

AUSTRALIAN VETERINARY EMERGENCY PLAN

# AUSVETPLAN

Disease strategy

Transmissible gastroenteritis

VERSION 4.0

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

**National Biosecurity Committee**

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### **DISEASE WATCH HOTLINE: 1800 675 888**

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

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# 1 Introduction

## 1.1 Scope of this manual

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

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

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

## 1.2 Structure of AUSVETPLAN

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

**Table 1.1a** AUSVETPLAN documents

Document type	Manuals
Summary document	Background information about AUSVETPLAN rationale, development and maintenance

<sup>1</sup> [www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan/](http://www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ausvetplan/)

**Table 1.1b** AUSVETPLAN documents

<b>Document type</b>	<b>Manuals</b>
<b>Disease strategies</b>	Individual disease and policy information for most of the diseases listed in the EADRA
	Bee diseases and pests
<b>Response policy briefs</b>	Summary disease and policy information for each EADRA disease not covered by individual disease strategies (see above)
<b>Operational manuals</b>	Decontamination
	Destruction of animals
	Disposal
	Livestock welfare and management
	Valuation and compensation
	Wild animal response
<b>Enterprise manuals</b>	Artificial breeding centres
	Feedlots
	Meat processing
	Saleyards and transport
	Pig industry
	Poultry industry
	Wool industry
	Zoos
<b>Management manuals</b>	Control centres management (Parts 1 and 2)
	Laboratory preparedness
<b>Outbreak manuals</b>	Collations of individual disease, operational and enterprise information for use in an emergency disease outbreak

EADRA =

Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses  
(see [www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement](http://www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement))



## 1.3 Nationally agreed standard operating procedures

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

## 1.4 World Organisation for Animal Health listing

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

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

The strategies in this document for the diagnosis and management of an outbreak of TGE are based on the recommendations in the OIE *Terrestrial Animal Health Code* (Chapter 15.5) and the OIE *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* (Chapter 2.8.11). The strategies and policy guidelines are for emergency situations, and are not applicable to quarantine policies for imported livestock or livestock products.

## 1.5 Australian emergency animal disease listing

In Australia, TGE 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 (EADRA)*.<sup>4</sup> Category 4 diseases are those for which costs will be shared 20% by government and 80% by industry.

## 1.6 Manner and risk of introduction to Australia

TGE occurs in most pig-producing areas of the world except Australia, New Zealand and Norway. The most likely sources of TGE infection are carcasses contaminated as a result of faecal or intestinal spillage during processing, and infected pigs.

The most significant risk of entry of TGE to Australia is via illegally imported infected pig products that are swill-fed to domestic pigs or accessed by feral pigs. These could be brought in by passengers

<sup>2</sup> [www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/nasops](http://www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/nasops)

<sup>3</sup> These criteria are described in more detail in Chapter 1.2 of the OIE *Terrestrial Animal Health Code* ([www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_1.1.2.htm](http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.1.2.htm))

<sup>4</sup> Information about the EAD Response Agreement can be found at [www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement](http://www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement)

on aircraft or ships, or via the post. (Swill feeding is illegal in Australia.) There is also a risk from garbage discarded by fishing vessels or yachts.

TGE has the potential to become established in the feral pig population in remote regions of Australia, with secondary spread to local backyard, small commercial and medium–large piggeries.

In 2004, Australia released a final Import Risk Analysis report for pigmeat. The risk of TGE from imported pigmeat did not warrant quarantine measures. The OIE recommendations for TGE apply only to live pigs and genetic material. There is no policy for the importation into Australia of live pigs or porcine genetic material or offal, all of which are illegal.

## **1.7 Social and economic effects**

Social and economic effects of an outbreak of TGE in Australia would be largely restricted to the effect of the disease on farm productivity. When newly introduced into a herd, TGE causes significant mortalities in the younger pigs, and reduces growth rates in the weaner and grower pigs. There are few published estimates of the costs of a TGE outbreak in the Australian pig industry. Baldock and Webster (1990) presented a preliminary assessment predicting that, in the first year following infection, the annual cash surplus of an average 100-sow piggery in Queensland would be less than half that expected in a normal year. These authors did not go on to predict the economic effects in subsequent years once TGE had become endemic.

Although the major effects would be felt in the first year following infection in most herds, the disease is likely to persist in herds with a regular clinical recrudescence. The presence of TGE in a breeding herd will affect the marketability of breeding stock. There should not be any reason for abattoirs to be unwilling to slaughter and process pigs from infected premises (IPs); however, local pressures may disrupt some trade practices.

The presence of this disease in Australia should not affect the current limited export in pork products. However, trade of Australian breeding stock to countries free from TGE is likely to be affected. A decrease in consumption of pork and pork products can be anticipated, at least in the short term. A public awareness campaign to inform people that this disease does not infect humans, cause disease in domestic pets or affect meat quality would be appropriate.

Where herds are depopulated, either by stamping out or by being sold for slaughter, producers will suffer a prolonged loss of income. Additional and significant costs will be associated with repopulation of the farm with seronegative pigs.

If a program of eradication by controlled exposure is attempted, the eradication process will take a minimum of 130 days to complete. This process will necessitate changes in management standards on the IP.

Movement controls will be largely restricted to IPs and will not cause major disruptions, other than by prohibiting live pig sales. Zoning would potentially interrupt the free movement of breeding stock, the movement of pigs to slaughter at preferred markets and the movement of pigmeat to markets.

## 2 Nature of the disease

Transmissible gastroenteritis (TGE) is an acute, highly contagious viral disease of pigs. The disease is mainly seen in very young piglets, and is characterised by profuse diarrhoea and vomiting, with high case morbidity and high case mortality rates. Pigs of all ages are susceptible to infection, but, in pigs older than 5 weeks, infection is milder and case mortality rates are low.

### 2.1 Aetiology and pathogenicity

TGE is caused by a virus of the family *Coronaviridae*. Coronaviruses are responsible for two other exotic pig diseases: porcine epidemic diarrhoea and porcine respiratory coronavirus infection. There is only one serotype of TGE virus.

### 2.2 Susceptible species

The clinical disease occurs only in pigs. Seroconversion has been recorded following experimental oral infection in dogs and cats, although no clinical disease was recorded (McClurkin et al 1970).

Infection does not occur in humans.

### 2.3 World distribution and occurrence in Australia

#### 2.3.1 World distribution

TGE is present in parts of Europe, North America, South America, Central America, China, Japan, Korea, Nepal and Myanmar (Burma), and in Southeast Asia and areas of west Africa.

No outbreaks have been recorded in Australia, New Zealand, Argentina, Chile, Peru, Uruguay, Paraguay, Denmark, Sweden or Norway.

For the latest information on the distribution of TGE, refer to the World Animal Health Information Database<sup>5 6</sup> of the World Organisation for Animal Health (OIE).

#### 2.3.2 Occurrence in Australia

No outbreaks of TGE have been recorded in Australia.

<sup>5</sup> <http://web.oie.int/wahis/public.php?page=home>

<sup>6</sup> <http://web.oie.int/wahis/public.php?page=home>

## 2.4 Epidemiology

Key factors in the epidemiology of TGE in susceptible herds are:

- the very short incubation period
- rapid spread of disease within herds
- age-related severity of clinical disease.

In large herds, the disease is likely to become enzootic following the initial outbreak, with permanent ongoing losses. In smaller herds, TGE virus may disappear from the herd following the outbreak, with a subsequent reversion of the herd to susceptibility to further outbreaks.

### 2.4.1 Incubation period

The incubation period in natural infections is 18 hours to 3 days.

#### 2.4.1.1 OIE incubation period

The OIE *Terrestrial Animal Health Code* (2012) describes the longest infective period for TGE as 40 days.

### 2.4.2 Persistence of agent and modes of transmission

The main sources of infection in 60 United Kingdom pig herds were believed to be the movement of pigs on and off infected premises, movement of livestock trucks that had transported pigs, and local spread to nearby farms without any obvious contact.

Within piggeries, infection is likely to spread as a result of ingestion of infected faeces from in-contact pigs, inhalation or ingestion of droplets of faeces, transfer of carrier stock, indirect transmission on implements, and mechanical transmission by flies and starlings if there is poor shed biosecurity.

#### 2.4.2.1 General properties

TGE virus is susceptible to sunlight, high temperatures and a range of chemicals, including 0.03% formalin, 1% phenol, 0.01% betapropiolactone, sodium hypochlorite, 1 mM binary ethylenamine, sodium hydroxide, iodines, quaternary ammonium compounds, ether and chloroform (see the **Decontamination Manual**).

#### 2.4.2.2 Environment (including windborne spread)

The virus can survive in the environment for up to 3 days. It is extremely stable when frozen, but is labile at room temperature or above.

The half-life of TGE virus at 37 °C is less than 2 hours; virus in excreted faeces stored at 21 °C was found to be noninfective 10 days after excretion (Young et al 1955).

Although there are strain differences in physical properties, TGE virus is considered to be very light sensitive; faecal material containing  $10^5$  pig infective doses was inactivated within 6 hours when exposed directly to sunlight.

The virus is trypsin resistant, stable in pig bile and stable at pH 3.

Although TGE virus can replicate in the respiratory tract, spread of the virus by aerosols does not seem to occur (Pensaert and Callebaut 1994).

