AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

Disease Strategy

Lumpy skin disease

Version 3.0, 2009

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

Primary Industries Ministerial Council

This disease strategy forms part of:

AUSVETPLAN Edition 3

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

AUSVETPLAN — Animal Health Australia
Manager, Veterinary Services
Suite 15, 26–28 Napier Close
Deakin ACT 2600
Tel: 02 6232 5522; Fax: 02 6232 5511
email: admin@animalhealthaustralia.com.au

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DISEASE WATCH HOTLINE

1800 675 888

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

Preface

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

This manual has been produced in accordance with the procedures described in the AUSVETPLAN Summary Document and in consultation with Australian national, state and territory governments and the cattle industry.

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

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

In Australia, LSD is included as a Category 3 emergency animal disease in the *Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses* (EAD Response Agreement).[4]

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.

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

Detailed instructions for the field implementation of AUSVETPLAN are contained in the disease strategies, operational procedures manuals, management manuals and wild animal manual. Industry-specific information is given in the relevant enterprise

[1] These criteria are described in more detail in Chapter 1.2 of the *OIE Terrestrial Animal Health Code* (http://www.oie.int/eng/normes/mcode/en_chapitre_1.1.2.htm)
[2] http://www.oie.int/eng/normes/mcode/en_chapitre_1.11.13.htm
[3] http://www.oie.int/eng/normes/mmanual/2008/pdf/2.04.14_LSD.pdf
[4] Information about the EAD Response Agreement can be found at https://www.animalhealthaustralia.com.au/programs/eadp/eadra.cfm

manuals. The full list of AUSVETPLAN manuals that may need to be accessed in an emergency is shown below:

AUSVETPLAN manuals[5]

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

Operational procedures manuals
- Decontamination
- Destruction of animals
- Disposal
- Public relations
- Valuation and compensation
- Livestock management and welfare

Wild animal manual
- Wild animal response strategy

Summary document

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

Management manuals
- Control centres management (Parts 1 and 2)
- Animal Emergency Management Information System
- Laboratory preparedness

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

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1 Nature of the disease

Lumpy skin disease (LSD) is an acute to chronic, highly infectious, generalised skin disease of cattle. The disease is caused by a poxvirus similar to that causing sheep pox and goat pox, and is transmitted mostly by biting insects.

1.1 Aetiology and pathogenicity

The sheep pox, goat pox and lumpy skin disease (LSD) viruses belong to the genus *Capripoxvirus* of the family Poxviridae. These viruses are morphologically indistinguishable from each other, but are adapted to different host species. The viruses are difficult to distinguish serologically, and cross protection does occur.

The prototype strain of LSD is the Neethling virus.

1.2 Susceptible species

LSD mainly affects cattle, although five cases have been seen in Asian water buffalo (*Bubalis bubalis*). *Bos taurus* cattle are generally more susceptible than *Bos indicus* (zebu) cattle; jersey, guernsey, friesian and ayrshire breeds are particularly susceptible. Cape buffalo (*Synercus caffer*) that do not show LSD lesions in the field have been found with antibodies against LSD in an area of Kenya where LSD is considered endemic (Davies 1991a).

1.3 World distribution and occurrence in Australia

LSD was first seen in Zambia in 1929 and since then has extended its range to include all countries in sub-Saharan Africa, as well as Madagascar. It became established in Egypt in 1988, and a single outbreak was reported in Israel in 1989. The Israel outbreak was eradicated by slaughter and vaccination. However, both Egypt and Israel reported outbreaks of LSD in 2006, after more than 15 years of freedom from the disease. New outbreaks in Israel appear to have been resolved in November 2007. LSD must be considered to have the potential to become established outside Africa.

For the latest information on the distribution of LSD, refer to the website of the OIE World Animal Health Information Database.[6]

LSD has never been recorded in Australia.

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

1.4 Diagnostic criteria

A presumptive diagnosis of LSD may be made on recognition of an epizootic disease of cattle, producing the characteristic skin nodules and systemic disease.

1.4.1 Clinical signs

A fever of 40–41.5°C may last 6–72 hours, and occasionally up to 10 days, and is accompanied by watering eyes, increased nasal and pharyngeal secretions, loss of appetite, reduction in milk production, some depression and reluctance to move.

Within 1–2 days, a cutaneous eruption of nodules occurs which may cover the whole body. The most common sites are the head and neck, perineum, genitalia and udder, and limbs. The nodules are 5–50 mm or more in diameter, appearing as round, circumscribed areas of erect hair, firm and slightly raised from the surrounding skin. There is hyperaemia, and drops of serum appear on the surface. The lesions are full-skin thickness, involving the epidermis, dermis and subcutis, which may be oedematous. Regional lymph nodes are enlarged and oedematous.

Lesions develop on the muzzle, in the nostrils, and in the mouth and pharynx. They show a ring-like margin where there has been separation from the surrounding healthy epithelium. Lesions in the larynx and trachea, and throughout the alimentary tract, especially the abomasum, become ulcerated and necrotic. Mucopurulent (containing mucus and pus) nasal discharges, persistent dribbling of saliva, coughing, and stertorous (snoring) and often distressed respiration result. Inflammation of the conjunctiva and cornea of the eyes is common.

Inflammatory and oedematous swellings of the limbs, brisket and genitalia may develop. Skin lesions become necrotic. Some remain in situ and others slough, leaving a hole of full-skin thickness, known as a 'sitfast', which becomes infected by pus-forming bacteria. Large areas of skin may slough. Lesions in the skin, subcutaneous tissue, and muscles of the limbs, together with the severe skin inflammation caused by secondary infection of lesions, greatly reduce mobility. Rapid deterioration in body condition results, and animals that recover may remain in extremely poor condition for up to 6 months.

Pneumonia is a common and often fatal complication. Absence of oestrus cycles or abortion is frequent in females, and painful genitalia in bulls can prevent them from serving. Foetuses born to infected cows may show skin lesions at birth.

The lesions may persist for 4 to 6 weeks with final resolution taking 2 to 6 months.

Morbidity rates vary greatly and range between 1% and 90%. Mortality has been reported between 10% and 40%, but 1–5% is more usual (Davies 1991a).

1.4.2 Pathology

Gross lesions

On autopsy, nodules may be found in the subcutaneous tissue, muscle fascia and in muscles, which are grey-pink with caseous necrotic cores. The subcutis is infiltrated by red, watery fluid. Similar nodules may be scattered through the

nasopharynx, trachea, bronchi, lungs, rumen, abomasum, renal cortex, testicles and uterus (Geering et al 1995).

Microscopic lesions (histopathology)

Electron microscopy reveals virus particles indistinguishable from the orthopoxviruses, and these can be readily differentiated from the virus particles of contagious pustular dermatitis. Borrel cells or 'cellules claveleuses' (epithelioid cells that infiltrate the lesions), and intracytoplasmic inclusion bodies similar to the inclusions found with all pox viruses, can be demonstrated on histology.

