AUSTRALIAN VETERINARY EMERGENCY PLAN

AUSVETPLAN

Enterprise manual

Dairy (cattle) industry

Version 5.0

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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Text under development

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

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EMERGENCY ANIMAL DISEASE WATCH HOTLINE: 1800 675 888

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

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Contents

1 Introduction

1.1 This manual

1.1.1 Purpose

Enterprise manuals address the risks associated with so-called risk enterprises. These are defined as livestock or related enterprises that are a potential source of major infection for many other premises, and can thus increase the potential size of a disease outbreak and affect its nature.

1.1.2 Scope

This enterprise manual is aimed at both government officers and dairy industry personnel who may be involved in emergency animal disease (EAD) preparedness. For government personnel, including those not familiar with the industry, the manual brings together, from many sources, operational guidelines, plans of action and other resources for dealing with EADs. For industry personnel, including owners or managers, the manual provides guidelines on their responsibilities during an EAD outbreak, as required by the relevant government authorities, and strategies that may be adopted to improve preparedness for, or to handle, a suspected EAD. Managers should include elements of this manual in the operational manuals of their enterprises.

1.1.3 Development

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

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

1.2 Other documentation

This enterprise manual should be read and implemented in conjunction with:

- other AUSVETPLAN documents, including response strategies, operational and management manuals, and any relevant guidance and resource documents. The complete series of manuals is available on the Animal Health Australia website[1]
- relevant nationally agreed standard operating procedures (NASOPs).[2] These procedures complement AUSVETPLAN and describe in detail specific actions undertaken during a response to an incident. NASOPs have been developed for use by jurisdictions during responses to EAD incidents and emergencies

[1] https://animalhealthaustralia.com.au/ausvetplan
[2] https://animalhealthaustralia.com.au/nationally-agreed-standard-operating-procedures

- relevant jurisdictional or industry policies, response plans, standard operating procedures and work instructions
- relevant Commonwealth and jurisdictional legislation and legal agreements (such as the Emergency Animal Disease Response Agreement – EADRA[3]).

1.3 Training resources

1.3.1 EAD preparedness and response arrangements in Australia

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

1.3.2 Industry-specific training

Further reading includes:

- United States Secure Milk Supply[5]
- contingency planning for industry
- Dairy Australia[6] – information to help Australian dairy farmers manage biosecurity risks
- Farm Biosecurity[7] – information and resources on farm biosecurity for dairy producers.

[3] https://animalhealthaustralia.com.au/eadra
[4] https://animalhealthaustralia.com.au/online-training-courses
[5] https://securemilksupply.org
[6] https://www.dairyaustralia.com.au/zh-cn/animal-management-and-milk-quality/animal-health/biosecurity#.Y0yd9HZBxaS
[7] https://www.farmbiosecurity.com.au

2 The Australian industry

Milk and milk products in Australia are primarily derived from cattle. Milking goats, sheep, buffalo and camels supply much smaller, specialist markets. Most raw cow milk leaving farms is destined for processing and packaging for human consumption. Small-volume milk samples can also leave dairy farms for quality testing. Milk production and processing from goats, sheep, buffalo and camels are regulated in the same way as for dairy cattle.

Approximately 37 000 people are directly employed on dairy farms and manufacturing plants (Dairy Australia 2021). Transport and distribution activities, and research and development projects are other areas of employment associated with the industry.

Dairy is also one of Australia's leading rural industries in adding value through downstream processing. Much of this processing occurs close to farming areas, thereby generating economic activity and employment in country regions. The Australian Bureau of Agricultural and Resource Economics and Sciences estimates the regional economic multiplier effect to be roughly 2.5 from the dairy industry.

2.1 Industry operations

2.1.1 Structure

Common dairy operating structures usually fall into one of the following categories:

- owner–operator or family farm
- owner–manager farm
- share-farming arrangement – involves an agreement between the farm manager and farm owners under which the milk income is divided between parties (eg the dairy herd may be owned 50% by both parties, costs other than labour may be split 50%, and the share farmer may supply labour and machinery)
- lease farm arrangement
- equity partnership
- corporate farming – generally refers to a structure in which a group of farms is governed by a board of directors that is at arm's length from the management decisions on the farm.

These categories are not clearly defined – for example, family farms may operate through a corporate structure.

In business structures that involve multiple farms, resources such as machinery and farm personnel are commonly shared between farms, particularly on larger corporate farms and equity partnerships.

A typical Victorian dairy farm uses 1 full-time-equivalent staff member per 107 cows (Agriculture Victoria 2019). In contrast, a typical New South Wales dairy farm uses 1 full-time-equivalent staff member for 77 cows (Dairy Australia 2019a). Higher workloads are associated with milking duties and calving periods. Since 77% of farms have 1–3 calving periods per year (Dairy Australia 2019b), use of part-time and casual employees, and contract workers is common. The workforce includes overseas workers who hold valid visas.

Many staff work on multiple farms to sustain an income. Where staff harvest milk on multiple farms, workwear such as protective sleeves, milking aprons and gumboots may be shared and not thoroughly sanitised between the farms.

2.1.2 Production

Dairying is a well-established industry across temperate and some subtropical areas of Australia (see Figure 2.1). Although the bulk of milk production occurs in the southeastern states, all states[8] have dairy industries that supply fresh drinking milk to nearby cities and towns (see Table 2.1).

Table 2.1 Dairy farm statistics, 2019–20

Characteristic	NSW	Qld	SA	Tas	Vic	WA	Australia
Dairy farms	534	327	206	391	3462	135	5055
Dairy farms (approximate percentage of national total) (%)	11	6	5	8	68	3	100
Dairy cows (thousands)	145	65	69	182	895	54	1411
Average milking herd per farm	271	199	335	465	259	400	279
Volume of milk produced (ML)	1044	311	488	950	5619	364	8776
Share of national milk production (%)	11.9	3.5	5.6	10.8	64	4.2	100

Source: Dairy Australia, collated from data from the Australian Bureau of Statistics, dairy manufacturers and state milk authorities

[8] There are currently no dairies in the territories.