### **2.4.2.3 Susceptible animals**

#### ***Live domestic animals***

Outbreaks usually start following the introduction of infected pigs. Large amounts of TGE virus are present in the faeces of affected animals. Faecal shedding of TGE virus may persist for up to 2 weeks after recovery from infection (Pensaert et al 1970), although there is one report of excretion up to 10 weeks after infection (Taylor 1981). The virus has been detected in tonsil samples from slaughtered pigs, and in nasal swabs for up to 11 days after exposure. The virus has also been isolated from intestinal contents or homogenates and from lung homogenates for postexposure periods of up to 104 days (Underdahl et al 1975), and there have been a few reports of virus being present in faeces for periods of up to 18 months (Pensaert 1976, Woods and Wesley 1998). However, it is not known whether viable, infective virus is excreted from the respiratory and gastrointestinal tracts over these prolonged periods.

Although infection usually spreads very rapidly through a susceptible population, spread may be slower during the summer months.

Virus has been recovered from the nasal tract of infected pigs and from the milk of sows during the acute stage of the disease; piglets may become infected from milk in this way (Kemeny et al 1975).

The longer-term carrier status of recovered animals is difficult to assess (see Section 2.6.2).

#### ***Live wild (including feral) animals***

The virus may be transmitted passively in the gut of cats, dogs, foxes and starlings (Haelterman 1962, Pilchard 1965, Larson et al 1979, Reynolds and Garwes 1979). Following experimental oral infection, dogs, cats and foxes were found to shed virus in their faeces for up to 14, 22 and 15 days, respectively (Haelterman 1962), without showing clinical signs. The virus excreted by dogs has been shown to be capable of infecting a pig (Haelterman 1962). However, the role of species other than pigs as carriers or reservoirs of TGE virus has not been confirmed.

Starlings are considered to play a prominent role in transmission between pig herds in the United States during the winter months and could play a significant role in Australia. The virus has been detected in the faeces of starlings for up to 32 hours after ingestion (Pilchard 1965).

Feral pigs are capable of transmitting the virus over wide distances. Apart from the domestic pig, feral pigs are the only animals likely to amplify and maintain the virus.

#### **2.4.2.4 Animal products**

Carcass material from infected pigs can be a source of infection for susceptible pigs that come into contact with it (Cook et al 1991, Forman 1991). Freezing or post-slaughter acidification do not significantly affect the infectivity of TGE virus in pig products. Cooking will destroy the virus. The survival of TGE virus in salted and cured meats is unknown, but, even during acute infections, viraemia has been difficult to detect, and carcass muscle tissue is not considered a major reservoir of virus.

#### **2.4.2.5 Animal byproducts**

##### ***Meatmeal***

Forman (1991) and Cook et al (1991) have demonstrated that the disease may be transmitted to pigs via ingestion of carcass material (including uncooked muscle and lymph nodes) from slaughtered pigs from a population in which TGE is endemic.

#### **2.4.2.6 Semen and embryos from live susceptible animals**

There are no reports of naturally occurring transplacental infection, or of transmission by semen or embryos.

#### **2.4.2.7 Equipment, including personal items**

Mechanical spread of TGE virus on contaminated footwear, clothing and equipment may occur, but is unlikely, because of the fragility of the virus at room temperatures.

#### **2.4.2.8 Vectors**

The virus may survive in flies (Gough and Jorgenson 1983). Concentrations of starlings around pig farms in winter may provide a method for mechanical transmission between farms.

Flies are believed to play a role in the mechanical transmission of the virus within piggeries, but are not considered to represent a risk of infection between farms under Australian farming conditions. No other insects have been implicated in the transmission of TGE virus.

### 2.4.3 Factors influencing transmission

In North America and the United Kingdom, TGE outbreaks commonly occur in winter. Outbreaks become rare with the onset of summer. It is believed that the susceptibility of TGE virus to inactivation by heat and light is responsible for the seasonal incidence of outbreaks. Winter conditions in these countries are more conducive to mechanical spread via fomites. Although outbreaks are rare during summer, enzootic infections are able to persist over summer, by spreading slowly through grower herds. Persistence of infection is also likely in herds with a continuous farrowing schedule.

Although regarded as a winter disease in Europe and North America, TGE used to flourish in Singapore, where the mean daily maximum temperature hovers around 30 °C for most of the year (R Webster, Queensland Department of Primary Industries, pers comm).

## 2.5 Diagnostic criteria

The high level of morbidity and mortality, the age group most commonly affected, and the clinical signs will all assist the diagnosis of TGE. Although TGE can produce syndromes of variable severity, the condition is most spectacular in immunologically naive (susceptible) populations, as would be the case for the Australian pig herd.

### 2.5.1 Case definition

For the purposes of this manual, the case definition for TGE is clinical signs of TGE in pigs accompanied by a confirmed laboratory diagnosis (for the first case), or clinical signs in susceptible species after an outbreak has been confirmed.

### 2.5.2 Clinical signs

When introduced into a susceptible herd, the disease usually spreads rapidly, with some degree of appetite loss and diarrhoea in most animals, and occasionally vomiting. The occurrence of TGE in a herd where most of the animals are naive is referred to as epizootic TGE. In such a herd, most animals are affected within 2–3 days. Piglets under 1 week old are the worst affected. The severity of clinical signs, duration of the disease and mortality rates all decline with age.

#### 2.5.2.1 Animals

##### Piglets

- Piglets less than 3 weeks old become very sick; they may vomit, develop profuse watery-yellow diarrhoea, lose weight and become severely dehydrated.
- The morbidity rate is usually 100%. Most piglets less than 10 days old will die within 2–7 days of the appearance of clinical signs; piglets older than 3 weeks usually survive, but are likely to fail to thrive.
- In young piglets, the diarrhoea is usually profuse and foul smelling, and contains curds of undigested milk.

## Growing, finishing and adult pigs

- Clinical disease in older animals and adults is usually limited to a loss of appetite and diarrhoea, for one or a few days, and rarely involves vomiting.
- Lactating sows may become pyrexemic and agalactic, occasionally vomit, lose their appetite and have diarrhoea. Illness in these sows would further contribute to piglet mortality.
- Although the severity of clinical disease is usually mild in growing, finishing and adult pigs, the morbidity may approach 100%, and mortalities of 25–30% have been recorded in 2–6-month-old pigs (Bachmann et al 1972).

When TGE becomes endemic in a herd (enzootic TGE), the clinical disease is less severe, and mortality in piglets is usually less than 10–20%. The disease is most likely to persist in large units, with some herds experiencing clinical re-emergence of disease every 3–4 months. This situation is usually brought about by the continued frequent or infrequent addition of susceptible animals, usually through purchases of replacement breeding stock. In these situations, the clinical disease may be restricted to diarrhoea affecting suckling pigs aged about 6 days or older and postweaning diarrhoea seen during brief episodes of overt clinical re-emergence of disease (Pritchard 1987). Enzootic TGE in suckling or recently weaned pigs can be very difficult to diagnose clinically and must be differentiated from other types of endemic diarrhoea: colibacillosis, coccidiosis and rotaviral diarrhoea. The possibility of mixed infections should be considered, especially if treatment of an assumed endemic disease is ineffective.

It is not known whether the source of virus during a clinical reappearance of the disease is reactivation of virus shedding in carrier pigs or reintroduction of virus into the herd.

### 2.5.3 Pathology

The pathogenesis of TGE has been reviewed by Saif and Wesley (1992). Infection occurs via the oral or nasal route. Once the virus is swallowed, it passes undamaged through the stomach and attaches to the susceptible villous epithelial cells of the small intestine. Infection results in a rapid and extensive loss of functional epithelial cells and an acute malabsorption syndrome. The virus is also capable of multiplying in the respiratory tract and lactating mammary glands. During acute infections, virus may be shed through nasal secretions and milk (Kemeny et al 1975). Kemeny and Woods (1977) demonstrated that sows infected via intramammary inoculation subsequently shed virus in milk, faeces and nasal secretions. Natural infection of the pig fetus has not been recorded.

#### 2.5.3.1 Gross lesions

In natural infections, lesions are confined to the gastrointestinal tract. The stomach is often distended with curdled milk and may be congested. A small area of haemorrhage on the diaphragmatic surface of the stomach is found in about 50% of cases. The small intestine is distended with yellow foamy fluid and contains curdled milk. The wall of the intestine may be inflamed, but is generally thin and almost transparent as a result of severe atrophy of the intestinal villi.



### 2.5.3.2 Microscopic lesions (histopathology)

Histologically, the primary lesion is marked shortening of the intestinal villi in the jejunum and ileum. The villus–crypt ratio, which is normally about 7:1, is reduced to about 1:1 in affected piglets.

### 2.5.4 Differential diagnosis

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

- colibacillosis
- coccidiosis
- haemagglutinating encephalomyelitis
- porcine rotavirus infection
- *Clostridium perfringens* type C infection
- swine dysentery
- arsenic poisoning
- salmonellosis
- ileitis
- classical and African swine fever
- porcine circovirus-associated diarrhoea
- porcine epidemic diarrhoea.

### 2.5.5 Laboratory tests

#### 2.5.5.1 Samples required

Loops of affected ileum, preferably from acutely ill cases and preferably collected within 24 hours of the onset of clinical signs, should be tied off and stored in sterile containers on ice. Viral antigen is best detected in piglets sacrificed at a very early stage of disease. Additional sections of small intestine, both unpreserved and in neutral buffered formalin, should be collected from different parts of the small intestine. Blood samples for serology should be collected from acute and convalescent animals. Neutralising antibodies can be detected in serum as early as 7–8 days after infection.