1.4.3 Laboratory tests

Specimens required

Specimens that should be collected from live animals include blood (from animals with fever), serum, nodular fluid, scabs, and skin scrapings from lesions or skin biopsies. At postmortem, a range of samples, both fresh and fixed, should be taken from skin lesions and lesions in the respiratory and gastrointestinal tracts.

Transport of specimens

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

Unpreserved tissue specimens should be chilled and forwarded with water ice or frozen gel packs. If delays of more than 48 hours are anticipated in transit, these specimens should be frozen and forwarded packed in dry ice. For further information, see the **Laboratory Preparedness Manual**.

Laboratory diagnosis [to be updated]

AAHL tests

A rapid, tentative diagnosis of LSD can be made by electron microscopy and histopathology of tissue samples. Confirmation of the diagnosis is obtained by specifically identifying the virus in tissues from early lesions or in tissue culture using virus-specific tests. The tests that are currently available at AAHL are listed in Table 1. A polymerase chain reaction (PCR) test is also available, but it has not been validated in Australian laboratories.

Table 1 Laboratory tests currently available at CSIRO–AAHL for the diagnosis of LSD

Test	Specimen required	Test detects	Time taken to obtain result
Electron microscopy	tissue samples	virus particles	1 day
Histopathology	formalin-fixed tissues	characteristic pox lesions	2 days
Virus isolation in various cell cultures	nodular fluid or tissue samples	virus/viral antigen	2–10 days

Source: Information provided by CSIRO-AAHL, July 2006 (refer to CSIRO-AAHL for most up-to-date information)

Other tests

Serological tests for LSD are under development, but none is currently available in Australia. Indirect immunofluorescence, serum neutralisation and immunodiffusion tests have been used for detecting antibody in sera. Indirect immunofluorescence is not an easy test and is difficult to interpret. It may be replaced by the immunoperoxidase test. Serum neutralisation is the test of choice for serosurveillance, but it has low sensitivity. There may be problems detecting low titres in individual animals, but it is a reasonable herd test. An enzyme-linked immunosorbent assay (ELISA) is under development overseas.

1.4.4 Differential diagnosis

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

- allergies to insect bites;
- pseudo-lumpy skin disease (bovine herpes mammilitis; herpesvirus 2) — lesions involve only the epidermis and leave a scab after sloughing, and systemic signs do not develop (see Geering et al 1995);
- pseudocowpox — teat and udder lesions caused by LSD could be confused with pseudocowpox;
- streptothricosis (*Dermatophilus congolensis*) — infection is superficial, and lesions may coalesce and can be readily peeled away, leaving a raw, granular surface;
- orphan herpes virus — a common contaminant, but does not produce clinical disease;
- photosensitisation — lesions are confined to unpigmented and exposed areas; and
- skin tuberculosis — lesions are subdermal but may rupture and discharge thick, yellow pus; they are confined to the lower limbs.

1.4.5 Treatment of infected animals

There is no effective treatment for LSD.

1.5 Resistance and immunity

Susceptible cattle of all ages develop serious clinical disease if infected with LSD. The introduction of LSD into countries previously free from the disease could result in high mortalities and rapid spread of the disease.

1.5.1 Innate and passive immunity

Different cattle breeds show different susceptibilities to LSD (see Section 1.2). Maternal immunity provides protection from LSD in cattle for at least 6 months (Davies 1991c).

1.5.2 Active immunity

Animals that have recovered from infection with capripoxviruses have lifelong immunity and do not become carriers .

1.5.3 Vaccination

All strains of capripoxvirus examined so far, whether of bovine, ovine or caprine origin, share a major neutralising site, so that animals that have recovered from infection with one strain are resistant to infection with any other strain. Consequently, it is possible to protect cattle against LSD using strains of capripoxvirus derived from sheep or goats (Coakley and Capstick 1961).

Live, attentuated vaccines are available. One is derived from a strain of Kenyan sheep and goat pox virus and has been shown to effectively immunise sheep, goats and cattle against infection with capripoxvirus (Kitching et al 1986, Davies 1991b). An attenuated South African LSD virus (Neethling strain) vaccine derived from cattle is also available (Capstick and Coakley 1961). Immunity to vaccination lasts at least 2–3 years and probably for life.

In the recent outbreak in Israel, ring vaccination was employed in a 3-kilometre radius zone around the outbreak.

As a result of inoculation site reactions to live vaccines in *Bos taurus* breeds, there is some resistance to using vaccine in countries where LSD is endemic. Generalised disease associated with vaccination has not been observed under controlled conditions (Davies 1991ac).

1.6 Epidemiology

1.6.1 Incubation period

The incubation period for LSD is 5 days in experimental animals (Wood 1990) but is thought to be 2–4 weeks in naturally infected animals (Barnard et al 1994).

The OIE *Terrestrial Animal Health Code* gives a maximum incubation period, for regulatory purposes, of 28 days.

1.6.2 Persistence of agent

General properties

Capripoxviruses have lipid-containing envelopes and are susceptible to a range of disinfectants containing detergents (see Section 2.2.8).

Environment

Capripoxviruses are very resistant in the environment and can remain viable for long periods on or off the animal host. They are susceptible to sunlight, but survive well at cold temperatures (Davies 1981). They may persist for up to 6 months in a suitable environment, such as shaded animal pens.

The viruses are inactivated by heating for 1 hour at 55°C.

Live animals

LSD virus is present in nasal, lachrymal and pharyngeal secretions, semen, milk and blood. Viraemia lasts for 4–5 days; however, the virus may be in saliva for up to 11 days and in semen for 22 days (Barnard et al 1994).

LSD virus can persist for up to 33 days in necrotic tissue remaining at the site of a skin lesion. Material from skin lesions also contains infective virus when shed (Barnard et al 1994).

Animal products

There is no evidence of the virus persisting in the meat of infected animals, but it may be isolated from the milk in the early stages of the fever (Davies 1991a). The virus may persist for months in lesions in cattle hides. Virus has been detected in semen up to 22 days after infection (Barnard et al 1994).

Equipment and personnel

LSD virus may persist for 6 months on fomites, including clothing and equipment.

Vectors

There is no evidence of LSD virus surviving more than 4 days in insect vectors.

1.6.3 Modes of transmission

Live animals

While transmission by contact can occur, this is thought to be at only a low rate and is not considered a major mechanism of transmission during epizootics. Experimentally, transmission has occurred between cattle in adjacent insect-proof enclosures only if they shared a water trough.

Nasal and laryngeal secretions, semen and blood could potentially play some part in the transmission of LSD, but in virtually all outbreaks the virus appears to be propagated by a continuous cattle–arthropod–cattle cycle.

Animal products

The virus may be transmitted in milk.

Equipment and personnel

LSD virus may be easily transmitted from fomites, such as clothing and equipment.

Vectors

Most infection is thought to be the result of insect transmission. Field observations have demonstrated spread from farm to farm and district to district regardless of the complete restriction of all animal movements. The 1989 outbreak in Israel is thought to have followed the aerial movement of infected insect vectors from Egypt, 70–300 km away.