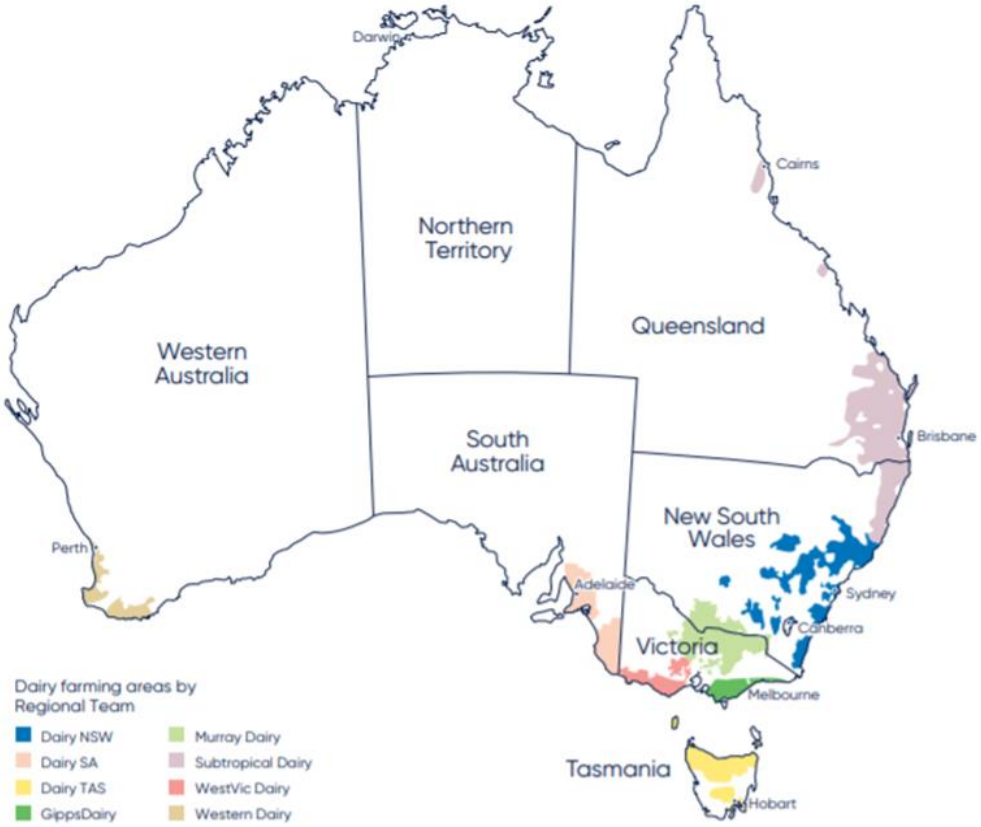

Figure 2.1 Dairying regions

Source: Dairy Australia (2019c)

A range of high-quality consumer products, including fresh milks, custards, yoghurts and a wide variety of cheese types, are produced in most Australian states. Manufacture of longer-shelf-life products, such as cheese and specialised milk powders, is becoming concentrated in the southeastern region of Australia. Many of these products are exported (Figure 2.2).

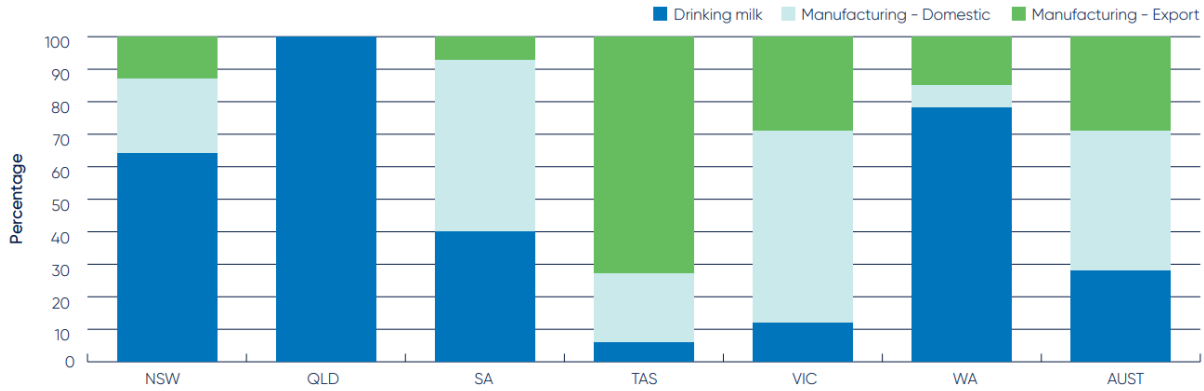

Figure 2.2 Use of Australian milk by state, 2019–20

Source: Dairy Australia (2020)

Australian milk production is generally seasonal in the key southeastern dairying regions, reflecting the predominantly pasture-based nature of the industry. Milk production peaks in October, tapers off until late summer and then flattens out into the cooler winter months (Dairy Australia 2019c). The

production of long-shelf-life manufactured products has enabled maximum use of milk within the seasonal cycle.

The Australian dairy industry was worth $4.8 billion in farmgate value for the 2019–20 year, with 29% of milk production exported. Australia provides approximately 5% of the world market share of dairy products, worth approximately $3.4 billion in export value (Dairy Australia 2020). In 2019–20, around 41% of manufactured product (in milk equivalent terms) was exported, and the remaining 59% was sold on the Australian market. This contrasts with drinking milk, which is mostly consumed in the domestic market. Cheese is consistently the major product stream, accounting for 39% of Australia's milk production, and recent increases in cheese production capacity suggest increases in the future. Drinking milk and skim milk powder/butter production were the next two largest uses of milk, accounting for 32% and 22%, respectively, of Australian milk.

Australia accounts for less than 2% of the world's estimated milk production but remains a significant exporter of dairy products. Australia currently ranks fourth in terms of world dairy trade, with a 5% share, behind New Zealand, the European Union and the United States.

For a number of years, China (including Hong Kong and Macau) has been Australia's largest market for dairy products, accounting for 32% of exports by volume. Japan is also a vital trade partner for Australian exporters. Australian exports to Asia account for more than 87% of the country's total exports. In 2019–20, the total value of Australian dairy exports was around $3.4 billion (Dairy Australia 2020).

2.1.3 Farming activities

Milking

Day-to-day activities revolve around milking times on dairy farms. Most dairy farms milk twice daily, although some farms milk once daily, three times daily or even three times every 2 days. In most herds, cattle are collected from a paddock for milking and may walk several kilometres to the milking parlour. Cows are held in close confinement in concrete yards while they wait to be milked.

On some farms, especially with larger herds, dairy cows may be split into multiple herds to assist with pasture management, nutrition and animal husbandry.

It is common, although not universal, for milk harvesters to use disposable gloves. During the milking process, skin surfaces of milk harvesters are exposed to urine and faecal material from cows. In addition, aerosolisation of particles occurs as cows urinate on concrete and faecal material is washed away with large hoses. Iodine or chlorhexidine is available in nearly all dairy parlours; these products are used on most farms to sterilise teats after the milking process, reducing the spread of mastitis-causing pathogens.

Once cows are milked, they usually either walk back to a paddock at their own pace or are held back together in a loafing area or feed pad. Loafing areas and feed pads are prone to buildup of faecal material if they are not frequently cleaned.

A very small proportion (approximately 2%) of Australian dairy farms keep dairy cows housed in barns on sand or composted faecal matter bedding. All feed (fodder and grain) is fed to the cows in concrete bunks (feed troughs). These systems require high levels of continuous access to staff to provide the care required.

Cleaning and sanitation of milking equipment

Milking equipment, storage areas and dairy yards must be cleaned regularly to maintain milk quality and reduce the risk of milk contamination. Cleaning typically occurs after each milking. Table 2.2 lists the cleaning steps.

Table 2.2 Post-milking cleaning steps

Activity	Details
Cleaning cups and milking platform	• The milking platform and the milking cups are hosed (with high-pressure hose) to remove manure from the area. • The outsides of the cups are further mechanically cleaned by hand with water to remove any remaining manure. The cups are then attached to cleaning jetters for the wash cycle.
Wash cycle	• Once the last of the milk has been emptied from the milk line into the vat, the milk line is detached from the vat to run the wash cycle. • Each wash cycle is unique to the dairy equipment, size, herd (different breeds produce different ratios of fat and protein), water quality, and milk quality history. • Typical wash cycles include: – pre-wash rinse (cold or warm water) – wash (hot water, with either acid or alkali) – final rinse (hot water or chemical sanitiser). • Wash cycle chemicals may alternate with milkings (eg acid in morning, alkali in evening).
Cleaning of yard and other trafficked areas	• The other areas of the dairy and dairy yard trafficked by cows are hosed down to remove manure. The water and solids are washed into the effluent dam. • Some dairies have automatic flood systems that use recycled effluent water to wash away solids. • In times of low water, some farms may wash full yards only once per day.