#### 2.5.5.2 Transport of specimens

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

of the specimens to Geelong. Sample packaging and consignment for delivery to CSIRO-AAHL should be coordinated by the relevant state or territory laboratory.

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

For further information, see the **Laboratory Preparedness Manual**.

### ***Packing specimens for transport***

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.

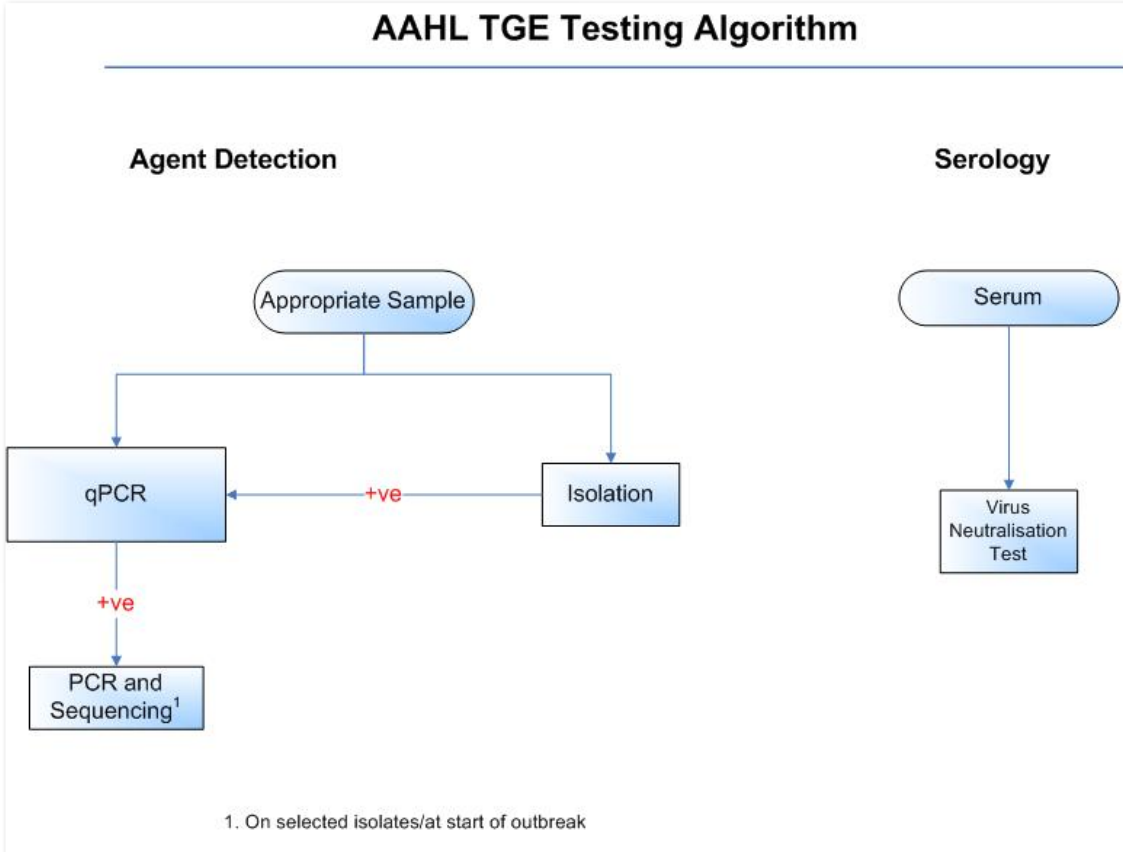
### **2.5.5.3 Laboratory diagnosis**

A rapid presumptive laboratory diagnosis can be made by electron microscope examination of intestinal contents for virus particles, provided that the samples were collected soon after the onset of clinical signs, or by the detection of viral antigens in intestinal epithelial cells by

immunofluorescence. Immunological or molecular methods may be required to distinguish TGE from related coronaviruses, as these may be indistinguishable by electron microscopy.

**CSIRO-AAHL tests**

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



**Figure 2.1** The current approach to diagnostic testing at CSIRO-AAHL

**Table 2.1a** Laboratory tests currently available at CSIRO-AAHL for the diagnosis of transmissible gastroenteritis

Test	Specimen required	Test detects	Time taken to obtain result
<b>Agent detection</b>			
qPCR	Intestinal contents	Viral RNA	4–6 hours

**Table 2.1b** Laboratory tests currently available at CSIRO-AAHL for the diagnosis of transmissible gastroenteritis

Test	Specimen required	Test detects	Time taken to obtain result
Electron microscopy and immuno-electron microscopy	Intestinal contents	Virus particles	12–24 hours
Immunofluorescence	Intestinal epithelial cells	Viral antigens	12–24 hours
<b>Agent characterisation</b>			
Virus isolation and identification	Intestinal contents	Virus	5–10 days
PCR and sequencing	Intestinal contents, virus isolate	Viral genome	2–3 days
<b>Serology</b>			
Virus neutralisation test	Serum	Antibody	3–5 days

PCR = polymerase chain reaction; qPCR = quantitative real-time polymerase chain reaction

Source: Information supplied by CSIRO-AAHL, 2011 (refer to CSIRO-AAHL for the most up-to-date information)

### **Other tests**

The polymerase chain reaction (PCR) test can be used to differentiate TGE virus from other porcine coronaviruses.

## **2.6 Resistance and immunity**

### **2.6.1 Innate immunity**

An age-dependent resistance to clinical disease is well demonstrated. Infective doses of TGE virus for a 6-month-old pig are around  $10^4$  times higher than those for a 2-day-old piglet. Slow cellular turnover rates, immature enterocyte cell types, absence of immunoglobulins at birth and depressed cell-mediated immunity in neonates are thought to facilitate infections.

Exposing sows in late pregnancy (but more than 3 weeks before farrowing) to virulent virus (via the gut and/or gut contents from infected piglets) will minimise losses from their litters. This protection is mediated through secretory immunoglobulin A (IgA) in the milk, not through colostral IgG. An uninterrupted supply of IgA in sows' milk over the lactation period is required for effective protection.

## 2.6.2 Adaptive immunity

Pigs that recover from enteric infections with TGE virus develop immunity, as shown by the appearance of antibodies of all isotypes in the circulation, as well as IgA antibodies in intestinal secretions. The IgA antibodies in intestinal secretions, rather than circulating antibodies, are responsible for providing protection, presumably due to local immunity within the intestinal mucosa. After primary infection, there is protection against enteric reinfection for at least 6 months. If reinfection occurs after this time, the effects are usually brief and subclinical (Pensaert and Callebaut 1994). Herds that have experienced an acute outbreak of TGE tend to remain free from the disease until the turnover of sows results in a large percentage of naive animals within the herd. Thus, outbreaks within a herd may occur every 2–3 years in countries where TGE is enzootic.

The role of cell-mediated immunity in either recovery or protection against reinfection is still not clear.

## 2.7 Vaccination and/or treatment of infected animals

In general, TGE vaccines produce only partial protection against infection.

Attenuation of oral vaccine strains reduces their ability to replicate in the sow's intestine, and to stimulate IgA production and secretion in milk. In seronegative sows, parenteral vaccines tend to produce a low level of IgG antibodies in the milk. Protective secretory IgA antibodies have been detected in intestinal fluids and serum after oral, but not after parenteral, inoculation of seronegative sows with TGE virus. In sows with previous exposure to infection, parenteral vaccines can significantly boost levels of antibody to TGE virus in milk.

There is some evidence that oral vaccination of neonates with attenuated TGE virus does not provide effective protection from infection (Furuuchi et al 1976). Protection due to active immunity generally takes at least 5 days to develop. Vaccination of the piglet shortly after birth cannot provide protection during the first critical few days of life.

Immunisation of suckling or weaned pigs may be useful in the control of enzootic infections, although there is evidence that the presence of maternal antibodies suppresses active antibody production (Furuuchi et al 1976).

There is no specific effective treatment for animals affected by TGE. Any treatment given would be limited to supportive care. Antibiotic treatment could prove useful in older piglets, since often secondary or concurrent infections with bacteria such as *Escherichia coli* can occur. In addition, fostering of infected litters onto TGE seropositive sows has been shown to be useful in the field.

## 3 Principles of control and eradication

### 3.1 Critical factors for formulating response policy

#### 3.1.1 Features of the disease

- Pigs of all ages are susceptible to infection with transmissible gastroenteritis (TGE); however, piglets under 1 week old are the worst affected, and most under 10 days of age will die.
- The severity of clinical signs, duration of the disease and mortality rates all decline with age, and endemic TGE in older pigs may be difficult to diagnose.
- There is rapid spread of disease within herds, with most animals infected within 2–3 days.
- When TGE becomes endemic in a herd, the clinical disease is less severe, and mortality in piglets is usually less than 10–20%.
- Pigs that recover from enteric infections develop immunity. Faecal shedding of virus may persist for up to 2 weeks after recovery from infection.
- The main sources of infection are the movement of pigs on and off infected premises (IPs), and the movement of livestock trucks that have carried pigs. Within piggeries, infection is likely to spread as a result of ingestion of infected faeces from in-contact pigs.
- Tests are available for rapid detection, but the initial diagnosis may be delayed as a result of variable clinical signs.
- TGE virus is susceptible to sunlight and high temperatures, and is unlikely to survive long on fomites. Decontaminants are available.
- A vaccine is available, and herd immunity can be induced by controlled rapid oral exposure to infection.
- There are no public health implications.