The method of vector-related transmission is apparently mechanical, rather than biological. This distinction is important because infectious organisms do not generally survive in vectors that merely carry them (mechanical vectors) for as long as those that multiply or over-winter in insects (biological vectors); the latter can permit a recurrence in the following season.

Many different types of biting insects (mosquitoes, tabanids, *Culicoides* species [biting midges] and *Glossina* species [tse-tse fly]) may play some role in the spread of LSD virus (Kitching and Mellor 1986). Flies, including the housefly and bushfly, are very commonly associated with infected cattle, and it is possible that they, and other flies such as blowflies, could siphon off infected lachrymal, nasal or other secretions and transfer the virus to another susceptible animal.

Vermin, predators and wild birds might also act as mechanical carriers of the virus.

Semen and embryos

No information is available on transmission of LSD virus via semen or embryos. Excretion occurs in semen for up to 22 days in clinically affected bulls and for at least 12 days in subclinically affected bulls (Weiss 1968). A prudent assumption is that the virus is also secreted in vaginal secretions. The extremely resistant nature of the virus to the environment would therefore make venereal transmission very likely (Committee on Managing Global Genetic Resources 1993). Due to insufficient information, the International Embryo Transfer Society has not classified LSD virus regarding the likelihood of its transmission via embryos.

1.6.4 Factors influencing transmission

The prevalence of insect vectors may affect the rate of transmission of the virus. This could account for the wide variation in morbidity, which may range from 1% to 90%, in different situations. The sharp reduction in the transmission of LSD after cold weather and frosts, which are associated with reduced insect vector populations, supports this hypothesis.

The movement of infected stock has been the cause of much of the spread of LSD through Africa and into the Middle East in the past 50 years. Whereas insect vectors are important in local spread, road and rail transport could play an important role in rapidly spreading the disease over larger areas.

1.7 Manner and risk of introduction to Australia

Spread of LSD by the movement of infected animals is one mechanism by which LSD is spread to new premises or new areas. There is, however, little possibility of the disease entering Australia by this means because importation of live cattle, or their germplasm, does not occur from LSD endemic countries.

Introduction of the disease via insects entering Australia on aircraft or on board ships represents a relatively low risk because LSD virus has a short survival time in insects, and the numbers of vectors entering Australia in this way would be low. However, the OIE recommends that disinfestation be conducted on aircraft coming from countries where animal diseases transmitted by insect vectors are present.

1.8 Social and economic effects

The morbidity and mortality rates for LSD vary greatly in different endemic areas, probably due to different distributions and relative abundances of insect vectors. An outbreak in a previously free country such as Australia could be expected to result in a high morbidity rate.

If LSD became endemic, continuing economic loss would occur due to serious stock losses, reduced production in the cattle industries and the cost of preventative vaccination. Permanent loss of some markets would also be expected, with associated downturn in the rural economy and increased rural unemployment.

The compulsory slaughter of infected and dangerous contact animals would impose some hardship (for example, through the loss of valuable genetic material), even with the provision of compensation. Prevention of restocking until after a possibly lengthy prescribed period had elapsed would exacerbate serious cash flow problems on infected premises and dangerous contact premises.

Movement restrictions within the restricted area and control area would cause loss of market opportunities and associated financial losses to unaffected properties in the area and to support industries such as stock transport.

Although beef and milk supplies in the area near the outbreak would be disrupted, consumers would be able to get adequate supplies from other areas.

If the outbreak occurred late in the area's vector season, eradication would be assisted if the cold weather were likely to kill the insect populations, and if infected animals were destroyed and disposed of quickly.

1.9 Criteria for proof of freedom

The OIE Terrestrial Code for LSD states that a country may be considered to be free from LSD when LAD is a notifiable disease in the country concerned and no case of LSD has been confirmed during the past 3 years.

Because it is possible that LSD may appear as a subclinical or inapparent infection, serological tests will be necessary to survey for the presence of disease for at least 3 years after the last case has been reported. The levels and types of surveillance that are necessary to provide proof of freedom are discussed in Appendix 1. Physical examinations of animals on risk premises will also be necessary.

Australia will need to provide detailed information that surveillance and examinations in both the free and infected areas have been adequate, that quarantine movement controls have been maintained and that the virus is not present in the insect populations.

2 Principles of control and eradication

2.1 Critical factors assessed in formulating response policy

Features of the disease:

- LSD is a highly contagious disease of cattle (especially *Bos taurus*), often with high mortality, so the disease should become apparent soon after introduction.
- Acute cases (the most common type in naive populations) should be readily diagnosed clinically.
- A rapid tentative diagnosis can be made.
- Recovered animals are immune and there is no carrier state.
- The virus is stable in the environment, especially in cool, shaded areas; fomites are important in spread of the disease. The virus is susceptible to a range of disinfectants.
- An effective vaccine is available.

Features of susceptible populations:

- Susceptible cattle of all ages develop serious clinical disease if infected with LSD. The introduction of LSD into Australia could result in high mortalities and rapid spread of the disease.
- Most infection is thought to be the result of mechanical insect transmission. Under Australian conditions, mechanical transmission by biting flies may be important. Market fluctuations due to public health perceptions or product withdrawals would reduce the value of the cattle industry.

2.2 Options for control or eradication based on the assessed critical factors

Managing the risk of LSD would be based on the identified critical factors and would involve:

- registration of all commercial and small holdings;
- application of mandatory biosecurity programs;
- the early determination of the extent of infection through the rapid identification of infected and potentially infected premises using quickly instituted serosurveillance and animal tracing, based on an epidemiological assessment;
- the swift declaration and effective policing of control areas and the rapid imposition of quarantine and movement controls on infected and potentially infected premises, to prevent the movement of cattle and fomites carrying virus or potentially carrying virus;
- minimising the exposure of susceptible animals through direct and indirect contact with infected cattle, insects and potentially contaminated fomites;

- elimination of infection from infected premises and/or infected populations by the rapid destruction of cattle and the sanitary disposal of carcases and fomites, and decontamination;
- identification of vectors of concern as quickly as possible and application of appropriate treatments;
- the implementation of zoning/compartmentalisation;
- the possible use of ring vaccination with movement controls.

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

- recognition of endemic status, using vaccination;
- modified stamping out, utilising ring vaccination; and
- stamping out — this would involve the prompt destruction and sanitary disposal of animals infected with or exposed to LSD virus.

The policy to be implemented is described in Section 3.

3 Policy and rationale

3.1 Introduction

Lumpy skin disease (LSD) is an OIE-listed disease that has the potential for rapid spread and is important in cattle production and trade.

LSD is an Animal Health Australia Category 3 disease under the government–industry Emergency Animal Disease (EAD) Response Agreement for cost-sharing arrangements. Category 3 diseases are those for which costs will be shared 50% by government and 50% by industry.