Most dairy farms use trained technicians to design wash cycles to maintain milk quality. These are typically associated with chemical sales companies.

More information on dairy hygiene and cleansing can be found in the *Australian dairy hygiene handbook*.[9]

[9] www.dairyaustralia.com.au/resource-repository/2020/09/01/australian-dairy-hygiene-handbook#.YRTtaIgzY2w

Clothing and personal protective equipment during milking

To allow access to the cows' udders, most dairies are set up with the cows on a platform, facing away from the milking equipment. Most dairies provide grain or pellets to the cows while they are milked, allowing for easy access to their udders. This setup means that most effluent from the cows ends up in the lower area used by the milking staff.

Milking staff typically wear a long plastic milking apron and long gumboots while milking. These are not always cleaned effectively, with only some businesses implementing standard operating procedures for cleaning. All milking staff should wear gloves to prevent the spread of pathogens that can cause mastitis.

Other protective equipment used on farm is milking sleeves (protecting the lower arm), waterproof overalls and pants, and waterproof jackets.

In warmer weather, some staff wear minimal personal protective equipment (PPE), preferring to hose themselves down after milking.

Staff milking on multiple farms may share their PPE between farms. This should be discouraged.

Breeding

Farms usually aim to calve their cows once every 12 months. Cows are inseminated via artificial insemination (AI) or a herd bull. Nationally, 34% of farms use AI only, 13% use herd bulls only, and 52% use AI and some herd bulls (Dairy Australia 2019b). Herd bulls are most commonly sourced from other farms (either purchased outright or leased). Leased bulls pose a high biosecurity threat for sexually and nonsexually transmitted diseases because of the close contact that they have with many herds. Many farms perform their own artificial insemination (DIY), especially in dairy regions with fewer dairy farms. Other farms use either contract technicians to perform AI (commercial), or a combination of DIY and commercial AI. AI semen is almost always sourced from commercial semen companies.

Calves and young stock

During calving season, a proportion of heifer calves are reared as replacement calves. In the 2018–19 season, 37% of calves born on farm were reared as replacement calves; 38% were sold as bobby calves;[10] 16% were reared as dairy beef; and 9% were stillborn or died, or were euthanased (Dairy Australia 2019b). Calves are most commonly reared on milk in sheds in close contact with other calves. Industry recommends at least 1.5 m^2 per calf (Dairy Australia 2017a).

Young calves are typically removed from their dams at 24 hours old and raised in sheds, fed milk produced on farm or powdered milk. Some farms feed calves milk produced by the 'sick' or 'blue' herd – milk that cannot be sold because of high cell count, an antimicrobial treatment withholding period or a colostrum withholding period. Feeding of milk from cows that are being treated with antimicrobials is discouraged. Milk from cows under colostrum withhold is generally provided to calves. On-farm pasteurising units to reduce the pathogen load in calf milk are very rarely used and are only capable of treating small volumes. Most calves are fed at least twice daily, although some farms feed once daily. Calves should be fed approximately 20% of their body weight per day. Calves may be housed individually or in groups, initially in sheds or hutches and later in paddocks. Some farms use automatic feeders.

[10] Bobby calves are calves aged 5–30 days, under 80 kg and transported without their dam.

Calves are introduced to a fibre source and concentrates that are usually bought onto the farm. Between weaning and calving, replacements often leave the dairy farm at 2 years of age. They may be sent to an out-block or may be agisted on another farm. Alternatively, they may be grown out by a contract heifer grower. If replacements are agisted on another farm or grown by a contract grower, they will probably come into contact with animals that originate from another herd.

On larger intensive dairy farms (especially in southern Australian seasonal calving systems – see Section 2.1.4) and with the use of breeding programs (eg fixed-time AI), many calves are born in a short period (hundreds of calves in 6–12 weeks). These farms may rely on surplus calves leaving the farm of birth with high regularity (daily to weekly) for bobby calf slaughter, or to be raised on other properties for beef or veal. If calves must remain on the farm for an extended period during a disease outbreak, the farms may not have the infrastructure or staff resources to manage all surplus calves. As a result of modern dairy cow genetics, cows produce more milk than a calf could drink in a day. Therefore, leaving calves with cows without milking may result in welfare concerns for the cow.

Pasture management

On farms that use seasonal or split calving systems (see Section 2.1.4), joining time usually coincides with a surplus of pasture on the farm. This surplus needs to be aggressively managed to maintain the quality of the farm pasture platform, or there will be a marked detrimental effect on milk production. The surplus of pasture is managed in one of three ways:

- 'strip grazing'
- 'topping' paddocks
- harvesting pasture as silage or hay.

Strip grazing uses a temporary electric fence to allow the herd a fresh allocation of pasture each grazing, but only enough pasture to consume without leaving excess plant residue. If too much plant residue is left, the pasture will lose quality and become less palatable by the next time the herd grazes the paddock. In essence, the herd may produce less milk in the short term using this tactic because they will not be able to be able to 'pick and choose' what feed they consume. However, in the long term, the herd is likely to produce considerably more milk because the paddock will have higher-quality and more palatable feed next time it is grazed. Increased grazing pressure occurs from strip grazing, which may expose the cows to a higher pathogen load.

Topping avoids excess residual pasture by using a large mower or a tractor to cut the grass either before or after grazing.

Paddocks that have already lost quality from excess growth before grazing are best dealt with by harvesting fodder in the form of silage or hay. Fodder can be used during periods of reduced pasture growth, such as winter and summer in southeastern Australia. Some farmers have the machinery required for conserving fodder (tractors, bailers, silage wrappers, compactors), whereas others rely on contractors who service many farms in a region.

Dairy businesses may own or lease multiple properties. Depending on the jurisdiction, these properties may or may not have the same Property Identification Code. Fodder, machinery and animals may be regularly moved between properties. For example, animals (and associated feeding machinery) may be regularly walked across or along public roads, leaving manure on the surface.

Transitioning cows to the next lactation

As a cow nears the end of lactation, the cow is 'dried off'. This refers to preparing the cow to stop producing milk. Cows may be put on a diet of reduced feed quality. An antibiotic may be infused into

the udder to treat existing subclinical mastitis, and a 'teat sealant' may be infused into the teats to prevent any new infections from occurring during the dry period or at calving time. Once cows are dried off, they are sometimes transported off the farm to preserve the milking platform for lactating cows. Like heifers, if dry cows are agisted, it is possible that they may come into contact with livestock from other properties.

Calving time is a period of immunosuppression and metabolic challenge for the dairy cow. The vast majority of disease events affecting dairy cows occur shortly after calving (Ribeiro et al 2016). The 'transition period' can be defined as the 3 weeks before calving to the 3 weeks after calving. The diet fed during this period has a dramatic effect on farm profitability by decreasing disease incidence, improving reproductive performance and allowing higher lactational milk yields. 'Transition cow management' refers to the strategy of improving cow health and performance by manipulating the diet during the transition period. Farms that use an effective transition cow management strategy will usually need to purchase feed inputs (grain and possibly fodder).