#### 3.1.2 Features of susceptible populations

- The first IP identified may not be the index case.
- Market fluctuations due to public health perceptions or product withdrawals would reduce the value of the industry.
- Intensive production systems are prone to rapid overcrowding if output is disrupted, with resultant animal welfare issues.
- The greatest threat of introduction of TGE virus to Australia is in imported fresh or frozen pigmeat being fed as swill.
- Feral pig populations are capable of transmitting the virus over long distances.
- Movement controls will prevent spread from herd to herd, especially if agreed industry biosecurity protocols are followed after the initial diagnosis.
- Feral pig and smallholder pig populations are not easily identified.
- Smallholders may have little knowledge of disease control issues such as the swill-feeding ban.
- Animals owned by such smallholders are more likely than those owned by commercial livestock producers to be exposed to emergency animal diseases, because of their locations, biosecurity practices, relative lack of quality assurance programs, and so on (Perkins et al 2010).

- Overall, most of the risk of emergency animal disease outbreaks is associated with commercial livestock producers, rather than smallholders, because of their far greater numbers of animals and animal movements (Perkins et al 2010).
- Fear of repercussions may deter smallholders from reporting disease.

### 3.2 Options for control and eradication based on the critical factors

Based on the assessed critical factors, managing an outbreak of TGE may require the use of some or all of the following options:

- registration of all commercial and small pig holdings (or another method of determining the location of domestic pigs, particularly those in smallholdings)
- application of mandatory biosecurity programs
- heightened prevention and assurance activities for swill feeding
- early determination of the extent of infection through rapid identification of infected and potentially infected premises (including piggeries, saleyards, meatworks and cold stores), using quickly instituted serosurveillance and animal tracing, based on an epidemiological assessment
- swift declaration and effective policing of control areas, and rapid imposition of quarantine and movement controls on infected and potentially infected premises, to prevent the movement of pigs, pig products and waste carrying virus or potentially carrying virus
- minimising the exposure of susceptible pigs by preventing direct and indirect contact of at-risk pigs with infected pigs, and potentially contaminated pig products and waste
- implementation of appropriate zones and compartments
- elimination of infection from IPs and/or infected pig populations by rapid destruction of pigs, sanitary disposal of carcasses and waste, and decontamination
- recall of pigmeat and offal originating from infected domestic pig premises, and game meat and offal sourced from possibly infected feral pig populations
- use of vaccination with movement controls — a DIVA (differentiating infected from vaccinated animals) strategy may need to be employed to distinguish infected from vaccinated pigs
- gaining of smallholder support
- management of feral pig populations.

The policy options for the control or eradication of TGE are:

- **stamping out** — the prompt destruction and sanitary disposal of pigs infected with, or exposed to, TGE virus when the IP is relatively small and the disease is not considered to be widespread
- **modified stamping out** — allowing slaughtering (for human consumption) of pigs not showing clinical signs
- **controlled rapid exposure** of herds to infection through the active dissemination of the virus throughout the infected herd, to ensure that all pigs develop an active immunity.

The policy to be implemented is described in Section 4.

## 4 Policy and rationale

### 4.1 Introduction

Transmissible gastroenteritis (TGE) is a World Organisation for Animal Health (OIE)-listed disease that would significantly increase the cost of production on infected piggeries if it were introduced into Australia.

#### 4.1.1 Summary of policy

The policy with regard to an outbreak of TGE is to eradicate the disease by the most cost-effective method, using one or more of three approaches in infected piggeries:

- *stamping out*, which involves quarantine, the destruction of all infected and exposed susceptible animals on infected premises, the sanitary disposal of destroyed animals and potentially contaminated animal products, and the decontamination of premises
- *modified stamping out*, which involves quarantine and the immediate slaughter of all saleable exposed pigs at approved abattoirs, if circumstances allow safe slaughter and processing capacity is available
- *controlled rapid exposure* of herds to infection, thus allowing immunity to develop and possibly for infection to be eliminated from individual herds.

These approaches will be 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
- *decontamination* of premises
- *treatment or destruction and disposal* of pig products likely to be contaminated, to reduce the source of infection
- *welfare management* to handle overcrowding of affected piggeries
- use of abattoirs for slaughter and disposal, where possible
- *zoning/compartimentalisation* to define infected and disease-free areas and premises
- *industry support* to increase understanding of the issues, facilitate cooperation, and address animal welfare issues and on-farm biosecurity
- *a public awareness campaign*.

Vaccination is unlikely to be used but may be approved in special circumstances.

In a situation in which TGE is considered not to be eradicable, 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 under an industry program.

#### **4.1.2 Case definition**

For the purposes of this manual, the case definition for TGE is clinical signs of TGE in pigs accompanied by a confirmed laboratory diagnosis (for the first case), or clinical signs in susceptible species after an outbreak has been confirmed.

#### **4.1.3 Cost-sharing arrangement**

In Australia, TGE 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 (EADRA)*.<sup>7</sup> 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**

Declaration of freedom may allow the resumption of trade in live breeding stock to countries that are TGE free.

After an outbreak of TGE, a statistically valid serological survey would have to be undertaken to demonstrate proof of freedom. Details are provided in Section 7.

#### **4.1.5 Governance**

##### **4.1.5.1 Chief veterinary officer**

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

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

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<sup>7</sup> Information about the EAD Response Agreement can be found at [www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement](http://www.animalhealthaustralia.com.au/programs/emergency-animal-disease-preparedness/ead-response-agreement)

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

#### **4.1.5.2 Consultative Committee on Emergency Animal Diseases**

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

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

The CCEAD reports to the NMG when appropriate.

#### **4.1.5.3 National Management Group**

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

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

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

## **4.2 Public health implications**

TGE has no public health implications.

## **4.3 Control and eradication policy**

The policy for the control and eradication of TGE is to use stamping out sparingly, and to attempt to slaughter through abattoirs as many animals as possible. Controlled exposure to infected material may be adopted to eradicate infection from large herds with a high prevalence of disease.

Quarantine of infected premises (IPs) and movement controls will be immediately introduced to prevent rapid spread of the disease between premises. Tracing and surveillance will be important to determine the distribution of the disease and the herd prevalence, so that the best approach may be selected. If animals are sent for slaughter, this will be carried out as quickly as possible, to reduce the spread of virus and contamination.

Any control measures will need to be thoroughly discussed with the industry and individual producers (including smallholdings) to arrive at strategies that will be complied with. An important factor in success of this policy is knowledge of the location of all commercial and small pig holdings (preferably through formal registration of premises). Any premises registration program would need to have been implemented before the outbreak.

### **4.3.1 Stamping out**

Stamping out has no great advantage over a slaughter policy. Stamping out will be considered in circumstances in which the disease is restricted to a few herds, the herds are relatively small and isolated, the disease is contained and unlikely to spread, and stamping out is highly likely to quickly eradicate the disease. The destroyed animals will be disposed of by the most appropriate means for the particular situation.

Quarantine of IPs and dangerous contact premises (DCPs), and destruction of all pigs on IPs (and possibly some on DCPs, according to circumstances) are the most reliable methods of eliminating TGE virus.

Under this approach, live pigs will not be permitted to move from IPs or DCPs. Only carcasses can be moved to another property for burial or to an approved place for rendering.

Personnel and fomites entering and leaving IPs will be restricted, to minimise the spread of infection, and appropriate decontamination procedures will be implemented.

All movements of pigs to saleyards or similar centres will be prohibited.

Release of premises from quarantine may occur 2 weeks after all pigs have been removed and the decontamination program has been completed. The premises may then be restocked.

### **4.3.2 Quarantine and movement controls**

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

#### **4.3.2.1 Quarantine**

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

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

#### **4.3.2.2 Movement controls**

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

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

### **4.3.3 Tracing and surveillance**

#### **4.3.3.1 Tracing**

Tracing from IPs will need to cover the movement of live pigs, products, people and fomites for at least 30 days before the first clinical signs and up to the time that quarantine is imposed. Tracing should concentrate on live pigs, which are the main source of infection.

#### **4.3.3.2 Surveillance**

Surveillance will be undertaken on premises that have received pigs from the IP and that have sent pigs to the IP, to help identify IPs, DCPs and suspect premises (SPs) not already identified by tracing. Special attention will be paid to breeder properties, piggeries with a history of recent introductions and piggeries selling breeding or grower stock. Serosurveillance would be of most value in herds in which the clinical syndrome is not classical — that is, herds in which infection is well established or has become endemic, and grower units where only mild signs may be seen because of the age of the susceptible animals.

Sentinel pigs will be used where the premises are not wholly depopulated (eg when approaches other than stamping out are used). Surveillance of sentinel pigs will be maintained for at least 60 days.

Surveillance will need to be maintained throughout the eradication period and after so that proof of freedom may be supported by reliable scientific information.

See Section 7 for further details on surveillance and proof of freedom.

## 4.3.4 Zoning and compartmentalisation for international trade

### 4.3.4.1 General considerations

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

According to the OIE *Terrestrial Animal Health Code*,<sup>8</sup> establishing and maintaining a disease-free status throughout the country should be the final goal for OIE Members. However, given the difficulty of establishing and maintaining a disease-free status for an entire territory, especially for diseases whose entry is difficult to control through measures at national boundaries, there may be benefits to a Member in establishing and maintaining a subpopulation with a distinct health status within its territory. Subpopulations may be separated by natural or artificial geographical barriers ('zoning') or, in certain situations, by the application of appropriate management practices ('compartmentalisation'). In practice, spatial considerations and good management, including biosecurity plans, play important roles in the application of both concepts.