The response policy is to eradicate LSD in the shortest possible time using *stamping out*, supported by a combination of strategies including:

- ***sanitary disposal* of destroyed animals and contaminated animal products, to remove the source of infection;**
- ***quarantine and movement controls* of animals, products and other potentially infected items to prevent spread of infection;**
- ***decontamination* of fomites (facilities, equipment and other items) to minimise the spread of the virus from infected animals and premises;**
- **control of insect vectors in the initial stages of an outbreak, to minimise mechanical transmission of the virus;**
- ***tracing and surveillance* to determine the source and extent of infection and to provide proof of freedom from the disease;**
- ***zoning* and/or *compartmentalisation* to define infected and disease-free premises and areas;**
- ***an awareness campaign* to facilitate cooperation from the industry and the community; and**

***Ring vaccination* may be utilised as part of a *modified stamping-out* policy.**

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

The Consultative Committee on Emergency Animal Diseases (CCEAD), convened for the incident, assesses the response plan drawn up by the CVO for technical soundness and consistency with AUSVETPLAN, and endorses or seeks modifications to it. Overall operational management of the incident rests with the CVO of the affected jurisdiction, with oversight by the CCEAD.

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

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

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

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

3.2 Control and eradication policy

If LSD occurred in Australia, the objective would be to eradicate it quickly through stamping out, the disinfection of infected premises and areas, and a vector control program.

Liaison with industry and the media, and keeping the public informed, will be an important strategy to maintain confidence in the safety of animal products.

3.2.1 Stamping out

The policy of stamping out will involve the destruction of all susceptible ruminants on infected premises (IPs). Action on properties to which dangerous contact animals have been traced will depend on tactical decisions taken according to the perceived risk of infection having spread to in-contact animals and the compensation bill.

If a dangerous contact premises (DCP) contains relatively few susceptible animals in addition to the dangerous contacts, all animals may be destroyed. If, on the other hand, there is a large number of stock, then only the dangerous contact animals would be destroyed and the in-contact animals would be quarantined and observed for clinical signs; animals not showing clinical signs may be slaughtered for human consumption, provided that they can be moved safely to an abattoir.. Such a strategy will depend on the ability to protect suspect animals from potential vectors and consequently the possibility of further spread.

If there is a delay between slaughter and disposal, the carcases will be sprayed with phenol and covered with straw kept wet with phenol. Interference from vermin or predators will be prevented, and potential vectors controlled.

3.2.2 Quarantine and movement controls

IPs, DCPs and any suspect premises (SPs) will be declared immediately, and quarantine and movement controls will be imposed. Infected cattle and dangerous in-contact cattle will be destroyed.

A restricted area (RA) of at least 5-kilometre radius around the IP, and a control area (CA) with a boundary at least 10 km from the RA boundary to act as a buffer zone, will be declared. The RA will contain all the IPS and DCPs, and as many SPs as possible.

All cattle within the boundaries will be subjected to strict movement controls, subject to permit. Non-susceptible species will also be subject to movement controls to ensure they do not mechanically transmit the virus.

Cattle classified as noncontact cattle on DCPs and cattle on SPs will be inspected daily for at least 7 days after detection of infection on the IP. Animals on DCPs and SPs may be sent to slaughter after the 28-day incubation period if all surveillance is negative. Such animals must go directly to an abattoir in the RA or CA, as appropriate, and not held in the lairage any longer than the minimum time required for meat hygiene purposes.

All persons leaving the quarantine area must undergo appropriate decontamination, including a change of clothing and footwear.

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

3.2.3 Tracing and surveillance

Tracing will need to include the movements from the IP of cattle, products, people, vehicles and other things, such as equipment and feedstuff, that could have been involved in the transmission of virus. The period to be covered should be from at least 28 days before the first clinical signs were seen on the initial IP to the time that movement restrictions were imposed.

The surveillance will include an epidemiological investigation of the possible vectors that are present and the environmental and ecological factors that may influence their distribution and survival. Surveillance will also determine the extent of infection and the extent of vector activity within the area of the IPs and DCPs, to enable a realistic RA and CA to be established.

Cattle on the DCPs and SPs will be examined on a daily basis during the first week of quarantine for signs of infection. If numbers are large, a statistically appropriate sample of animals on these premises must be examined.

The restocking process on individual IPs and DCPs can commence once decontamination is complete on the property and a minimum of 28 days has passed since the last clinical case of LSD in a 10-kilometre radius of the property in question. Repopulation may occur after a successful sentinel surveillance period of at least 2 months. The sentinel animals will be regularly examined, and their temperatures taken to detect possible early infection. Repopulated animals will be surveyed, including by physical examination, for a period of up to 3 years.

See Appendix 1 for further details on surveillance.

3.2.4 Zoning and compartmentalisation

An LSD-free zone would be difficult to declare and have accepted unless the disease had been quickly detected and its distribution rapidly defined. Much would depend on the distribution of insect vectors, the temperature and the amount of surface water that could act as insect breeding grounds. Once the disease has been brought under control, areas more than 50 km from known infection should be disease-free zones, provided that tracing has been sufficient to locate all movements, and surveillance is thorough. Ongoing surveillance would

be necessary to provide trading partners with confidence that the infection is contained within the declared limits and that movement controls and environmental and ecological factors can restrict the spread of vectors.

3.2.5 Vaccination

If a disease outbreak outstrips the resources available to control it by stamping out, a ring vaccination program will provide a buffer zone of immune animals around the disease area until the outbreak can be brought under control. A vaccination zone of at least 5–10-kilometre radius around the IP(s) is recommended, but the actual area will depend on the possible presence of the disease in feral animals (cattle and buffalo), the presence of the virus in vectors and the distribution of vectors. If the disease spreads to susceptible feral animals, all susceptible domestic animals within the feral animal range, and extending to about 10 km beyond, may need to be vaccinated. The use of natural boundaries will be considered. The use of a vaccine to protect valuable genetic lines will be considered, subject to conditions imposed by the chief veterinary officer (CVO).

Vaccinated animals will not need to be slaughtered to comply with OIE Terrestrial Code requirements. However, they will need to be permanently identified so that they will not interfere with the results of serological surveys.

See Section 1.5.3 for further details on vaccination.

3.2.6 Treatment of infected animals

Infected or susceptible animals would not be treated.

3.2.7 Treatment of animal products

Although meat from infected animals has not been implicated in the transmission of LSD, it will not be used because there is a risk of the virus persisting in chilled meat and its packaging. Knowingly distributing meat from diseased animals also contravenes meat hygiene best practice. Meat from noninfected animals that have been cleared for slaughter does not need to be treated.

Milk and milk products from susceptible species on IPs will be chemically treated by acidification or heat treated (if the process is available on the premises), and buried on the premises. Milk that has left the premises within the 28 days before the diagnosis of disease will be traced and, if found, suitably treated by heat or chemicals and buried. However, milk from clean premises in the RA may be used, provided that it is subjected to appropriate heat or acid treatment.

Feed, and wastes such as faeces and straw, will be treated and disposed of on the premises.

Untreated cattle hides present a major risk. If they originate from IPs and DCPs within 28 days before diagnosis of the disease, they will be destroyed unless they are already at a processing plant, in which case they will be immediately treated or destroyed. Suitable treatments would include commercial tanning because the acid levels achieved during the normal commercial processing of skins and hides are sufficient to inactivate the virus. This applies to fully tanned, 'wet blue' (lightly or fully chrome tanned, but not dried) or 'wet white' (pretanned with aluminium sulfate, but limed and acid pickled only) skins and hides (DAFF 2001).