Disease surveillance and biosecurity

Because milking dairy cows are handled at least daily, frequent opportunities are presented to observe for signs of changes in behaviour that may be associated with disease. Drop in milk yield, changes in milking order and changes in milk quality are other indicators of illness observable by the milking staff in their day-to-day management (Polikarpus et al 2015). Dairy farmers are provided with daily information on volume and bulk milk cell count by their milk processor (by text message or physical docket), triggering internal investigations if unexplained changes are seen.

Calves are also handled daily, with close observation for disease. Diarrhoeal diseases ('scours') typically caused by *Cryptosporidium parvum* or *Salmonella* spp., are common in calf-raising facilities, and are often managed using isolation, electrolytes and antibiotics (Izzo et al 2011).

Weaned calves, bulls and dry cows may be observed less frequently, depending on feed availability and farm management.

As of 2019, 58% of dairy farmers reported having a written biosecurity plan. Written plans are more common in regions with legislated biosecurity planning requirements; 88% of Queensland farms and 87% of Western Australian farms have a written plan (Dairy Australia 2019b).

Additional income streams

Common sources of dairy farm income other than milk sales include bobby calf sales, sale of surplus dairy heifers, dairy beef sales, cull cow sales, and sale of excess fodder.

Some dairy farm operators who have invested in specialised farm machinery undertake some agricultural contracting.

The sale of surplus heifers to live export is a significant income stream; 94 661 heifers were sold to export in 2019–20. Most of these were sold from Victoria, and small numbers from Queensland and Western Australia. Of heifers sold in 2019–20, 82% were exported to mainland China; the remainder were destined for Southeast Asia, Japan and the Middle East (Dairy Australia 2021). Each export market has different import requirements and sensitivity to disease status – see the Manual of Importing Country Requirements[11] for further information.

[11] https://www.agriculture.gov.au/biosecurity-trade/export/micor

Pest management

Common vertebrate pests on dairy farms are rodents (attracted by grain and shelter), rabbits, feral cats and foxes. Less common vertebrate pests include deer, wild dogs and feral pigs. Other common animals seen on dairy farms include kangaroos, wombats, aquatic birds (eg ibis, ducks) and nonaquatic birds.

Farmers are required through their dairy licensing and quality assurance programs to keep milk storage rooms free from pests, and therefore typically control for rodents using baits, traps and cats. Professional shooters are commonly employed to control larger pests.

Key invertebrate pests from a biosecurity perspective include flies, ticks and other biting insects (eg mosquitoes, midges, mites, lice). Other significant invertebrate pests for dairy farms are internal parasites; however, these do not present a biosecurity challenge.

Flies are common on dairy farms as a result of the volume of manure (in effluent ponds) concentrated close to the milking area. Farmers are required through their dairy licensing and quality assurance programs to keep milk storage rooms free from pests including flies, and typically do so using traps and chemicals (sprayed on the premises or applied as animal treatments).

Cattle ticks are located in northern Australia, and some dairy farms are above the tick line (between the infested and free areas). State regulations set the requirements for treatment and prevention for animals crossing the tick line. Control of cattle ticks typically involves use of acaricides. Some acaricides are not available to dairy farmers because of the significant milk withholding period.

Brown ticks are widely distributed, but rarely controlled for.

2.1.4 Farming systems

There is vast climatic diversity between dairy regions within Australia. Consequently, operational strategies adopted by Australian dairy farms vary enormously.

Farms can be classified by the frequency and period over which the cows calve (calving system), and by the methods used to feed cattle and the quantities of supplementary feed used (feeding system).

Calving systems

Three calving systems are recognised on Australian farms (Dairy Australia 2017b):

- seasonal – all cows calve within a single time period each year
- split – the cows calve in two (usually spring and autumn) or three distinct time periods each year
- year-round – the cows calve for at least 10 months of the year; batch calving systems that calve groups of cows in set months of the year across the year are a form of year-round calving.

In dairy regions that have a high prevalence of split or seasonal calving systems, share-farmers and their dairy cattle are likely to move from one farm to another in the 'dry period' (when cows are no longer lactating before calving).

Factors that determine the calving system adopted, and the time of year when cows calve, include pasture availability, soil type, milk company price structure and milk company supply requirements. Some calving systems are more prevalent in particular regions (Table 2.3), and the system and timing

of calving also vary within regions. For example, a sandy coastal farm may drain well in winter, with pastures drying out early in summer, whereas, on a farm with heavy clay river flats, soils may easily compact and pug in winter but pastures may remain active well into summer. Disease events can have a significant indirect financial impact on dairy farms by altering the time and period of calving away from the optimum.

Table 2.3 Calving system by region

System	National (%)	Murray Dairy (%)	WestVic Dairy (%)	GippsDairy (%)	Dairy NSW (%)	Subtropical Dairy (%)	Dairy SA (%)	Western Dairy (%)	Dairy Tas (%)
Seasonal calving	38	27	54	53	6	3	23	17	70
Split or batch calving	39	58	39	41	20	3	50	43	23
Year-round calving	23	15	7	6	74	93	27	40	8

Source: Dairy Australia (2019b)

Feeding systems

Although terms used to describe feeding systems are not rigidly defined by industry, they usually relate to the amount of grain concentrates used, and the method of feeding supplementary feeds. Farms feed anywhere from no grain concentrates (very uncommon) to more than 2 tonnes of concentrate per cow per year.

Grain concentrates are commonly fed through the dairy parlour while the cows are milking. Concentrates may also be fed with other feed supplements on a feed pad (a designated area with feed troughs on a gravel or concrete base). This occurs at times of the year that are not conducive to pasture grazing, or year-round on a minority of farms.

Cows on some farms are housed in barns and fed a total mixed ration, although this is very uncommon in Australia.

In most circumstances, directly consumed (grazed) pasture is a highly cost-efficient form of feed (Leddin et al 2011). Consequently, where and when rainfall is abundant, and it is cost-effective to apply irrigation water to pastures, feed pads and housed barns are less often used. In some high-rainfall areas, however, feed pads can be used to avoid excess damage to pastures when waterlogging occurs.

2.1.5 Processing

The milk processing sector is diverse, ranging from micro-operations manufacturing one product to multinational companies operating over multiple factories across states. Dairy manufacturing occurs in all states. Factories are typically located either close to dairy farms or in manufacturing hubs in major cities. This means that raw milk may be transported significant distances from the original dairy farms before being processed, and raw milk is regularly transported across state boundaries. Individual dairy companies may also source milk from other companies through commercial contract arrangements, typically called 'milk swaps', to meet their milk intake needs.

Farmers sell their milk to a milk processor, typically on an annual supply contract. However, milk supply has diversified in recent years as a result of regulatory and governance changes that allow farmers to change milk processors more easily. The majority of milk processing is divided across a number of larger local and international businesses, including Bega (Australian), Saputo Dairy Australia (Canadian), Fonterra (New Zealand), Lactalis (French) and Norco (cooperatively owned). Some fresh milk supply goes direct to supermarket chains (Coles, Woolworths).

Micro-processing plants are sometimes located on farm, which eliminates the need for transport. These small processors are required to meet the same dairy food safety licensing requirements (see Section 2.3) as larger operators. Other small processors choose not to have direct contact with farmers, mostly purchasing pasteurised milk from other dairy processors.

