normal jurisdictional, including interstate, requirements)

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

6.3.6 People

The movement of people is restricted to essential visitors who use protective clothing, including boots, on the premises (including between sections containing pigs of different health status) and decontaminate their hands before leaving the premises.

6.3.7 Crops, grains, hay, silage and mixed feeds

Before movement, stored grain should be sieved to detect rodents or cats that may have died from Aujeszky's disease.

6.3.8 Sales, shows and other events

Events such as sales and shows are prohibited if pigs are involved. The hunting of feral pigs should be actively discouraged during a response to Aujeszky's disease.

7 Surveillance and proof of freedom

7.1 Proof of freedom

The importance for trade of proof of freedom is less for Aujeszky's disease than for some other diseases. Evidence of freedom – which comprises serological testing of previously infected herds, in-contact herds, herds with stock movements from the infected premises (IP), and other pig herds within a 5 km radius of the previously infected premises – will be collected at least 6 months after the pivotal property was determined free from the disease. Conducting a national survey would be resource intensive, but some surveys outside the area defined above would be necessary to substantiate free status.

The number of animals to be serologically tested depends on the circumstances of the particular herd. A herd that was on an IP and is undergoing test-and-removal procedures will have all breeding stock tested periodically. A dangerous contact premises (DCP) will have animals tested that are directly related (by way of movements) to an IP. In addition, a sample of animals sufficient to detect a 5% prevalence of Aujeszky's disease with 95% confidence would need to be tested. Depending on resources and the number of herds involved, this may entail testing all breeding animals in the DCP. Further proof of freedom would include sampling a proportion of culled sows and boars from the restricted area or state.

The OIE *Terrestrial animal health code* recommends that the importation of breeding pigs be allowed from countries not free from Aujeszky's disease, under certain conditions. Certification of the absence of clinical, virological or serological evidence of Aujeszky's disease; that the animals had been kept exclusively in Aujeszky's disease–free establishments; and serological testing and isolation of the animals are considered satisfactory. The OIE Terrestrial Code recommends that the importation of meat from animals slaughtered in an abattoir and found to pass health inspections before and after slaughter be allowed.

A1 Appendix 1

Aujeszky's disease fact sheet

Disease and cause

Aujeszky's disease is caused by porcine alphaherpesvirus type 1 of the family *Herpesviridae*.

Species affected

The pig is the only natural host for Aujeszky's disease virus. Sporadic cases occur in horses, cattle, sheep, goats, dogs, cats, mink, foxes, deer, rabbits, mice and rats. The disease is invariably fatal in these other species.

There have been no substantiated reports of human infection.

Distribution

Aujeszky's disease has never been recorded in Australia.

The disease occurs in most countries of Europe and Asia, in parts of the United States (feral pigs only), and in Central and South America.

Canada, Denmark, Norway, Finland and Luxembourg are free from the disease, and the United Kingdom eradicated it during the 1980s. New Zealand declared itself free from Aujeszky's disease in 2000, following an eradication campaign in the 1990s.

Potential pathways for introduction into Australia

The most significant risk of entry of Aujeszky's disease into Australia is through illegal entry – via passengers on ships or aircraft, or via post – of genetic material and infected pig products that are swill-fed to domestic pigs or accessed by feral pigs and rodents (swill feeding is illegal in Australia). There is a risk from garbage discarded by fishing vessels or yachts

Key signs

Clinical signs in pigs are dependent on the strain and dose of virus, and the age of infected pigs. The most severe disease occurs in young animals, and infection of adult pigs is often mild or inapparent. The first signs of infection in a herd may be reproductive failure (abortions, mummified fetuses and stillbirths), followed shortly after by disease in neonates.

Spread

Aujeszky's disease is contagious in pigs and is mainly spread by the respiratory route. Spread from farm to farm can be expected to be slow, but within-farm spread will be relatively rapid.

Persistence of the disease agent

Aujeszky's disease virus is a large virus with a lipid envelope, which is sensitive to many disinfectants, including detergents.

Impacts for Australia

Losses to individual producers and to the industry as a whole could be substantial if the disease is allowed to proceed uncontrolled over the long term. The costs could include lost production (piglet mortality) and costs of ongoing control (vaccination). The cost of endemic disease has justified eradication in a number of countries.