As the virus is found in body secretions, semen and embryos may be sources of infection, and semen and embryos collected from animals on an IP and DCP will be destroyed. An informed judgment on semen and embryos in storage may be taken when all relevant information is available.

Feedstuff from IPs will be destroyed.

3.2.8 Disposal of animals and animal products

Infected or suspect animal products and byproducts must be buried or burned as soon as possible to reduce exposure to vectors and vermin.

Carcases, skins, feedstuff and bedding that may have been contaminated will be either burned or buried.

If there may be a delay between destruction and disposal, the carcases will be sprayed with phenol, covered with straw (kept wet with phenol), and guarded continuously to prevent interference from vermin or predators. Insects that are potential vectors will be controlled.

The disposal method chosen must be suited to the location and product at that particular time (see the **Disinfection and Disposal Manuals** for more information).

3.2.9 Decontamination

Fomites such as bedding materials, feedstuff, footwear, clothing, cattle handling facilities equipment will be appropriately decontaminated or destroyed.

Vehicles and people leaving the premises will be decontaminated. If decontamination cannot be reliably achieved, contact with susceptible animals will be prohibited for a specified period that will be determined by other disease control activities at the time (eg the use of vaccination in susceptible animals).

Further information is available in the Decontamination Manual, and in Geering et al (1995).

3.2.10 Wild animal and vector control

Disposal of contaminated materials (including feedstuffs) and carcases will be prompt to minimise exposure of susceptible feral species, and wild predators and vermin to LSD virus. Control measures must be such that wild animal populations are not induced to disperse out of the RA. A range of options may be available, such as baiting, trapping and decoy feeding.

The epidemiological investigation team, which will include an entomologist, will identify the vectors of concern through a vector monitoring program and will devise a targeted approach to vector control to break the transmission cycle.

It is possible that several vectors may be present that may be able to mechanically transmit the virus, and this may require a range of approaches to control, such as the aerial and ground application of insecticides as ultra-low volume (ULV) fogs; and treatment of cattle (within, say, 5 km of an IP) with either a systemic insecticide such as ivermectin, or a topical insecticide that will repel insects or

reduce the population of target insects. Insect-proof housing for animals might also be considered.

Because the virus survives in insect vectors for only a few days, there should be no transmission to new populations of vectors if the infected source animals can be destroyed and disposed of quickly.

3.2.11 Public awareness and media

A media campaign will emphasise the importance of inspecting cattle for skin lesions and of reporting suspicious lesions and unusual deaths promptly. The public must not be panicked into avoiding any meat or milk products. For further information, see the **Public Relations Manual**.

The disease may not result in a large number of deaths (1–5% of infected animals) but infected and in-contact animals will need to be destroyed to ensure removal of the major source of virus. LSD is a Category 3 disease with respect to national EAD response funding arrangements, which include provision for compensation to producers for livestock dying from the disease and for livestock and property destroyed as a result of the disease control measures. Opposition from industry is therefore unlikely to occur, at least in the early stages. The possible use of aerial spraying for insect control may raise environmental issues. For these reasons, close liaison with industry, the media and the public will be necessary to provide clear and detailed information on the disease and the control measures, and to maintain confidence in the actions being taken and in the safety of the product.

The absence of any zoonotic potential will be emphasised.

3.2.12 Public health implications

There are no public health implications.

3.3 Other policies

LSD may readily get out of control if conditions are favourable for vector spread. If the size of an outbreak outstrips the resources available for control, and ring vaccination of all susceptible animals is not able to contain the disease, then LSD could become established.

In such a situation, LSD would be controlled by vaccination, using an appropriate vaccine, of all susceptible animals in areas where the disease occurred. If LSD became established, it would be difficult to eradicate the virus from the insect vector population until the disease had been eradicated from the cattle population. Vaccination would have to continue until eradication had been achieved.

3.4 Funding and compensation

LSD is classified as a Category 3 emergency animal disease under the EAD Response Agreement between the governments of Australia and the livestock industries.

Category 3 diseases are emergency animal diseases that have the potential to cause significant (but generally moderate) national socioeconomic consequences through international trade losses, market disruptions involving two or more states and severe production losses to affected industries, but have minimal or no effect on human health or the environment. For this category, the costs will be shared 50% by governments and 50% by the relevant industries (refer to the EAD Response Agreement for details).[7]

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

[7] Information about the EAD Response Agreement can be found at http://www.animalhealthaustralia.com.au/programs/eadp/eadra.cfm

4 Recommended quarantine and movement controls

4.1 Guidelines for classifying declared areas

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

4.1.1 Declared premises

Infected premises

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

Dangerous contact premises

Premises classified as DCPs will be those that contain animals, animal products, waste or other items that have recently been introduced from an IP (usually up to 28 days before the premises were declared infected) and are likely to be infected or contaminated, or any of these items that may have been in substantial contact with people, vehicles and equipment that have been associated with an IP within 28 days of visiting the DCP.

Thus, for LSD, premises classified as DCPs will be:

- all neighbouring properties on which susceptible animals have been sharing a common fenceline with infected animals on an IP and where it is considered necessary to impose disease control measures;
- all properties to which susceptible animals have moved from an IP within 28 days before the first appearance of symptoms on the IP and where it is considered necessary to impose disease control measures;
- all other properties owned or managed in conjunction with an IP;
- all premises on which it is considered that disease could possibly have spread to susceptible animals from an IP by way of the movement of vehicles, equipment or feedstuff during the 28 days before the first appearance of symptoms; and
- all properties that people have visited after handling or having close contact with susceptible animals on an IP during 28 days before the initial appearance of symptoms, and where it is considered that subsequent transmission of disease is possible.

DCPs will be subject to quarantine, and to eradication or control measures.

Suspect premises

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

Thus, for LSD, premises classified as SPs will be other neighbouring properties containing susceptible animals. SPs will be subject to quarantine and intensive surveillance.

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

4.1.2 Declared areas

Restricted area

An RA will be a relatively small declared area (compared with a *control area*) around IPs that is subject to intense surveillance and movement controls. Movement out of the area will, in general, be prohibited, while movement into the area would only be by permit. Multiple RAs may exist within one CA.

The RA does not need to be circular but can have an irregular perimeter, provided that the boundary is initially an appropriate distance from the nearest IP, DCP or SP. This distance will vary with the size and nature of the potential source of disease agent, but will be approximately 5 km around the IP, depending on the density of premises, and there should be at least 2 stock-proof barriers between the boundaries of the IP and the RA. The boundary could be the perimeter fence of the IP if the IP is in an isolated location. The boundary in a densely populated area will take into account the distribution of susceptible animals, traffic patterns to markets, service areas and abattoirs, and natural barriers to movement.