Each processing plant produces a limited range of products, such as commodity milk powder, cheddar cheese, butter, drinking milk and consumer products (eg dairy desserts, yoghurt). Australian processors also produce specialty products such as infant formula or ingredients such as lactoferrin.

Dairy Australia maintains a list of active dairy processors buying milk directly from farmers. This is available from Dairy Australia in the event of an emergency animal disease (EAD) response.

2.1.6 Raw milk transport and processing

Generally, raw milk can only be sold to licensed operators, such as milk processors. Raw milk cannot be sold for human consumption. Dairy farmers can sell raw milk to other (licensed) dairy farmers for the feeding of calves; the transporting vessel must be clearly labelled 'not for human consumption'.

Dairy farmers are contracted to provide milk to an individual dairy processor or, in the case of non-exclusive contracts, multiple dairy processors. The dairy processor collects the milk from farms in specialised milk tankers, which may be owned by the dairy processor or a contracted private transport company. Some milk is collected by competing dairy processors in 'milk swapping' and processing agreements – this means that milk may be collected by a company that the farmer does not have a contracted agreement with.

Dairy factories collect milk from their suppliers either twice daily, daily or on alternate days, depending on milk production and on-farm milk storage capacity. The milk is transported in tankers that have a capacity of 16 000–45 000 L. A tanker may visit several farms consecutively in the process of filling the tanker before returning to the processing plant. Note that effluent may be present on the road, and potentially driven through by tankers, because some farms are permitted to move cattle across public roads to other sections of the property.

Tankers return to the milk factory depot for unloading. At the depot, milk is pumped into bulk storage silos, which may have a capacity of more than 250 000 L. Depending on the milk factory, milk may then be:

- treated (including by pasteurisation) and packaged for the whole milk market
- processed into dairy products on-site
- transhipped to smaller, boutique clients for further processing
- transhipped in bulk for processing and packaging in Australia for international markets as fresh or shelf-stable products.[12]

[12] A small volume of pasteurised liquid milk is transhipped in bulk to international markets.

Milk collection and transport are described in the Dairy Australia *Milk tanker operator information kit*.[13]

On-farm collection

The dairy may be located in the centre of the farm, and so the tanker may need to drive down farm roads, typically gravel, to the dairy. Farmers are required by most milk processor quality assurance requirements to keep cattle and manure separate from on-farm tanker routes. However, contamination of tanker areas by cattle effluent is possible through farm vehicles moving from cattle yards, paddocks or tracks to the tanker area. Table 2.4 describes activities that happen when the tanker arrives at the dairy.

Table 2.4 Activities when the tanker arrives at the dairy

Step	Activity	Details
1	Park tanker	Park tanker close to the dairy vat room.
2	Prepare vat and milk for pumping	• Perform senses check (check by sight and smell for possible contaminants or for milk that has 'gone off'). • Check vat levels and temperature. • Agitate vat for 2 minutes.
3	Attach hose	Unreel the hose from the truck and attach it to the vat. The reel and pump controls are typically located at the front of the tanker; depending on accessibility, the hose may drag on the ground. Once the hose is attached, start the tanker pump.
4	Pump and sample	While the vat is being emptied, two things occur: • The tanker vents automatically open to allow displacement of air. This only occurs during the pumping process; the vents remain closed in transit. The vents do not have air filters as this would impede cleaning of the vents. • Milk samples (typically two) are automatically taken during pumping. These are representative of the whole vat, and are used to test for contaminants, quality and milk components. Dip samples are generally no longer taken. Generally, samples are couriered to an independent laboratory, tested and disposed of within 24–48 hours. These are labelled before filling.
5	Detach hose	• Disconnect the hose once pumping is complete (not always to empty). Some milk may be spilt near the vat. The hose is not rinsed on farm. • If the vat is emptied, hose the residual milk from the vat. Depending on the farm, the vat wash cycle then starts. • Leave paperwork (eg milk slips) in the shed.

[13] www.dairyaustralia.com.au/resource-repository/2020/09/01/australian-dairy-hygiene-handbook#.YRRvoYgzaUk

Transport from farm to factory

The milk transport fleet is divided into conventional trucks and performance-based standards (PBS) trucks. Conventional trucks are allowed on all normal roads, weight and height limits permitting. PBS trucks are specially manufactured for their purpose and can only drive on legally permitted routes. These routes are known by the driver and are included in the truck maps for reference.

Most dairy processors or their transport providers use logistics optimisation software, which uses locations of farms, volumes of milk, pick-up frequency, milking times and road permit limitations to develop a list of farms for each tanker. The driver receives the list of farms at the start of their shift in the order that they should be visited; however, drivers are not restricted to exact routes and can make detours for safety or other purposes (excluding PBS trucks with permitted routes). All milk transport fleets use telematics to track the location (and other information) of trucks, and most trucks also have cameras. Most telematics systems retain the information collected indefinitely; hypothetically, this information could be accessed for contract tracing.

Depending on the size of the tanker, the time of year (spring peak is September–November), vat size, herd size and so on, the tanker might pick up from 1–15 farms in a route. Typically, tankers pick up milk from an average of four farms per route. The milk from these multiple farms is pooled in the tanker.

At the factory, a pooled sample is taken from the tanker and tested for inhibitory substances (contaminants such as antibiotics) before unloading into the milk silo. These samples are discarded after testing. Farmers are encouraged to contact the dairy processor if they suspect a vat has been contaminated, which prevents further milk being contaminated and therefore having to be discarded. If unloaded, the majority of the milk is processed on-site, depending on seasonal requirements or shutdowns. If the milk is to be sold on to other processors, it remains in the tanker ('hot seated') and is transported to the next processing facility.

Most company food safety programs require the tanker to be cleaned once every 24 hours or after carrying a contaminated load. The tankers have automatic internal washing mechanisms, typically employing a range of alkaline and acid detergents and sanitisers. This process must have regular maintenance every 6 months. The external surfaces of the tanker must be cleaned every 24 hours using truck-wash facilities; most dairy factories use manual wash facilities.

Other raw milk movements

Dairy processors with multiple factory locations may ship milk from one dairy region to another that has greater capacity at that time. In the past two decades, there have been pricing incentives for farmers to produce more of their milk outside the peak spring period, which has led to some flattening of the milk production volume over the year. Some regions, such as northern Victoria, are better suited to producing milk out of spring and therefore have achieved a flatter milk curve, and can take some of the peak milk of other regions (eg Gippsland). This means that raw milk can be transported far from its place of production and regularly across state borders.

Raw milk may also be transported to other smaller milk processors for localised manufacturing. Micro-dairy manufacturing occurs on farm, involving pumping of raw milk from the dairy vat to the manufacturing facilities.

Small amounts of colostrum and milk are transported between dairy farmers and other producers (eg specialised calf rearers, hobby farmers) for the raising of calves. This can only occur if the transportation vessel is clearly labelled ‘not for human consumption’, the receiver of the milk is also a

licensed dairy farmer, and records of the sale (date, volume, receiver) are retained by the seller of the milk.

Milk, both raw and processed, that has tested positive to contaminants is diverted from the processing plant to an environment protection authority–approved disposal site, such as the Dutson Downs Soil and Organic Recycling Facility in east Gippsland. Contaminated milk may also be returned to the farm of production if it can be disposed of appropriately there.

Small volumes of raw milk are taken by pig producers and fed to their animals in troughs or from pits. As pig producers have become more aware of biosecurity, this is becoming less common.