There could be spillover effects. Sheep, cattle, cats and dogs are sporadically affected, with fatal results. This could cause social disharmony in Australia where the reputation of veterinary services to eliminate spillovers and to eradicate animal diseases is high.

A2 Appendix 2

Available vaccines

Vaccination is an integral part of the control and eradication strategy. The recommended vaccine is a gene-deleted vaccine that meets World Organisation for Animal Health (OIE) specifications (OIE *Manual of diagnostic tests and vaccines for terrestrial animals*). Gene-deleted vaccines used at a national level must be restricted to one type – for example, glycoprotein I (gE)-deleted vaccine – for which an ELISA (enzyme-linked immunosorbent assay) test is carried out by CSIRO-ACDP (CSIRO Australian Centre for Disease Preparedness).

A3 Appendix 3

Permit conditions

a	For slaughter only, in situations where a modified stamping-out policy has been adopted.
b	For slaughter, or to an ARP for other purposes if a risk analysis indicates that the risk associated with movement is acceptable within the response.
c	For slaughter only.
d	For slaughter, movement within an approved compartment or movement to other PORs.
e	Only to a ZP (such as a broadacre farm) for use as fertiliser, or to a composting facility.
f	Travel by approved route only, and no stopping en route.
g	Appropriate biosecurity standard at receiving premises.
h	Appropriate decontamination of equipment and vehicles under supervision between loads.
i	Absence of clinical signs before and on day of travel.
j	Absence of clinical signs before and on the day of collection and since that time.
k	After a minimum of 7 days following depopulation.
l	Single consignment per load.
m	Physical identification of individual animals (eg ear tag, brand), with accompanying movement documentation (eg National Vendor Declaration, waybill, PigPass).
n	Pigs from IPs, DCPs, TPs and SPs are slaughtered at abattoirs on different days from pigs from other premises, and the abattoir is decontaminated before reuse.
o	Product derived from pigs from IPs, DCPs, TPs and SPs must be rendered/processed or cooked to inactivate the virus.
p	Owner declaration and evidence that the boars have been tested twice in the previous 14 days, at least 5 days apart, with negative results, with the second test occurring less than 72 hours before collection of semen.
q	Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures, accurate record keeping, and semen containers being adequately clean and biosecure.
r	Embryos collected and handled in accordance with the procedures detailed in the International Embryo Technology Society (IETS) manual (4th edition, 2010).
s	Pigmeat and offal derived from pigs from DCPFs must be rendered/processed into meat meal, blood meals or other cooked products.
t	The material is not brought into direct or indirect contact with susceptible animals.
u	Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.

Glossary

Disease-specific terms

All-in-all-out production	A method of production in which all stock leave the premises (or area), followed by total restocking.
Encephalomyelitis	Inflammation of the brain and spinal nerves.
Glial cells	Supporting cells of the brain and spinal cord.
Glycoproteins	Surface antigenic proteins of a microorganism.
Rendering	Processing by heat to inactivate infective agents. Rendered material may be used in various products according to particular disease circumstances.
Salvage	Recovery of some (but not full) market value by treatment and use of products, according to disease circumstances.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
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.
Suppurative	Discharging pus.

Standard AUSVETPLAN terms

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, hoofs, bones, fertiliser).
Animal Health Committee	A committee whose members are the chief veterinary officers of the Commonwealth, states and territories, along with representatives from the CSIRO Australian Centre for Disease Preparedness (ACDP) and the Department of Agriculture, Water and the Environment. There are also observers from Animal Health Australia, Wildlife Health Australia, and the New Zealand Ministry for Primary Industries. The committee provides advice to the National Biosecurity Committee on animal health matters, focusing on technical issues and regulatory policy. *See also* National Biosecurity Committee
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Approved disposal site	A premises that has zero susceptible livestock and has been approved as a disposal site for animal carcasses, or potentially contaminated animal products, wastes or things.
Approved processing facility	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.
At-risk premises	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.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture, Water and the Environment who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. *See also* Chief veterinary officer