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

The OIE guidelines for TGE are in Chapter 15.5 of the OIE Terrestrial Code.

If desired, a zoning application would need to be prepared by the Australian Government in conjunction with the relevant jurisdiction(s). The recognition of zones must be negotiated bilaterally with trading partners and is not an overarching international agreement. Zoning will also require considerable resources that could otherwise be used to control an outbreak, and careful consideration will need to be given to prioritising these activities.

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

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

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

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<sup>8</sup> [www.oie.int/index.php?id=169&L=0&htmfile=chapitre\\_1.4.3.htm](http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.4.3.htm)

#### **4.3.4.2 Specific considerations**

There are no specific standards in the OIE Terrestrial Code for TGE-free zones or compartments.

Because the OIE Terrestrial Code does not make recommendations on zoning for TGE, zoning and/or compartmentalisation are likely to be an advantage only for specific international markets, where individual countries may have certain requirements. The worth of these markets must be balanced against any cost to domestic trade of the zoning restrictions. The same may apply if individual states impose restrictions.

### **4.3.5 Vaccination**

#### **4.3.5.1 General considerations**

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

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

#### **4.3.5.2 Specific considerations**

The currently available vaccines are unlikely to be effective in protecting against infection, but may be used to boost immunity in previously infected animals as part of a specific eradication strategy.

Immunity may also be increased in a herd undergoing TGE eradication by the use of controlled rapid exposure to infective faecal contents (see Section 4.4 and Appendix 1 for further details).

### **4.3.6 Treatment of infected animals**

Treatment is limited to supportive care, which will tend to reduce mortality rates. Most animals, apart from piglets less than 3 weeks of age, are likely to recover within a few days.

### **4.3.7 Treatment of animal products and byproducts**

Under a slaughter policy (but not under stamping out), seropositive animals (but not those with clinical signs) may be sent to abattoirs for immediate slaughter. Such animals will need to be handled with care to prevent contamination of meat with intestinal contents, and the head and

neck meat (with lymph nodes) will need to be removed and disposed of by rendering. There is no need for other treatment.

Current techniques for processing (with the possible exception of curing, for which there is insufficient information) and rendering of pig products are sufficient to inactivate TGE virus. Therefore, such products present a minimal threat of spreading disease. The only risk for transmission of the virus is from feeding of carcass material to susceptible pigs (see Section 2.4.2). Hence, intensified publicity and policing of swill-feeding bans will need to occur during the outbreak.

See the **Destruction of Animals Manual** for appropriate methods for the destruction of pigs.

#### **4.3.8 Disposal of animals, and animal products and byproducts**

Carcasses will be disposed of in such a way as to prevent access to them by wild pigs and carnivores (eg by rendering; see the **Disposal Manual**).

#### **4.3.9 Decontamination**

Premises will be decontaminated following depopulation. Special decontamination measures will need to be implemented if eradication is being undertaken while animals are still on the premises.

Fomites and people will be decontaminated before leaving IPs or DCPs; vehicles will also be decontaminated after transporting pigs from an IP or DCP. Multiple consignments of pigs will be allowed only when the IP or DCP is the final pickup point.

The decontamination of vehicles used to transport infected pigs, loading ramps at abattoirs and other potentially infected fomites will minimise spread of infection. Decontamination is a major component of the 'eradication by controlled exposure' procedure (see Appendix 1).

#### **4.3.10 Wild animal control**

The entry of dogs, foxes, feral pigs and cats to affected premises will need to be prevented through effective perimeter fencing. Bird-proofing will also be needed.

#### **4.3.11 Vector control**

Numbers of insects, particularly flies, should be minimised to reduce the possibility of spread of virus.

#### **4.3.12 Public awareness and media**

The veterinary authorities will need to explain the control measures (eg closure of live pig sales) to the industry and to individuals who are directly affected (eg pigmeat processors and the owners

of smallholdings), to gain their confidence in the measures being imposed and to discourage illegal activities. The media and public will need to be kept informed about progress in eradication of the disease and reasons for the control arrangements, so that buyer confidence in the product is maintained and any effect on the market is minimised.

A special publicity campaign will be instituted about the swill-feeding regulations and the role that untreated swill may have in the spread of TGE.

Piggery owners will be advised to adopt appropriate biosecurity measures to prevent the entry of TGE virus, including:

- preventing pig introductions (unless from herds known to be free from TGE virus)
- minimising the number of visitors — those who do enter should wear boots and overalls held on the piggery
- using perimeter fences to exclude wild and domestic animals
- locating bulk feed bins on perimeter fences
- locating pig-loading facilities at perimeter fences
- cleaning and disinfecting pig-carrying trucks after unloading
- bird-proofing of sheds, feed areas and silos.

For further information on public awareness issues, see the **Biosecurity Incident Public Information Manual**.

## 4.4 Other strategies

The second approach (**modified stamping out** using immediate slaughter) requires quarantining of the IP and sending all saleable exposed pigs to an approved abattoir for immediate slaughter. Pigs that are not saleable will be destroyed on the IP. Pigs showing clinical signs will not be sent to an abattoir, but will be destroyed on the IP or held in quarantine until the clinical signs pass. If the pigs are held in quarantine, sentinel pigs will be used to monitor resolution of the infection.

Immediate slaughter will minimise the contamination of lairages by pigs shedding TGE virus. Killing all pigs from IPs within 4 hours of their arrival at the abattoir, and ensuring that all pigs received at that abattoir are killed within 18 hours, will minimise the number of viraemic carcasses entering the food chain.

Personnel and fomites entering and leaving IPs will be restricted to minimise the spread of infection, and appropriate decontamination procedures will be implemented.

All movements of pigs to saleyards or similar centres will be prohibited.

Release of premises from quarantine may occur 2 weeks after all pigs have been removed from the premises and the decontamination program has been completed. The premises may then be restocked.

The third approach (**controlled rapid exposure of herds to infection**) involves quarantine of the IP, followed by active dissemination of the virus throughout the infected herd, to ensure that all pigs are infected and develop an active immunity. This will reduce the susceptible population within the piggery. Because the virus is excreted from infected animals for only a short time after



infection, the process of active infection, followed by decontamination of the piggery, is designed to eliminate the virus from the piggery. Success depends on the absence of carrier pigs.

Sentinel pigs will be required because infective virus may remain in the piggery and in carrier pigs. Sentinel pigs will be monitored for clinical disease and absence of seroconversion over a 60-day period. The absence of seroconversion should be considered the more sensitive test.

Release of the premises from quarantine may occur following the satisfactory monitoring of sentinel animals. The entire controlled exposure program will require a minimum of 130 days.

For further information on the controlled exposure program, see Appendix 1.

The situation could arise, however, in which TGE was regarded as an endemic disease in certain areas or in feral pig populations for a period of time, pending the development and application of long-term eradication strategies. Under these circumstances, the policy for long-term control (and possible eradication) of the disease will be determined following consultation between governments and the pig industry. Zoning and/or compartmentalisation could be adopted in an attempt to contain the infection and to regain partial access to markets.

## **4.5 Funding and compensation**

### **4.5.1 General considerations**

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

## 5 Guidelines for classifying declared areas and premises

### 5.1 Declared areas

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

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

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

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

#### 5.1.1 Restricted area (RA)

An RA is a relatively small legally declared area around infected premises (IPs) and dangerous contact premises (DCPs) that is subject disease controls, including intense surveillance and movement controls.

An RA will be a relatively small declared area<sup>9</sup> (compared with a CA) drawn with at least 3-km radius around all IPs and DCPs, and including as many suspect premises (SPs), trace premises (TPs) and dangerous contact processing facilities (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 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.

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<sup>9</sup> As defined under relevant jurisdictional legislation

### **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 outside area (OA). Specific movement controls and surveillance strategies will be applied within the CA to maintain its disease-free status and prevent spread of the disease into the OA.

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

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

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

### **5.1.3 Outside area (OA)**

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

The OA is not a declared area but is used to describe the rest of Australia outside the declared areas. The OA will be subject to surveillance. Because it is highly desirable to maintain the OA as ‘disease free’, the movement of animals and commodities from the RA and CA into the OA will be restricted.

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

### **5.1.4 Other types of areas**

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

## **5.2 Declared premises**

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

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

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

### 5.2.1 Infected premises (IP)

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

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

For most diseases, the classification of a premises as an IP would be followed by the declaration of the areas around it as an RA and a CA.<sup>10</sup> In the case of vector-borne diseases, a transmission area (TA) may also be identified, if required.

Depending on the situation, control measures in accordance with the agreed Emergency Animal Disease Response Plan (EADRP)<sup>11</sup> or the relevant AUSVETPLAN disease strategy or response policy brief may be applied immediately, or may await the outcomes of further investigation of the IP.

When the required control measures for an IP have been completed, the premises would be classified as a resolved premises (RP). After further risk assessment, it may be reclassified as:

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

If a premises has been classified as an IP on the basis of clinical signs as per the case definition,<sup>12</sup> and subsequently both the EAD and the causative agent are confirmed as absent (ie a ‘false’ declaration), the premises would be reclassified as an RP. Thereafter, depending on the specific disease and its epidemiology, it would be reclassified as a ZP or an ARP (the qualifiers AN and/or VN may also be used, depending on the actions taken on the premises).

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<sup>10</sup> Less contagious diseases (eg Hendra virus, anthrax, Australian bat lyssavirus) do not use declared areas as part of their control measures. See the applicable AUSVETPLAN disease strategies or response policy briefs for details.