Records of disposal are maintained by milk processors.

Herd testing

Producers may send individual cow milk samples to a herd test centre for measurement of milk volume, fat and protein content, and somatic cell count. Samples may be collected by farmers or a herd tester who visits the farm. The samples are either transported to the herd test centre by the herd tester or collected on a round by herd test centre staff, who visit farms consecutively.

Amalgamation of herd test centres means that samples are now often collected for transport to a central testing laboratory at another location.

Individual cow-side milk testing is also used. Because samples are tested on-site and generally do not leave the farm, they pose a low biosecurity risk.

2.1.7 Waste and deceased stock

Effluent from dairy yards and feed pads is required to be dealt with on farm to avoid runoff into waterways. This is enforceable by the relevant state environment protection authority. To avoid nutrient runoff and waterway contamination, effluent may only be able to be used on paddocks at times of the year when waterlogging is less likely (ie summer and autumn). Consequently, most farms have effluent storage ponds. If herd size increases on a dairy farm with improved pasture production, effluent storage volume will need to increase, as well as the area on the farm over which the effluent can be used. Effluent is a valuable resource to increase pasture growth on dairy farms (Longhurst et al 2000, Roach et al 2001), but poses a biosecurity risk by exposing livestock to pathogens. A withholding period for pastures of at least 20 days (Roach et al 2001) should be adhered to after effluent has been applied.

On occasion, a large volume of milk may need to be dumped on a dairy farm – for example, as a result of refrigeration failure. Disposal of large volumes of milk can create a logistical problem. Discharging of milk into effluent ponds should be avoided because severe odour problems are likely to result over an extended period. State and local government environmental protection laws regulate the disposal of products on farm. Because of the time required to dry off cattle (see Appendix 1) and the limited storage facilities on farm (typically only enough refrigerated volume for 1 day), enabling milk pick-up in a disease response will need to be considered as part of the management of disease risk.

Mortalities that occur in the everyday management of dairy farms may be managed differently depending on location, the local environment and farmer preference. Knackeries operate in most states; however, only Victorian knackeries will remove farm mortalities. This is a preferred option for many dairy businesses. Dairy Australia encourages on-farm composting of mortalities or appropriate burial; however, burning or 'dead piles' left to decompose may still occur. Other options may include landfill and commercial composting sites.

Most mortalities occur during calving periods – 80% of animal health incidents occur within 3 weeks either side of calving. Industry benchmarks are 1% mortalities for adult cows and 3% for calves; this will vary significantly between farms.

2.2 Industry organisations

2.2.1 Dairy cattle

Australian Dairy Farmers

Australian Dairy Farmers (ADF) provides national representation for dairy farmers and forms the dairy commodity council of the National Farmers' Federation. This representation extends to being a member of Animal Health Australia and a signatory to the Emergency Animal Disease Response Agreement (EADRA) (see Section 4.2.1). ADF is recognised by the Australian Government as the peak national body for the dairy farming sector; its purpose is to provide policy positions on matters affecting dairy farmers.

State dairy farmer organisations

State-based members of ADF are:

- Dairy Committee of NSW Farmers
- eastAUSmilk (Queensland)
- South Australian Dairyfarmers' Association
- Dairy Council of Tasmanian Farmers and Graziers Association
- United Dairyfarmers of Victoria
- Dairy Council of Western Australian Farmers Federation.

Dairy Connect (New South Wales) is an additional dairy farmer representative body that is not a member of ADF.

Australian Dairy Products Federation

The Australian Dairy Products Federation (ADPF) is the national peak policy body representing commercial, post-farmgate members of the Australian dairy industry, including processors, traders and marketers of Australian dairy products. For the past 30 years, the ADPF has worked to represent the interests of members in promoting and protecting dairy products through advocating for improvements in the manufacturing, marketing and trading of dairy. Members of the ADPF process more than 90% of Australian milk volumes and provide dairy products for both the domestic and export markets.

Australian Dairy Industry Council

The Australian Dairy Industry Council (ADIC) is the dairy industry's cross-sectoral peak policy body. It coordinates industry policy across the various sectoral bodies and, when consensus exists, represents all sectors of the industry on national and international issues.

The ADIC represents farmers, dairy product manufacturers and milk processors through its constituent organisations: ADF and the ADPF.

Dairy Australia

Dairy Australia is the industry-owned national service organisation. Formed on 1 July 2003, it replaced the Australian Dairy Corporation, and the Dairy Research and Development Corporation.

Dairy Australia manages the Issues Management Framework (see Section 5.1)[14] on behalf of the dairy industry. It provides tools to protect the reputation of the dairy industry by actively managing risks and issues at an early stage to prevent, wherever possible, a crisis situation.

2.2.2 Other species

Some information on industries associated with other dairy species is provided in Appendix 2, noting that the scope of this manual is restricted to dairy cattle.

2.3 Industry regulations, standards and programs

The dairy industry is closely regulated from the farm to the supermarket or export.

2.3.1 Dairy food safety requirements

The dairy approach to whole-chain food safety reflects:

- international requirements under standards of the Codex Alimentarius Commission (Code of Hygienic Practice for Milk and Milk Products)
- national requirements of Food Standards Australia New Zealand (FSANZ) (see Section 2.4)
- requirements of the state and territory dairy food safety authorities.

In line with these requirements, all dairy farmers are required to be licensed to produce milk and must implement a documented food safety program, as part of a wider dairy company quality assurance (QA) program. The food safety components are approved by the state and territory regulatory authorities, based on the principles of hazard analysis and critical control points (HACCP). The QA program must meet requirements under Standard 4.2.4: Primary Production and Processing Standard for Dairy Products[15] of the Australia New Zealand Food Standards Code.

The on-farm QA program is necessary for a dairy farmer to ensure that:

- they gain a licence to operate from their state or territory regulatory authority
- their milk is accepted by their manufacturer.

The QA programs include standards for hygiene and sanitation of milking equipment and storage, the temperature at which the milk is stored, milk quality (somatic cell count and bacteria levels), health and medical treatment of the milk-producing animals, and steps taken to reduce the risk of milk contamination.

[14] www.dairyaustralia.com.au/strategic-plan-2020-25/key-strategic-resources#.Y2g8jctBxPY
[15] www.foodstandards.gov.au/code/userguide/documents/WEB%20Dairy%20Processing.pdf

Many dairy processors also include non-food safety elements in their QA requirements, including animal welfare, workplace safety, and environmental and biosecurity planning.

Regular auditing of food safety programs by state and territory regulatory authorities ensures that dairy farmers assess food safety risks and that strategies are in place to deal with the risks, including full traceability up and down the input chain.

The Australian Milk Residue Analysis (AMRA) Survey is an independent government monitoring program to monitor the effectiveness of Australian dairy food safety programs. Every year, a strategic review of current and emerging risks is undertaken as a prelude to determining the AMRA Survey monitoring program for the next year. This review uses the collective knowledge of industry and government to identify and review risks.[16]

2.3.2 Milk transport licensing requirements

As milk tankers are transporting a product for human consumption, some state dairy food authorities have licensing requirements, with regular compliance audits. There are a limited number of licensed tankers in the Australia fleet; most have a lifespan of up to 20 years. The larger milk processors (Saputo Dairy Australia, Fonterra) own the tankers that pick up the majority of milk, with the remainder picked up by contractors. Saputo and Fonterra generally keep a modern fleet, typically selling tankers after 10 years of use. Some contractors purchase these older tankers; however, the nonprocessor milk transport fleet has significantly modernised in the past decade. The milk tanker fleet is at capacity during peak production (September–November), so any additional cleaning or sanitation requirements at that time would limit the capacity for all milk to be picked up.