Control area

The CA will be a larger declared area around the RA(s) and, initially, possibly as large as a state or territory where restrictions will reduce the risk of disease spreading from the RA(s). The boundary of the CA will be adjusted as confidence about the extent of the outbreak increases but must remain consistent with the OIE Terrestrial Code chapters on zoning and compartmentalisation (see Chapter 4.3 of the code)[8] and surveillance (see Chapter 1.4 of the code).[9] In general, surveillance and movement controls will be less intense in the CA than in the RA, and animals and products may be permitted to move under permit from the area.

The declaration of a CA also helps to control the spread of the outbreak from within the RA. The CA is a buffer zone between the RA and the rest of the

[8] http://www.oie.int/eng/normes/Mcode/en_chapitre_1.4.3.htm
[9] http://www.oie.int/eng/normes/Mcode/en_chapitre_1.1.4.htm

industry. The boundary does not have to be circular or parallel to that of the RA but should be at least 10 km from the boundary of the RA, and there should be at least 2 stock-proof barriers between the boundaries of the CA and the RA. In general, the movement of possibly contaminated items and materials within the CA is allowed, but movement out of the CA is prohibited without CVO approval. The CA may need to be extended to include the destination of animal products from within the CA, such as a skin merchant, tannery or an abattoir. The CA must be large enough to contain spread by insect vectors. This type of control area allows reasonable commercial activities to continue.

4.2 Movement controls for LSD

4.2.1 Declared premises

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

Table 4.1 Movement controls for declared premises

Quarantine/movement controls	Infected and dangerous contact premises (IP and DCP)	Suspect premises (SP)
Movement out of:		
– susceptible animals	Prohibited, except after observation period of 28 days when may be allowed to go to slaughter under permit	As for IPs/DCPs
– non-susceptible animals	Allowed under permit, subject to decontamination	As for IPs/DCPs
– cattle hides, etc	Prohibited, except may be allowed to be processed if at plant	As for IPs/DCPs
– milk products from susceptible species	Prohibited	As for IPs/DCPs
- semen and embryos	Allowed under permit	As for IPs / DCPs
– crops and grains	Allowed under permit, subject to not being used as bedding or fodder for susceptible animals	As for IPs/DCPs
Movement in and out of:		
– people	Allowed under permit, subject to decontamination	People having close contact with suspect animals must undergo decontamination

Quarantine/movement controls	Infected and dangerous contact premises (IP and DCP)	Suspect premises (SP)
– vehicles and equipment	Allowed under permit, subject to decontamination	Vehicles and equipment having close contact with suspect animals must undergo decontamination
***Movement in of*:**		
– susceptible animals	Allowed under permit	Allowed after quarantine lifted

4.2.2 Declared areas

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

Table 4.2 Movement controls for declared areas

Quarantine/ movement control	Restricted area (if declared) (RA)	Control area (if declared) (CA)
Movement out of:		
– susceptible animals	Allowed under permit, direct to slaughter	Allowed under permit, direct to slaughter
– non-susceptible animals, people and equipment	Allowed under permit, subject to decontamination	Allowed
– vehicles	Allowed under permit, subject to decontamination	Allowed
– fibre and hides of susceptible species	Allowed under permit	Allowed under permit
– milk	Allowed under permit for processing, using appropriate milk tankers	Allowed
- semen and embryos	Allowed under permit	As for IPs and DCPs
***Movement within of*:**		
– susceptible animals	Allowed under permit	Allowed under permit
– milk	Allowed under permit for processing, using appropriate milk tankers	Allowed
Movement through of:		
– susceptible animals	Allowed under permit, subject to vehicles not stopping.	Allowed under permit, subject to vehicles not stopping.
Movement in of:		
– susceptible animals	Allowed under permit	Allowed under permit

Quarantine/ movement control	Restricted area (if declared) (RA)	Control area (if declared) (CA)
Risk enterprises	Skin dealers prohibited from operating	Skin dealers regulated by permit
Races, sales, shows, rodeos (ie gatherings of susceptible animals)	Prohibited	Prohibited
Movement on stock routes, rights of way	Prohibited	Prohibited

4.3 Criteria for issuing permits

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

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

Appendix 1 Procedures for surveillance and proof of freedom

At the onset, the disease must be compulsorily notifiable. Farmers, veterinarians and meat workers must be alert and report suspicion of disease.

According to the OIE Terrestrial Code, a country's claim for freedom from LSD cannot be made until 3 years after the last case. All at-risk properties (see note 1) must therefore be kept under close surveillance for 3 years.

Detection of disease would be from physical examination of herds, as well as from applying serological tests. Surveillance of virus in insect vectors must also be undertaken (see Section 3.2.3).

On IPs, and dangerous contact premises DCPs that have been destocked, sentinel animals will be introduced about 28 days after decontamination is completed, provided there is no active disease within 10 km. Sentinel animals should undergo weekly physical inspection and fortnightly serological testing for 6 weeks, at which time restocking may occur, provided there is no active infection within 10 km. Clinical inspection and serological testing on each premises should take place at 3, 9 and 18 months after restocking (6, 12 and 21 months after cleaning and disinfection). Subject to satisfactory results, these premises may then be released from quarantine. A final inspection and test close to 3 years after the last case may be required (see note 2).

On other properties at risk, physical inspection surveillance visits (see note 3) should be made as soon as possible after detection of disease on the first IP in the RA and then at weekly intervals while the disease is still active in the area. Other SPs should be visited as soon as possible after declaring the contact with the IP, and then at weekly intervals while the disease is still active in the area, for at least 3 weeks. Provided that any necessary decontamination on the risk property is completed, satisfactory results from physical inspection and serological surveillance for all premises in the RA for a period of 42 days from the last contact with the IP should be sufficient to certify that no residual infection remains in the RA (see note 4).

A statistically appropriate serological survey (see note 5) is recommended on all at-risk premises (see note 1) 6 weeks after the last case, and any animals testing positive should be destroyed.

Further serological surveys of all premises at risk should be undertaken about 1 year and again about 2.5 years after the last case is detected in the area.

Notes

(1) Premises considered to be at risk are all premises within the RA with susceptible animals, IPs, DCPs, and other properties considered to have had significant contact with an IP.

(2) Animals dying within 12 months after repopulation of IPs must be autopsied and appropriate samples taken for virus testing.

(3) At surveillance visits for physical inspection, every mob of susceptible animals must be inspected and numbers accounted for. In extensive grazing areas, where the degree of contact between groups of animals in a flock may be low, care must be taken to ensure that all groups of animals are present and healthy.

(4) Allowance should be made for the possibility of virus over-wintering in insect vectors, with subsequent seasonal resurgence of the disease.

(5) A statistical sample, sufficient to detect at least one seropositive animal with 99% confidence if the prevalence of seropositive reactors is 10%, of all susceptible animals on all premises considered to be at risk will need to be tested by the serum neutralisation test for antibodies (Cannon and Roe, 1982, p17).