<sup>11</sup> An EADRP will usually be prepared for consideration at the first CCEAD meeting, at the start of a disease response.

<sup>12</sup> During the early phase of an EAD response, a comprehensive ‘initial case definition’ is used — eg individual and herd clinical signs, epidemiological investigation and risk assessment, and laboratory evaluation. Later in the response, the ‘response case definition’ may be used, which may be only clinical signs and on-site clinical assessment.

### 5.2.2 Suspect premises (SP)

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

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

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

### 5.2.3 Trace premises (TP)

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

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

- If the case definition is met, the premises would be classified as an IP.
- If it appears highly likely that the disease is present and that the TP is highly likely to contain an infected animal(s) or contaminated animal products, wastes or things, even though there are no visible clinical signs, the premises would be classified as a DCP or a DCPF.
- If the investigation shows no evidence of the EAD, the premises would be assessed as negative. If it is located in the RA and there are susceptible animals remaining, it would then be reclassified as an ARP with the qualifier AN (ARP-AN). If it is located in the CA, it would be classified as a POR with the qualifier AN (POR-AN).
- If the tracing investigation reveals no susceptible animals or risk products, wastes or things on the destination premises, a TP may be reclassified as a ZP.

### 5.2.4 Dangerous contact premises (DCP)

A DCP is a premises, apart from an abattoir, knackery or milk processing plant or other such facility, that, after investigation and based on a risk assessment, is considered to contain a susceptible animal(s) not showing clinical signs, but considered highly likely to contain an infected

animal(s) and/or contaminated animal products, wastes or things that present an unacceptable risk to the response if the risk is not addressed, and that therefore requires action to address the risk.

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

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

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

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

- If the presence of an infected animal or contaminated animal products, wastes or things is confirmed, the premises would be classified as an IP.
- If their presence is not confirmed but the likelihood is considered to remain high, the premises would continue to be classified as a DCP until completion of control measures enables it to be reclassified as an RP. A subsequent risk assessment would allow it to be reclassified as an ARP with an AN qualifier. If animals had been vaccinated as part of the control measures, the premises may also have the qualifier VN.
- If it is considered unlikely that an infected animal or contaminated animal products, wastes or things are present, the premises would be assessed as negative (DCP-AN). If it is located in the RA, it would then be reclassified as an ARP with the qualifier AN. If it is located in the CA, it would be classified as a POR with the qualifier AN.

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

## 5.2.5 Dangerous contact processing facility (DCPF)

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

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

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

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

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

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

## 5.2.6 Approved processing facility (APF)

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

Before being classified as an APF, the premises is assessed to confirm that it has not received infected animals, or contaminated animal products, wastes or things, and is operating according to agreed biosecurity standards.

If, during the course of a response, the premises is suspected to have received infected animals, or contaminated animal products, wastes or things, it will be reclassified as a DCPF pending further investigation.

### **5.2.7 At-risk premises (ARP)**

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

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

### **5.2.8 Premises of relevance (POR)**

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

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

### **5.2.9 Resolved premises (RP)**

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

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

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

### **5.2.10 Unknown status premises (UP)**

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

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

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



### **5.2.11 Zero susceptible species premises (ZP)**

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

### **5.2.12 Qualifiers**

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

#### **5.2.12.1 Assessed negative (AN)**

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

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

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

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

#### **5.2.12.2 Vaccinated (VN)**

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

Some of the issues that could be included for consideration are detailed below.

## **Definition and monitoring of vaccination**

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

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

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

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

## **Monitoring vaccination programs**

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

## **Incomplete vaccination programs**

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

## **Vaccination records and identification of vaccinated animals**

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

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

## **5.3 Guidelines for reclassifying previously declared areas**

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

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

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

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

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

- The area should be epidemiologically distinct from other declared areas.
- All TPs and SPs have been investigated and reclassified, and all IPs, DCPs and DCPFs in the area have been reclassified as RPs.
- All tracing and surveillance associated with EAD control has been completed satisfactorily, with no evidence or suspicion of infection in the area.
- A minimum period of [xxx] days<sup>13</sup> has elapsed since pre-determined disease control activities and risk assessment were completed on the last IP or DCP in the area.
- An approved surveillance program (including the use of sentinel animals, if appropriate) has confirmed no evidence of infection in the RA (see below).
- For vector-borne diseases, vector monitoring and absence of transmission studies indicate that vectors are not active.

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

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

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

After a further period of surveillance and monitoring, and provided that the additional surveillance and monitoring find no evidence of infection, a jurisdiction, in consultation with the CCEAD, could lift the CA. This would result in the lifting of all the remaining regulatory controls associated with the response, and a return to business as usual.

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<sup>13</sup> The minimum period uses, or is based on, the disease-specific incubation periods defined by the OIE — two incubation periods is a common guideline.

## 6 Quarantine and movement controls

### 6.1 General principles

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

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

### 6.2 Guidelines for issuing permits

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

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

- community and human behaviour
- risk of sabotage
- technology
- regulations and standards
- available resources for compliance and enforcement
- areas of impact
  - livestock health (health of affected species, including animal welfare)
  - human health (including work health and safety)
  - trade and economic impacts (including commercial and legal impacts)
  - environmental impacts
  - organisational capacity
  - political impacts
  - reputation and image
- proposed risk treatment measures
  - vaccination
  - processing of product
  - disinfection or other treatment of animals, vehicles and fomites
  - vector control, if relevant
  - security
  - communication.

## 6.3 Types of permits

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

### 6.3.1 General permit

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

### 6.3.2 Special permit

Special permits (SpPs) are issued by the relevant government veterinarian or gazetted inspector of stock. They are used for higher risk movements, and therefore require formal application and

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

#### **6.3.2.1 Emergency permit**

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

## **6.4 Recommended quarantine practices and movement controls**

### **6.4.1 Live susceptible animals**

#### **Pigs**

Because of the risk of transmitting TGE, movement of live pigs from high-risk premises (IPs, DCPs, SPs and TPs) is prohibited, except for pigs being moved for slaughter, under permit. Movement of live pigs into an RA is restricted, to minimise the number of susceptible animals within the RA.

Animals will not be permitted to enter any IP unless they are part of an official eradication program. If movement of pigs from a free herd is required for breeding, the animals will be subjected to test before a permit is issued for movement.

Restrictions on premises in the RA may be lifted once 14 days have passed following clearance of infection and appropriate decontamination.

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

To→ From ↓		RA		CA		OA
		IP/DCP/SP/TP	ARP/DCPF	SP/TP	POR	
RA	IP/DCP/SP/TP	Prohibited	Prohibited, except under SpP1	Prohibited		Prohibited
	ARP		Prohibited, except under SpP2			
CA	SP/TP	Prohibited	Prohibited, except under SpP3	Prohibited		Prohibited
	POR			Prohibited	Prohibited, except under GP1	
OA	OA	Prohibited	Prohibited, except under SpP3	Prohibited	Prohibited, except under GP1	Allowed

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

**Notes for Table 6.1**

The transit of live pigs through declared areas is allowed under a transit permit, provided that the origin and destination of the pigs are outside the declared area, the pigs are not unloaded and the vehicle does not stop en route.

**SpP1 conditions:**

- For slaughter only, in situations where a modified stamping-out policy has been adopted.
- Travel by approved route only, and no stopping en route.
- Appropriate biosecurity standard at receiving premises.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs before and on day of travel.
- Single consignment per load.
- Physical identification of individual animals (eg ear tag, brand), with accompanying movement documentation (eg National Vendor Declaration, waybill, PigPass).
- 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.
- Product derived from pigs on IPs, DCPs, TPs and SPs is rendered, processed or cooked to inactivate the virus.

**SpP2 conditions:**

- 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.
- Travel by approved route only, and no stopping en route.
- Appropriate biosecurity standard at receiving premises.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs before and on day of travel.
- Single consignment per load.
- Physical identification of individual animals (eg ear tag, brand), with accompanying movement documentation (eg National Vendor Declaration, waybill, PigPass).

**SpP3 conditions:**

- For slaughter only.
- Travel by approved route only, and no stopping en route.
- Appropriate biosecurity standard at receiving premises.
- Appropriate decontamination of equipment and vehicles.
- Absence of clinical signs before and on day of travel.
- Single consignment per load.
- Physical identification of individual animals (eg ear tag, brand), with accompanying movement documentation (eg National Vendor Declaration, waybill, PigPass).

**GP1 conditions:**

- For slaughter, movement within an approved compartment or movement to other PORs.
- Absence of clinical signs before and on day of travel.
- Appropriate decontamination of vehicles and equipment.
- Travel by approved route only, and no stopping en route.
- Physical identification of individual animals (eg ear tag, brand), with accompanying movement documentation (eg National Vendor Declaration, waybill, PigPass).

**6.4.2 Semen and embryos from live susceptible animals**

Although there are no confirmed reports of TGE being transmitted by semen or embryos, the movement of semen and embryos from higher risk premises and from the RA is prohibited. To allow business continuity, semen is allowed to be moved from the CA and OA under permit.

Tables 6.2 and 6.3 describe the recommended movement controls for pig semen and in vivo-derived pig embryos, respectively, within and between declared areas.



**Table 6.2** 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 SpP4		Prohibited, except under SpP4		
OA	OA	Prohibited, except under GP2		Prohibited, except under GP2		Allowed

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

**Notes for Table 6.2**

**SpP4 conditions:**

- 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.
- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures, accurate record keeping, and semen containers being adequately clean and biosecure.
- Absence of clinical signs before and on the day of collection, and since that time.