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AUSVETPLAN	Australian Veterinary Emergency Plan. Nationally agreed resources that guide decision making in the response to emergency animal diseases (EADs). It outlines Australia's preferred approach to responding to EADs of national significance, and supports efficient, effective and coherent responses to these diseases.
Carcase	The body of an animal slaughtered for food.
Carcass	The body of an animal that died in the field.
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. *See also* Australian Chief Veterinary Officer
Compartmentalisation	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, to facilitate disease control and/or trade.
Compensation	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
Consultative Committee on Emergency Animal Diseases (CCEAD)	The key technical coordinating body for animal health emergencies. Members are state and territory chief veterinary officers, representatives of CSIRO-ACDP and the relevant industries, and the Australian Chief Veterinary Officer as chair.
Control area (CA)	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).
Cost-sharing arrangements	Arrangements agreed between governments (national and state/territory) and livestock industries for sharing the costs of emergency animal disease responses. *See also* Compensation, Emergency Animal Disease Response Agreement

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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.
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.
Disinsectisation	The destruction of insect pests, usually with a chemical agent.

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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	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
Emergency Animal Disease Response Agreement	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
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. *See also* Emergency animal disease, Exotic animal disease
Enterprise	*See* Risk enterprise
Enzyme-linked immunosorbent assay (ELISA)	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.
Epidemiological investigation	An investigation to identify and qualify the risk factors associated with the disease. *See also* Veterinary investigation
Epidemiology	The study of disease in populations and of factors that determine its occurrence.
Exotic animal disease	A disease affecting animals (which may include humans) that does not normally occur in Australia. *See also* Emergency animal disease, Endemic animal disease
Exotic fauna/feral animals	See Wild animals

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Fomites	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.
General permit	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
In-contact animals	Animals that have had close contact with infected animals, such as noninfected animals in the same group as infected animals.
Incubation period	The period that elapses between the introduction of a pathogen into an animal and the first clinical signs of the disease.
Index case	The first case of the disease to be diagnosed in a disease outbreak. *See also* Index property
Index property	The property on which the index case is found. *See also* Index case
Infected premises (IP)	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.
Local control centre	An emergency operations centre responsible for the command and control of field operations in a defined area.

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Monitoring	Routine collection of data for assessing the health status of a population or the level of contamination of a site for remediation purposes. *See also* Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National Biosecurity Committee	A committee that 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 committee provides advice to the Agriculture Senior Officials Committee and the Agriculture Ministers' Forum on national biosecurity issues, and on the IGAB.
National Management Group (NMG)	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, Water and the Environment 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.
Native wildlife	*See* Wild animals
OIE Terrestrial Code	OIE *Terrestrial Animal Health Code*. Describes standards for safe international trade in animals and animal products. Revised annually and published on the internet at: www.oie.int/international-standard-setting/terrestrial-code/access-online.
OIE Terrestrial Manual	OIE *Manual of diagnostic tests and vaccines for terrestrial animals*. 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: www.oie.int/en/standard-setting/terrestrial-manual/access-online.
Operational procedures	Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.
Outside area (OA)	The area of Australia outside the declared (control and restricted) areas.
Owner	Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).

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Polymerase chain reaction (PCR)	A method of amplifying and analysing DNA sequences that can be used to detect the presence of viral DNA.
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.
Premises of relevance (POR)	A premises in a control area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, suspect premises, trace premises, dangerous contact premises or dangerous contact processing facility.
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.
Proof of freedom	Reaching a point following an outbreak and post-outbreak surveillance when freedom from the disease can be claimed with a reasonable level of statistical confidence.
Quarantine	Legally enforceable requirement that prevents or minimises spread of pests and disease agents by controlling the movement of animals, persons or things.
Resolved premises (RP)	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.
Restricted area (RA)	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.
Risk enterprise	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 and garbage depots.
Sensitivity	The proportion of truly positive units that are correctly identified as positive by a test. *See also* Specificity

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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.
Slaughter	The humane killing of an animal for meat for human consumption.
Special permit	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. *See also* General permit
Specificity	The proportion of truly negative units that are correctly identified as negative by a test. *See also* Sensitivity
Stamping out	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.
State coordination centre	The emergency operations centre that directs the disease control operations to be undertaken in a state or territory.