Table A1 Summary of surveillance program for LSD

	Infected premises	**Restricted area**
Day 0	decontamination completed	
Week 1		clinical exam
Week 2		clinical exam
Week 3		clinical exam
Week 4	introduce sentinel animals	
Week 5	clinical exam	
Week 6	clinical exam + serotest	clinical exam + serosurvey; release from quarantine
Week 7	clinical exam	
Week 8	clinical exam + serotest	
Week 9	clinical exam	
Week 10	clinical exam + serotest; restock	
Month 6	herd inspection + serosurvey	
Month 12	herd inspection + serosurvey	
Month 21	herd inspection + serosurvey	

Appendix 2 Key features of lumpy skin disease

Disease and cause

Lumpy skin disease (LSD) is an acute, highly infectious, generalised skin disease of cattle. The disease is caused by a virus of the family Poxviridae similar to that causing sheep pox and goat pox (family Poxviridae) and mostly transmitted by biting insects.

Species affected

The disease affects cattle, although a few cases have been seen in Asian water buffalo. Humans are considered not to be susceptible.

Distribution

LSD is generally confined to sub-Saharan Africa. There has been only one laboratory-confirmed outbreak outside Africa, in Israel in 1989. The disease has never been recorded in Australia.

Key signs

In naturally occurring cases of LSD, the incubation period is 2–4 weeks. Initial signs are fever accompanied by eye and nasal discharge, depression, loss of appetite and a reluctance to move. Firm, raised nodules up to 50 mm in diameter develop on the skin within 1–2 days, especially around the head, neck, genitals and limbs. The centres of the nodules die, after which the resultant scabs ('sitfasts') may fall out, leaving large, ulcerous holes that are subject to secondary bacterial infections. Lesions also develop in the nose, throat and gut. Oedema of the limbs, brisket and genitals also occurs. Although few adult cattle die from the disease, many become debilitated and can remain in extremely poor body condition for up to 6 months. Pneumonia can be a fatal complication. Abortion, intrauterine infection and temporary sterility of bulls and cows may also occur.

Spread

The LSD virus is present in eye, nose and mouth secretions, semen, milk and blood. In virtually all outbreaks, the virus appears to be propagated by a continuous cattle–insect–cattle cycle. Many different types of biting insects may be involved in transmission, but particularly mosquitoes and flies. Cold weather with frosts causes a sharp reduction in the spread because it reduces insect populations. Insect vectors on ships and aircraft may spread the disease. Spread by direct contact does not occur easily, unless animals share a water trough. The virus can be readily transported on clothing and equipment.

Persistence of the virus

The LSD virus is very resistant to inactivation in the environment. It has been isolated from sloughed-off skin tissue up to 4 months after infection, and may be found in blood for 4–5 days, saliva for 11 days and semen for 22 days.

Glossary

Abomasum	Fourth stomach of ruminants; also called the 'true' or 'rennet' stomach or 'reed'. Leads into the small intestine.
Animal byproducts	Products of animal origin that are not for consumption but are destined for industrial use (eg hides and skins, fur, wool, hair, feathers, hooves, bones, fertiliser).
Animal Health Committee	A committee comprising the CVOs of Australia and New Zealand, Australian state and territory CVOs, Animal Health Australia, and a CSIRO representative. The committee provides advice to PIMC on animal health matters, focusing on technical issues and regulatory policy (formerly called the Veterinary Committee). *See also* Primary Industries Ministerial Council (PIMC)
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture, Fisheries and Forestry who manages international animal health commitments and the Australian Government's response to an animal disease outbreak. *See also* Chief veterinary officer
AUSVETPLAN	*Aus*tralian *Vet*erinary Emergency *Plan*. A series of technical response plans that describe the proposed Australian approach to an emergency animal disease incident. The documents provide guidance based on sound analysis, linking policy, strategies, implementation, coordination and emergency-management plans.
Chief veterinary officer (CVO)	The senior veterinarian of the animal health authority in each jurisdiction (national, state or territory) who has responsibility for animal disease control in that jurisdiction. *See also* Australian Chief Veterinary Officer
Compensation	The sum of money paid by government to an owner for stock that are destroyed and property that is compulsorily destroyed because of an emergency animal disease. *See also* Cost-sharing arrangements, Emergency Animal Disease Response Agreement

Consultative Committee on Emergency Animal Diseases (CCEAD)	A committee of state and territory CVOs, representatives of CSIRO Livestock Industries and the relevant industries, and chaired by the Australian CVO. The CCEAD convenes and consults when there is an animal disease emergency due to the introduction of an emergency animal disease of livestock, or other serious epizootic of Australian origin.
Control area	A declared area in which the conditions applying are of lesser intensity than those in a restricted area (the limits of a control area and the conditions applying to it can be varied during an outbreak according to need). *See* Appendix 1 for further details
Cost-sharing arrangements	Arrangements agreed between governments (national and states/territories) and livestock industries for sharing the costs of emergency animal disease responses. *See also* Compensation, Emergency Animal Disease Response Agreement
Dangerous contact animal	A susceptible animal that has been designated as being exposed to other infected animals or potentially infectious products following tracing and epidemiological investigation.
Dangerous contact premises	Premises that contain dangerous contact animals or other serious contacts. *See* Appendix 1 for further details
Declared area	A defined tract of land that is subjected to disease control restrictions under emergency animal disease legislation. Types of declared areas include *restricted area, control area, infected premises, dangerous contact premises and suspect premises*. *See* Appendix 1 for further details
Decontamination	Includes all stages of cleaning and disinfection.
Depopulation	The removal of a host population from a particular area to control or prevent the spread of disease.
Destroy (animals)	To slaughter animals humanely.
Disease agent	A general term for a transmissible organism or other factor that causes an infectious disease.
Disease Watch Hotline	24-hour freecall service for reporting suspected incidences of exotic diseases — **1800 675 888**
Disinfectant	A chemical used to destroy disease agents outside a living animal.
Disinfection	The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; applies to premises, vehicles and different objects that may have been directly or indirectly contaminated.

Disposal	Sanitary removal of animal carcases, animal products, materials and wastes by burial, burning or some other process so as to prevent the spread of disease.
Emergency animal disease	A disease that is (a) exotic to Australia or (b) a variant of an endemic disease or (c) a serious infectious disease of unknown or uncertain cause or (d) a severe outbreak of a known endemic disease, and that is considered to be of national significance with serious social or trade implications. *See also* Endemic animal disease, Exotic animal disease
Emergency Animal Disease Response Agreement	Agreement between the Australian and state/territory governments and livestock industries on the management of emergency animal disease responses. Provisions include funding mechanisms, the use of appropriately trained personnel and existing standards such as AUSVETPLAN. *See also* Compensation, Cost-sharing arrangements
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. *See also* Emergency animal disease, Exotic animal disease
Enterprise	*See* Risk enterprise
Enzyme-linked immunosorbent assay	A serological test designed to detect and measure the presence of antibody or antigen in a sample. The test uses an enzyme reaction with a substrate to produce a colour change when antigen–antibody binding occurs.
Epidemiological investigation	An investigation to identify and qualify the risk factors associated with the disease. *See also* Veterinary investigation
Exotic animal disease	A disease affecting animals (which may include humans) that does not normally occur in Australia. *See also* Emergency animal disease, Endemic animal disease
Exotic fauna/feral animals	*See* Wild animals
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.
Hyperaemia	An increase in the amount of blood in a tissue or organ due to dilation of the supplying arteries.
Immunodiffusion test	A serological test to identify antigens or antibodies by precipitation of antibody–antigen complexes after diffusion through agar gel.