**GP2 conditions:**

- Owner declaration 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.
- Absence of clinical signs before and on the day of collection, and since that time.
- Accurate record keeping of all semen movements off the property.
- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures.

**Table 6.3** Recommended movement controls for in vivo-derived pig embryos

To→ From ↓	RA	CA	OA
RA	Prohibited, except under GP3	Prohibited, except under GP3	Prohibited, except under GP3
CA	Prohibited, except under GP3	Prohibited, except under GP3	Prohibited, except under GP3
OA	Prohibited, except under GP3	Prohibited, except under GP3	Allowed

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

**Notes for Table 6.3**

**GP3 conditions:**

- Embryos collected and handled in accordance with the procedures detailed in the International Embryo Transfer Society manual (4th edition, 2010).
- Absence of clinical signs before and on the day of collection, and since that time.
- Accurate record keeping of all embryo movements off the property.
- Evidence of an operational biosecurity manual, including maintenance of biosecurity procedures.

### 6.4.3 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 in all jurisdictions. Because TGE is not a zoonosis, disease concerns are limited to disease in pigs arising from the diversion of pigmeat or offal for pig feed.

Table 6.4 describes the recommended movement controls for fresh/frozen pigmeat and offal within and between declared areas.

**Table 6.4** Recommended movement controls for fresh/frozen pigmeat and offal

To→ From ↓	RA	CA	OA
RA	Prohibited, except under SpP5	Prohibited, except under SpP5	Prohibited, except under SpP5
CA	Prohibited, except under GP4	Prohibited, except under GP4	Prohibited, except under GP4
OA	Allowed	Allowed	Allowed

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

**Notes for Table 6.4**

**SpP5 conditions:**

- Pigmeat and offal derived from pigs from DCPFs are rendered/processed into meat meal, blood meals or other cooked products.
- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicle and containers are decontaminated under supervision between loads.

**GP4 conditions:**

- Pigmeat and offal derived from pigs from DCPs, SPs and TPs are rendered or processed into meat meal, blood meals or other products that require cooking.
- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicle and containers are decontaminated between loads.

**6.4.4 Waste products and effluent**

Pig effluent can transmit TGE 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 premises without susceptible livestock (ZP) and under permit. To allow business continuity, movement of piggery wastes into the RA from the OA is allowed only onto a premises without susceptible stock.

Table 6.5 shows the recommended movement controls for pig waste products and effluent within and between declared areas.

**Table 6.5** Recommended movement controls for waste products and effluent

To→ From ↓		RA		CA		OA
		IP/DCP/SP/ ZP/(ARP in RA)	TP/TP	POR		
RA	IP	Prohibited	Prohibited, except under SpP6	Prohibited		Prohibited
	DCP/SP/TP		Prohibited			
	ARP		Prohibited, except under SpP6	Prohibited	Prohibited, except under SpP6	
CA	SP/TP	Prohibited		Prohibited		Prohibited
	POR			Prohibited	Prohibited, except under GP5	
OA	OA	Prohibited	Allowed	Allowed		Allowed

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

**Notes for Table 6.5**

**SpP6 conditions:**

- After a minimum of 30 days following depopulation.
- Only to a ZP (such as a broadacre farm) for use as fertiliser, or to a composting facility.
- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicle and containers are decontaminated under supervision between loads.
- Use of an approved transport route.

**GP5 conditions:**

- Only to a ZP (such as a broadacre farm) for use as fertiliser, or to a composting facility.
- The material is not brought into direct or indirect contact with susceptible animals.
- Every precaution is taken to ensure that effluent, other fluids or aerosols do not leak out of the transport vehicle.
- Transport vehicle and containers are decontaminated between loads.

### 6.4.5 Empty livestock transport vehicles and associated equipment

TGE virus does not survive for long in the environment; however, vehicles that have transported pigs and equipment used with pigs must be thoroughly cleaned after use to prevent virus spread.

Table 6.6 shows the recommended movement controls for empty pig transport vehicles and associated equipment within and between declared areas.

**Table 6.6** Recommended movement controls for empty pig transport vehicles and equipment

To→ From ↓	RA	CA	OA
RA	Prohibited, except under SpP7	Prohibited, except under SpP7	Prohibited, except under SpP7
CA	Prohibited, except under GP6	Prohibited, except under GP6	Prohibited, except under GP6
OA	Allowed	Allowed	Allowed

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

#### Notes for Table 6.6

##### SpP7 conditions:

- Vehicles that have carried pigs and equipment that has been used with pigs are appropriately decontaminated as soon as possible after use, at an appropriate site (eg truck wash-down facility at an abattoir), and are dry before reuse.

##### GP6 conditions:

- Vehicles that have carried pigs and equipment that has been used with pigs are appropriately decontaminated as soon as possible after use, at an appropriate site (eg truck wash-down facility at an abattoir), and are dry before reuse.

### 6.4.6 People and nonsusceptible animals

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.

The movement of **other animals** is allowed unless they have had contact with a diseased pig.

Dogs and cats will need to be confined because they have been implicated in transmitting the disease, but destruction of animals other than pigs is unnecessary. Wild birds, including starlings,

have also been implicated as a possible means of transmission and need to be excluded from premises. Foxes may also be infected, so they should be prevented from having any contact with pigs.

#### **6.4.7 Crops, grains, hay, silage and mixed feeds**

The movement of **crops** and **grains** is allowed.

#### **6.4.8 Sales, shows and other events**

Events such as sales and shows are prohibited if pigs are involved. The hunting of feral pigs within the RA and CA should be actively discouraged during a response to TGE, and the risks of disease transmission should be publicised.

#### **6.4.9 Other movements**

**Risk enterprises** may continue to operate under a GP.

## **7 Procedures for surveillance and proof of freedom**

### **7.1 Proof of freedom**

After an outbreak of TGE, a statistically valid serological survey would have to be undertaken to demonstrate proof of freedom. The survey would concentrate on the restricted area(s) in which disease was present and the high-risk herds, based on the results of tracing and pig movements.

In a herd with no history of infection with TGE, serological evidence of freedom would be sufficient. Testing should be at a level to detect a 1% prevalence with 95% confidence.

In a previously infected herd containing seropositive animals, sentinel animals must be placed in the farrowing, weaner and grower accommodation, and monitored for seroconversion to TGE virus over 60 days. Sentinel animals (ideally 20–40 weaner pigs) must be seronegative.

On farrow-to-finish units in continual production, the presence or absence of clinical signs of the disease would need to be ascertained. As confirmation, the level of neonatal and preweaning mortalities from diarrhoea must be determined, and serum samples submitted for testing.

On units with fatteners only, the presence or absence of clinical signs must be determined. Serological testing would be the only way to confirm freedom.

# Appendix 1

## ERADICATION BY CONTROLLED EXPOSURE

This program was developed to eliminate TGE from breeder herds in the United States (Harris et al 1987, Wiseman et al 1988, Fitzgerald and Welter 1990). The exact protocol to be adopted would depend on the facilities and management level on the IP, but would include steps 1–7 as follows.

1. Day 1 — diagnosis of TGE; pig movements off the IP restricted to direct slaughter only.
2. Days 1–21 (until the cessation of clinical signs):
  - a. Introduction of all breeding stock replacements necessary for a 4–6-month period. This should include animals of differing weight ranges. No further additions to the herd allowed until sentinel pigs are brought in (step 4).
  - b. Exposure of entire herd (including replacements) to intestines and intestinal contents from dead or moribund pigs affected with TGE. Feedback could include an attenuated oral vaccine. Feedback should begin with sows in late gestation, and continue backwards to the sows and boars in the breeding area. Continue feedback until clinical signs are observed in all pigs. See below for further information on the source of the virus and manner of collection and administration.
3. After clinical signs have subsided, begin strict all-in-all-out movement of stock for farrowing and weaner rooms; clean, disinfect (and, if possible, fumigate) rooms between groups. Continue to monitor for clinical signs of diarrhoea; use laboratory facilities to differentiate aetiology.
4. Thirty days after cessation of clinical signs of TGE, place approximately 20–40 sentinel pigs from a herd known to be free from TGE in weaner, grower, breeding and gestation buildings.
5. Observe the sentinel pigs for clinical signs of TGE daily over the 60-day sentinel period. If diarrhoea occurs, kill and necropsy acutely affected pigs and submit tissues to a diagnostic laboratory.
6. Collect blood from sentinel pigs on three occasions: immediately before or upon entry into the herd, 30 days after entry to the herd, and 60 days after entry to the herd. Assay sera for antibodies to TGE; negative serum neutralisation test results (titre of 1:2 or less) indicate that TGE virus has been eliminated.
7. If step 6 shows that sentinel pigs are unaffected, quarantine may be removed.

It should be recognised this technique has been successfully implemented in herds in the United States with highly competent management. The technique must be critically evaluated for its applicability to a herd in Australia with less competent management and without all-in-all-out facilities.

Specific issues to be addressed before this technique is adopted are:

- responsibility for day-to-day management during the program — may involve input from a skilled manager (possibly a pig industry livestock officer)
- compensation arrangements
- availability of infective material — delay in diagnosis may mean a lack of infective material.



### Source of virus for feedback

Virus held in laboratories in cell culture attenuates rapidly, with loss of virulence, and is unsuitable as a source in a feedback program.