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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. or An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises (SP)	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).

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Swill	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: • milk, milk products or milk byproducts, either of Australian provenance or legally imported for stockfeed use into Australia • material containing flesh, bones, blood, offal or mammal carcases that is treated by an approved process1 • 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 • material used under an individual and defined-period permit issued by a jurisdiction for the purposes of research or baiting. Refer to jurisdictional legislation for approved processes. Jurisdictions may have approved processes that meet the following minimum standards: • rendering in accordance with the Australian Standard for the Hygienic Rendering of Animal Products • under jurisdictional permit, cooking processes subject to compliance verification that ensure that an internal temperature of at least 100 °C for a minimum of 30 minutes, or equivalent, has been reached • treatment of cooking oil that has been used for cooking in Australia, in accordance with the National Standard for Recycling of Used Cooking Fats and Oils Intended for Animal Feeds • under jurisdictional permit, any other nationally agreed process approved by the Animal Health Committee for which an acceptable risk assessment has been undertaken and that is subject to compliance verification. This definition was endorsed by the Agriculture Ministers' Council through AGMIN OOS 04/2014.

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Swill feeding	Also known as 'feeding prohibited pig feed', it includes: • feeding, or allowing or directing another person to feed, prohibited pig feed to a pig • allowing a pig to have access to prohibited pig feed • the collection and storage or possession of prohibited pig feed on a premises where one or more pigs are kept • supplying to another person prohibited pig feed that the supplier knows is for feeding to any pig. This definition was endorsed by the Agriculture Ministers' Council through AGMIN OOS 04/2014.
Trace premises (TP)	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).
Tracing	The process of locating animals, people or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
Unknown status premises (UP)	A premises within a declared area where the current presence of susceptible animals and/or risk products, wastes or things is unknown.
Vaccination	Inoculation of individuals with a vaccine to provide active immunity.
Vaccine	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.
– adjuvanted	A vaccine in which one or several disease-causing agents are combined with an adjuvant (a substance that increases the immune response).
– attenuated	A vaccine prepared from infective or 'live' microbes that are less pathogenic but retain their ability to induce protective immunity.
– gene deleted	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.

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– inactivated	A vaccine prepared from a virus that has been inactivated ('killed') by chemical or physical treatment.
– recombinant	A vaccine produced from virus that has been genetically engineered to contain only selected genes, including those causing the immunogenic effect.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A biological vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A mechanical vector is one that transmits an infectious agent from one host to another but is not essential to the lifecycle of the agent.
Veterinary investigation	An investigation of the diagnosis, pathology and epidemiology of the disease. *See also* Epidemiological investigation
Viraemia	The presence of viruses in the blood.
Wild animals **– native wildlife** **– feral animals** **– exotic fauna**	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials). Animals of domestic species that are not confined or under control (eg cats, horses, pigs). Nondomestic animal species that are not indigenous to Australia (eg foxes).
Wool	Sheep wool.
Zero susceptible species premises (ZP)	A premises that does not contain any susceptible animals or risk products, wastes or things.
Zoning	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, to facilitate disease control and/or trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

Disease-specific terms

CNS	central nervous system
gE	glycoprotein I

Standard AUSVETPLAN abbreviations

ACDP	Australian Centre for Disease Preparedness
AN	assessed negative
ARP	at-risk premises
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
DCPF	dangerous contact processing facility
EAD	emergency animal disease
EADRA	Emergency Animal Disease Response Agreement
EADRP	Emergency Animal Disease Response Plan

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EDTA	ethylenediaminetetraacetic acid (anticoagulant for whole blood)
ELISA	enzyme-linked immunosorbent assay
GP	general permit
IETS	International Embryo Transfer Society
IP	infected premises
LCC	local control centre
NMG	National Management Group
OA	outside area
OIE	World Organisation for Animal Health
PCR	polymerase chain reaction
POR	premises of relevance
RA	restricted area
RP	resolved premises
SCC	state coordination centre
SP	suspect premises
SpP	special permit
TP	trace premises
UP	unknown status premises
ZP	zero susceptible stock premises

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