Tanker driver training is managed internally by dairy or transport companies; however, this has become somewhat standardised across the industry as a result of the efforts and collaboration of former milk processor Murray Goulburn and Worksafe. Whereas rollovers of milk tankers were common in the early 2000s, coordinated driver training packages developed around 2012 have made them rare. Most drivers have completed a Certificate III in Road Transport, and the industry is considering developing a milk tanker–specific generic training package.

2.4 Legislation relevant to the industry

2.4.1 Dairy food safety legislation

FSANZ sets national food safety standards, which are implemented via state and territory food regulatory authorities. State and territory authorities are responsible for implementing all regulatory matters relating to the safety of milk and dairy foods produced and manufactured in the jurisdiction. All dairy enterprises – farms, transporters[17] and processors – must be licensed by the relevant state or territory authority.

The relevant state and territory dairy and food regulatory authorities are:

- New South Wales Food Authority
- Safe Food Queensland
- Dairysafe (South Australia)

[16] www.agriculture.gov.au/export/controlled-goods/dairy/links/australian-milk-residue-survey

[17] Not all states require milk carriers to be licensed.

- Tasmanian Dairy Industry Authority
- Dairy Food Safety Victoria
- Western Australian Department of Health
- Northern Territory Department of Health
- Australian Capital Territory Department of Health.

All milk and milk products for human consumption must be produced in accordance with the Australia New Zealand Food Standards Code.

Under the Food Standards Code, Standard 4.2.4: Primary Production and Processing Standard for Dairy Products[18] establishes the food safety standards for the dairy industry. The standard covers the production, transport and processing of milk for human consumption from all milking animals (including cows, goats, sheep, buffalo and camels). The exception is raw goat milk: some state food authorities permit the production and sale of raw goat milk under specific state regulatory measures.

The standard does not apply to retail activities; these are covered by other parts of the Food Standards Code.

Standard 4.2.4 is implemented by the state or territory food safety authorities under their jurisdictional legislation through licensing, QA programs based on HACCP principles, records maintenance, audits and enforcement. The state and territory authorities provide guidelines and/or codes of practice for implementation of the standards. Different state regulators have different arrangements to verify adherence to legislative requirements. For example, Victorian dairy farmers must be audited at least every 2 years, whereas Queensland dairy farmers are audited using a risk-based approach when milk hygiene and quality indicators reach a threshold.

To help with interpreting Standard 4.2.4, FSANZ has developed a guide in three parts:[19]

- Part 1: dairy primary production requirements (FSANZ 2008). Dairy farms must implement a food safety program to control potential food safety hazards, and must have a system for tracing inputs, animals to be milked and the milk produced. People working on the dairy farm must have skills and knowledge of food safety and hygiene matters commensurate with their work activities.
- Part 2: dairy collection and transport requirements (FSANZ 2009a). Dairy transport businesses must implement a documented food safety program to control potential food safety hazards. Specific requirements address hazards arising from transport vehicles, equipment and containers used in the collection and transport of the milk or dairy product, and people engaged in the dairy transport business. The safety program ensures that the food contact surfaces of transport vehicles, and the equipment and containers used are clean and sanitary. The transport business must have a system to identify the immediate supplier and immediate recipient of the dairy products, and must transport dairy products under time and temperature conditions that prevent microbiological hazards in the product. People involved in collection and transport of milk or dairy products must have appropriate skills and knowledge of food safety and hygiene.
- Part 3: dairy processing (FSANZ 2009b). Dairy processor businesses must implement a documented food safety program, which includes a system to identify the immediate supplier of dairy products and ingredients, and the immediate recipient of the dairy products.

[18] www.foodstandards.gov.au/code/userguide/documents/WEB%20Dairy%20Processing.pdf
[19] The guide is not legally enforceable, and some elements are no longer relevant.

More information on food safety requirements and compliance with Standard 4.2.4 can be found on the FSANZ website.

2.4.2 Other species

Regardless of species, dairy producers, manufacturers and distributors must comply with FSANZ requirements and will require a dairy licence for the state or territory that they operate in. Additionally, all production animals must be traceable through the National Livestock Identification System. Requirements for testing, transport and processing of milk for other dairy species are almost identical to those for cattle. Accreditation and QA may also involve organisations for the relevant species (see Section 2.2).

Producers of buffalo milk in all states and territories (except the Northern Territory and New South Wales) must obtain a permit or licence to own buffalo, as they are considered a pest species in most states. The conditions of the permit or licence vary from state to state. Although milk processing is identical to that of cow milk, demand for buffalo milk can be inconsistent, which is a consideration for storage and transport. Most sheep milk producers process their own milk on-site, limiting the need for raw milk transport. Camel milk producers either process on-site or have a specified contractor for transport. Depending on size and contracts, goat dairies either process milk on-site, self-deliver to a manufacturer twice a week, or have a specified contractor for transport.

2.4.3 Biosecurity legislation

Legislation at both the Commonwealth and state and territory levels has been enacted for controlling EADs. The Commonwealth *Biosecurity Act 2015* is primarily concerned with preventing the introduction of disease into Australia. State and territory legislation relating to the management of stock diseases contains wide-ranging provisions that can influence operational procedures, including the availability of dairy produce for markets, during an EAD outbreak. The Acts and subordinate legislation establish controls over movement of animals and animal products, treatment of animals, decontamination (including premises and equipment involved in milk handling), slaughter and compensation.

Powers are conferred on authorised officers appointed under legislation, including the authorisation to enter premises, impose quarantine, restrict movement of milk and milk products, order stock musters, test animals, and order the destruction of animals and products that are suspected of being infected or contaminated.

2.5 Animal welfare

Animal welfare considerations on dairy farms primarily relate to the short-term care of animals and overcrowding issues in the calving season.

Dairy cows must be milked regularly. Failure to milk leads to painful udder distension, mastitis and production losses in the short term, and, if it continues for a number of days, potentially death. Many farms rely on external staff to herd cows and undertake milking. 'Dry' (heavily pregnant nonlactating) cows and heifers may be located on a separate property from the milking infrastructure. Poor welfare outcomes are likely if the farmer is unable to supervise calving, and if the cows are unable to be milked because of movement restrictions (dairy cows typically produce more milk than can be suckled by the calf).

In late summer, during drought and on lot-fed or barn-housed dairy systems, feed must be delivered to the cows multiple times daily. Lactating cows have very high energy requirements, and therefore delivery of feed and access by staff to feed are essential.

Overcrowding in calf housing is another animal welfare risk. On typical dairy farms, calves are separated from their dams, housed in sheds and fed milk from teats. These calves may be born during dense calving periods, and their care requires significant resources. Delivery of feed and milk, and access by staff to feed are therefore essential.

Roughly half of all calves born are surplus to the farmer's requirements. On many farms, they are either sent to slaughter (at 5–30 days of age) or euthanased on farm. If transport of these young calves ceases, overcrowding of calf housing may occur.

Some farms do not have access to appropriate euthanasia methods (firearm or captive bolt), and rely on veterinarians and knackery services to euthanase animals.