Wiseman et al (1988) described a technique to ensure that sufficient infective material is harvested to allow infection of the entire herd. These techniques were developed for an eradication program in a 330-sow herd with endemic infection, where clinical disease was not dramatic and only small amounts of infective material were available at any one time.

1. Infective samples of intestines/intestinal contents were collected from within the herd and frozen.
2. Ten sows at 110 days gestation were introduced from a seronegative herd.
3. When the first of these farrowed, the frozen material saved from the previous clinical episode was used to infect three baby pigs at 12–24 hours of age.
4. As these pigs became clinically ill, they were sacrificed. Intestinal tracts and lungs were collected and homogenised in cold saline. This homogenate was used to infect all pigs born to the 10 TGE-seronegative sows by 72 hours of age.
5. Ill infected pigs were sacrificed when clinical signs appeared. Lungs and intestinal tracts were collected again and homogenised with cold saline at a ratio of 1:1.
6. This cocktail was administered orally as a 5–10-mL dose to the entire breeding herd, all replacement stock and all pigs from the farrowing house through to the weaner room. Sows and boars were restrained by snaring.
7. As any of the animals in the herd broke with scours, the scour material was fed back to the rest of the herd. Lungs and intestines were also fed back from any additional suckling pigs dying with clinical signs.

## 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.
Enterocytes	Cells lining the small intestine that are responsible for the final digestion and absorption of nutrients and water.
Feedback	The deliberate feeding of infective material (usually sourced from within the same farm) to susceptible animals.
Immunofluorescence	Technique for the location of antibodies or antigens on cells by binding of a fluorescently tagged antibody or antigen and examination by fluorescence microscopy.
Immunoglobulin – IgA – IgG	Antibody proteins. Humoral antibody mainly secreted from mucosal surfaces. The main form of immunoglobulin produced in response to an antigen. It is mainly found in body fluids.
Parenteral	Administration of a drug/vaccine by a route other than the digestive tract (eg by injection).
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.
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.

### Standard AUSVETPLAN terms

Term	Definition
Animal byproducts	Products of animal origin that are not for consumption but are destined for industrial use (eg hides and skins, fur, wool, hair, feathers, hooves, bones, fertiliser).

Term	Definition
Animal Health Committee	A committee whose members are the Australian and state and territory CVOs, the Director of the CSIRO Australian Animal Health Laboratory, and the Director of Environmental Biosecurity in the Australian Government Department of the Environment. The committee provides advice to the National Biosecurity Committee on animal health matters, focusing on technical issues and regulatory policy (formerly called the Veterinary Committee). <i>See also</i> 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 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 (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.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. <i>See also</i> Chief veterinary officer

Term	Definition
AUSVETPLAN	<i>Australian Veterinary Emergency Plan.</i> A series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.
Chief veterinary officer (CVO)	The senior veterinarian of the animal health authority in each jurisdiction (national, state or territory) who has responsibility for animal disease control in that jurisdiction. <i>See also</i> Australian Chief Veterinary Officer
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, in order 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. <i>See also</i> 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 CVOs, representatives of CSIRO-AAHL and the relevant industries, and the Australian CVO 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).

<b>Term</b>	<b>Definition</b>
Cost-sharing arrangements	Arrangements agreed between governments (national and states/territories) and livestock industries for sharing the costs of emergency animal disease responses. <i>See also</i> Compensation, Emergency Animal Disease Response Agreement
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.

<b>Term</b>	<b>Definition</b>
Disease Watch Hotline	24-hour freecall service for reporting suspected incidences of exotic diseases — <b>1800 675 888</b> .
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.
Disinsectation	The destruction of insect pests, usually with a chemical agent.
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. <i>See also</i> 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. <i>See also</i> Compensation, Cost-sharing arrangements
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. <i>See also</i> Emergency animal disease, Exotic animal disease
Enterprise	<i>See</i> Risk enterprise

<b>Term</b>	<b>Definition</b>
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. <i>See also</i> 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. <i>See also</i> Emergency animal disease, Endemic animal disease
Exotic fauna/feral animals	<i>See</i> Wild animals
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. <i>See also</i> 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.

<b>Term</b>	<b>Definition</b>
Incubation period	The period that elapses between the introduction of the pathogen into the animal and the first clinical signs of the disease.
Index case	The first case of the disease to be diagnosed in a disease outbreak. <i>See also</i> Index property
Index property	The property on which the index case is found. <i>See also</i> 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 (LCC)	An emergency operations centre responsible for the command and control of field operations in a defined area.
Monitoring	Routine collection of data for assessing the health status of a population or the level of contamination of a site for remediation purposes. <i>See also</i> Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National Biosecurity Committee (NBC)	The NBC was formally established under the Intergovernmental Agreement on Biosecurity (IGAB). The IGAB was signed on 13 January 2012, and signatories include all states and territories except Tasmania. The NBC provides advice to the Agriculture Senior Officials Committee and the Agriculture Ministers' Forum on national biosecurity issues, and on the IGAB.



<b>Term</b>	<b>Definition</b>
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 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 <i>Terrestrial Animal Health Code</i> . Describes standards for safe international trade in animals and animal products. Revised annually and published on the internet at: <a href="http://www.oie.int/international-standard-setting/terrestrial-code/access-online">www.oie.int/international-standard-setting/terrestrial-code/access-online</a>
OIE Terrestrial Manual	OIE <i>Manual of Diagnostic Tests and Vaccines for Terrestrial Animals</i> . Describes standards for laboratory diagnostic tests and the production and control of biological products (principally vaccines). The current edition is published on the internet at: <a href="http://www.oie.int/international-standard-setting/terrestrial-manual/access-online">www.oie.int/international-standard-setting/terrestrial-manual/access-online</a>
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).
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.

<b>Term</b>	<b>Definition</b>
Premises of relevance (POR)	A premises in a control area that contains a live susceptible animal(s) but is considered at the time of classification not to be an infected premises, suspect premises, trace premises, dangerous contact premises or dangerous contact processing facility.
Prevalence	The proportion (or percentage) of animals in a particular population affected by a particular disease (or infection or positive antibody titre) at a given point in time.
Primary case	The first actual case of the disease.
Quarantine	Legal restrictions imposed on a place or a tract of land by the serving of a notice limiting access or egress of specified animals, persons or things.
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, garbage depots.
Sensitivity	The proportion of truly positive units that are correctly identified as positive by a test. <i>See also</i> Specificity

<b>Term</b>	<b>Definition</b>
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. <i>See also</i> General permit
Specificity	The proportion of truly negative units that are correctly identified as negative by a test. <i>See also</i> Sensitivity

<b>Term</b>	<b>Definition</b>
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 (SCC)	The emergency operations centre that directs the disease control operations to be undertaken in that state or territory.
Surveillance	A systematic program of investigation designed to establish the presence, extent or absence of a disease, or of infection or contamination with the causative organism. It includes the examination of animals for clinical signs, antibodies or the causative organism.
Susceptible animals	Animals that can be infected with a particular disease.
Suspect animal	An animal that may have been exposed to an emergency disease such that its quarantine and intensive surveillance, but not pre-emptive slaughter, is warranted. <i>or</i> An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises (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).

Term	Definition
Swill	<p>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:</p> <ul style="list-style-type: none"> <li>• milk, milk products or milk byproducts, either of Australian provenance or legally imported for stockfeed use into Australia</li> <li>• material containing flesh, bones, blood, offal or mammal carcasses that is treated by an approved process</li> <li>• 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</li> <li>• material used under an individual and defined-period permit issued by a jurisdiction for the purposes of research or baiting.</li> </ul>
Swill feeding	<p>Also known as 'feeding prohibited pig feed', includes:</p> <ul style="list-style-type: none"> <li>• feeding, or allowing or directing another person to feed, prohibited pig feed to a pig</li> <li>• allowing a pig to have access to prohibited pig feed</li> <li>• the collection and storage or possession of prohibited pig feed on a premises where one or more pigs are kept</li> <li>• supplying to another person prohibited pig feed that the supplier knows is for feeding to any pig.</li> </ul>
Trace premises (TP)	<p>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).</p>

<b>Term</b>	<b>Definition</b>
Tracing	The process of locating animals, persons or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
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.
– 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.

<b>Term</b>	<b>Definition</b>
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A <i>biological</i> vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A <i>mechanical</i> vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.
Veterinary investigation	An investigation of the diagnosis, pathology and epidemiology of the disease. <i>See also</i> Epidemiological investigation
Viraemia	The presence of viruses in the blood.
Wild animals	
– native wildlife	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).
– feral animals	Animals of domestic species that are not confined or under control (eg cats, horses, pigs).
– exotic fauna	Nondomestic animal species that are not indigenous to Australia (eg foxes).
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, in order to facilitate disease control and/or trade.
Zoonosis	A disease of animals that can be transmitted to humans.

## Abbreviations

### Disease-specific abbreviations

TGE	transmissible gastroenteritis
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### Standard AUSVETPLAN abbreviations

Abbreviation	Full title
AAHL	Australian Animal Health Laboratory
AN	assessed negative
APF	approved processing facility
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
EDTA	ethylenediaminetetraacetic acid (anticoagulant for whole blood)
ELISA	enzyme-linked immunosorbent assay
GP	general permit
IETS	International Embryo Transfer Society
IP	infected premises



<b>Abbreviation</b>	<b>Full title</b>
LCC	local control centre
NASOP	nationally agreed standard operating procedure
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 species premises

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## Further reading

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## **Training resources**

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