In-contact animals	Animals that have had close contact with infected animals, such as noninfected animals in the same group as infected animals.
Incubation period	The period that elapses between the introduction of the pathogen into the animal and the first clinical signs of the disease.
Indirect immunofluorescence	A technique in which the presence of antigen or antibody in a sample can be detected by binding of a specific antibody bound to a fluorescent marker molecule, which is visible under a fluorescence microscope.
Infected premises	A defined area (which may be all or part of a property) in which an emergency disease exists, is believed to exist, or in which the infective agent of that emergency disease exists or is believed to exist. An infected premises is subject to quarantine served by notice and to eradication or control procedures. *See* Appendix 1 for further details
Local disease control centre (LDCC)	An emergency operations centre responsible for the command and control of field operations in a defined area.
Monitoring	Routine collection of data for assessing the health status of a population. *See also* Surveillance
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
Mucopurulent	Consisting of mucus and pus.
National management group (NMG)	A group established to direct and coordinate an animal disease emergency. NMGs may include the chief executive officers of the Australian Government and state or territory governments where the emergency occurs, industry representatives, the Australian CVO (and chief medical officer, if applicable) and the chairman of Animal Health Australia.
Native wildlife	*See* Wild animals
OIE Terrestrial Code	*OIE Terrestrial Animal Health Code.* Reviewed annually at the OIE meeting in May and published on the internet at: **http://www.oie.int/eng/normes/mcode/a_summry.htm**
OIE Terrestrial Manual	*OIE Manual of Standards for Diagnostic Tests and Vaccines for Terrestrial Animals.* Describes standards for laboratory diagnostic tests and the production and control of biological products (principally vaccines). The current edition is published on the internet at: **http://www.oie.int/eng/normes/mmanual/a_summry.htm**

Operational procedures	Detailed instructions for carrying out specific disease control activities, such as disposal, destruction, decontamination and valuation.
Owner	Person responsible for a premises (includes an agent of the owner, such as a manager or other controlling officer).
Premises	A tract of land including its buildings, or a separate farm or facility that is maintained by a single set of services and personnel.
Prevalence	The proportion (or percentage) of animals in a particular population affected by a particular disease (or infection or positive antibody titre) at a given point in time.
Primary Industries Ministerial Council (PIMC)	The council of Australian national, state and territory and New Zealand ministers of agriculture that sets Australian and New Zealand agricultural policy (formerly the Agriculture and Resource Management Council of Australia and New Zealand). *See also* Animal Health Committee
Quarantine	Legal restrictions imposed on a place or a tract of land by the serving of a notice limiting access or egress of specified animals, persons or things.
Restricted area	A relatively small declared area (compared with a control area) around an infected premises that is subject to intense surveillance and movement controls. *See* Appendix 1 for further details
Risk enterprise	A defined livestock or related enterprise, which is potentially a major source of infection for many other premises. Includes intensive piggeries, feedlots, abattoirs, knackeries, saleyards, calf scales, milk factories, tanneries, skin sheds, game meat establishments, cold stores, artificial insemination centres, veterinary laboratories and hospitals, road and rail freight depots, showgrounds, field days, weighbridges, garbage depots.
Sensitivity	The proportion of affected individuals in the tested population that are correctly identified as positive by a diagnostic test (true positive rate). *See also* Specificity
Sentinel animal	Animal of known health status that is monitored to detect the presence of a specific disease agent.
Serosurveillance	Surveillance of an animal population by testing serum samples for the presence of antibodies to disease agents.
Serotype	A subgroup of microorganisms identified by the antigens carried (as determined by a serology test).

Serum neutralisation test	A serological test to detect and measure the presence of antibody in a sample. Antibody in serum is serially diluted to detect the highest dilution that neutralises a standard amount of antigen. The neutralising antibody titre is given as the reciprocal of this dilution.
Specificity	The proportion of nonaffected individuals in the tested population that are correctly identified as negative by a diagnostic test (true negative rate). *See also* Sensitivity
Stamping out	Disease eradication strategy based on the quarantine and slaughter of all susceptible animals that are infected or exposed to the disease.
State or territory disease control headquarters (SDCHQ)	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 of, 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, are warranted. *or* An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises	Temporary classification of premises containing suspect animals. After rapid resolution of the status of the suspect animal(s) contained on it, a suspect premises is reclassified either as an infected premises (and appropriate disease-control measures taken) or as free from disease. *See* Appendix 1 for further details
Tracing	The process of locating animals, persons or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
Vaccination	Inoculation of healthy individuals with weakened or attenuated strains of disease-causing agents to provide protection from disease.
– ring vaccination	Vaccination of susceptible animals around a focus of infection to provide a buffer against the spread of disease.

Vaccine	Modified strains of disease-causing agents that, when inoculated into an animal, stimulate an immune response and provide protection from disease.
–attenuated	A vaccine prepared from infective or 'live' microbes that have lost their virulence but have retained their ability to induce protective immunity.
Vector	A living organism (frequently an arthropod) that transmits an infectious agent from one host to another. A *biological* vector is one in which the infectious agent must develop or multiply before becoming infective to a recipient host. A *mechanical* vector is one that transmits an infectious agent from one host to another but is not essential to the life cycle of the agent.
Veterinary investigation	An investigation of the diagnosis, pathology and epidemiology of the disease. *See also* Epidemiological investigation
Viraemia	The presence of viruses in the blood.
Wild animals	
– native wildlife	Animals that are indigenous to Australia and may be susceptible to emergency animal diseases (eg bats, dingoes, marsupials).
– feral animals	Domestic animals that have become wild (eg cats, horses, pigs).
– exotic fauna	Nondomestic animal species that are not indigenous to Australia (eg foxes).
Zebu (cattle)	Bovine animals (*Bos indicus*) with characteristic large hump over the shoulders. Widely distributed in India, China, eastern Africa, etc and used for cross-breeding in Australia.
Zoning	The process of defining disease-free and infected areas in accord with OIE guidelines, based on geopolitical boundaries and surveillance, in order to facilitate trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

AAHL	Australian Animal Health Laboratory
AUSVETPLAN	Australian Veterinary Emergency Plan
CA	control area
CCEAD	Consultative Committee on Emergency Animal Diseases
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CVO	chief veterinary officer
DCP	dangerous contact premises
EAD	emergency animal disease
ELISA	enzyme-linked immunosorbent assay
IP	infected premises
LSD	lumpy skin disease
NMG	national management group
OIE	World Organisation for Animal Health (formerly Office International des Epizooties)
PCR	polymerase chain reaction
PIMC	Primary Industries Ministerial Council
RA	restricted area
SP	suspect premises
ULV	ultra-low volume

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Video/training resources

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