Farms may require emergency veterinary services, particularly during calving periods – 80% of a herd's health events occur within 2 weeks either side of calving. These events include calving (vaginal or caesarean), displaced abomasum and hypocalcaemia (milk fever).

Prolonged shutdowns may lead to downstream welfare impacts. Delays in management activities such as cutting and storing silage and hay, and disbudding of calves do not have immediate welfare impacts, but may lead to later issues – namely, reduced feed availability and the need for painful horn removal, respectively.[20]

[20] Horn bud removal should occur before the horn bud attaches to the skull of the calf at approximately 8 weeks of age. Cautery disbudding is typically undertaken by a service provider using pain relief. Horn removal, once the bud has attached, is painful and should occur under veterinary supervision.

3 Emergency animal diseases and the industry

The dairy industry has a strong reputation for producing and supplying clean, healthy products to its domestic and international markets. The industry is vulnerable to changes in its ability to supply its markets, and the effects of such changes on income, reputation, welfare of livestock and employment security. Delays in, or cessation of, milk collection and processing would have immediate effects on both the product and the market. Similarly, stopping the milking of dairy animals can have rapid flow-on impacts on animal health and welfare, and the economy.

Raw milk collection and transport, which can occur on multiple properties and over long distances, has the potential to spread emergency animal diseases (EADs) over a large area in a short period. Regular, frequent contact between properties by milk tankers, and possibly feed suppliers, veterinarians, knackery trucks, animal husbandry technicians and other personnel, can increase the risk of spread of an EAD before it is diagnosed.

The industry provides significant employment, both direct and indirect, and economic strength in associated rural areas. Loss of livestock through disease control programs, or of the ability to milk animals, would strongly affect employment.

3.1 The risk of an EAD entering Australia

Currently, importation of live cattle into Australia from overseas is not permitted. Semen and embryos may be imported from selected countries under strict import protocols. Dairy products may also be imported from selected countries under strict import protocols and following specified processing requirements. Importation of other livestock and livestock products is also strictly controlled. Import controls ensure a level of protection for the dairy industry. These legal imports are unlikely to be implicated in an EAD outbreak. However, illegal imports and other uncontrollable pathways of entry (eg vector-borne pathways) pose threats to the industry.

People returning from overseas who have had contact with livestock could transfer a disease agent to Australian dairy herds via footwear, clothing or myiases. Travellers can also bring undeclared processed and unprocessed food into the country. If undetected, these products could find their way into food refuse and into illegally fed swill for pigs, which could then pose a serious risk to animal health.

Although the likelihood of introduction and establishment of EADs is managed by import controls, the increasing movements of personal mail, cargo and passengers mean that these risks are changing.

The consequences of an EAD outbreak for the Australian dairy industry are potentially high. Maintenance of strict biosecurity is therefore important for all dairy enterprises.

3.2 Products entering the enterprise

The main farm physical inputs can be categorised as nutrients for animals, nutrient for plants, water and bedding substrate.

3.2.1 Nutrients for animals

Feed for livestock is a crucial input for most dairy farms. These inputs may include grain concentrates and fodder. Farms that use a total mixed ration or partial mixed ration are likely to use other feed inputs, such as byproducts including citrus pulp, tomato pomace and brewers' grain. Grain concentrates are used on most farms and may be purchased direct from farms or through a feed merchant. Concentrates may be fed as straight grain, a grain mix or a pelletised product. Grain and fodder purchased may or may not be sourced from farms that have livestock.

3.2.2 Nutrients for plants

Nutrients for plants include inorganic and organic products. Dairy farms commonly apply a commercial inorganic blend of nutrients twice yearly in autumn and spring in southeastern Australia. In addition, many farms apply inorganic urea to pasture with each grazing while rainfall allows plants to actively grow. Pasture yields on dairy farms have dramatically increased, largely as a result of use of urea. In higher-density dairy areas that are well serviced by industry providers, contractors commonly move from one farm to the next to apply fertiliser blends and urea.

Forms of organic nutrients for plants include compost and manure from intensive animal industries such as the poultry industry. Compost may include animal carcasses, and specified grazing withholding periods may apply to ensure that the cattle are not exposed to a restricted animal material risk.[21]

3.2.3 Water

Dairy regions in Australia have varying requirements for water and varying infrastructure available for water supply. A network of channels spanning much of northern Victoria, the southern Riverina of New South Wales and the Macalister Irrigation District of Gippsland is vitally important in these areas – it supplies water for stock and domestic purposes, as well as flood irrigation for pasture production.

In other dairy regions, water supply for stock and dairy purposes, as well as irrigation, usually comes from rivers, dams or groundwater.

3.2.4 Bedding substrate

Bedding substrate is an input brought into most dairy farms in varying quantities. Bedding substrate is used in calf rearing sheds and calving pads (confined areas used to assist cows calving, usually during inclement weather). Dairy farms that use free-stall barns (housed cattle) or large feed pads with associated loafing areas are also likely to bring in bedding substrate. Common substrates used include:

- rice hulls
- sawdust, wood chips or wood shavings
- sand.

[21] https://animalhealthaustralia.com.au/australian-ruminant-feed-ban

3.3 Risk of disease spread from the enterprise

3.3.1 Factors to consider in assessing risk of disease spread

Live animals

Live animals present a significant risk of disease spread. Animal-based risk activities are shown in Table 3.1.

Table 3.1 Animal-based risk activities

Animal type	Movement type	Factors
Calves	Transport by calf buyer for slaughter	Calves are picked up by transporters, intended for slaughter within a day or so. Trucks may stop at multiple farms to pick up calves before transport to abattoir.
	Transport for raising	Calves are picked up by transporter or producer to be raised on another farm (commercial calf raiser or smallholder). May result in mixing of animals from multiple herds. Potential risk of poor traceability.
	Saleyards	Some farmers deliver calves for sale to saleyards or calf sales, resulting in mixing of animals from multiple herds. Calves may be sold to slaughter or to other producers for raising.
Adult cows, heifers, bulls	Movement to agistment	Dry cows (nonlactating) and heifers may be agisted off farm. May result in mixing of animals from different herds.
	Transport to slaughter	Cull cows may be directly transported to abattoir from farm. Some abattoirs send transport trucks that pick up animals from multiple properties.
	Transport to other producers	Some cows and heifers are transported direct to other milking herds. This might be for sale of the animals, integration of part-owned herds, or care of the animals on behalf of the owner. Varying biosecurity measures are used by dairy farmers to reduce risk of disease transmission, from full exclusions to full mixing of herds.
Bulls	Lease bulls	Some farms lease bulls for the joining (mating) period. These bulls may have been on multiple farms. Varying biosecurity measures are used.
Genetic material	Movement of semen or embryos	Includes risk of staff acting as fomites.
Other nonmilking animals	Movement on and off farm	Dairy farmers may have other nondairy animals managed on the same property. These include beef cattle (originating as surplus calves or as a separate beef herd), and other

Animal type	Movement type	Factors
		ruminant (sheep and goats) and nonruminant (pigs, horses) animals. Dairy farmers may allow neighbouring small-scale farmers to use their husbandry facilities (yards, crushes).
All	Nonpermitted movements	Poor fences may result in animals from neighbouring properties straying onto dairy farms.

Products

For some diseases, milk may pose a risk of disease spread if fed to a susceptible species. Milk and milk products may be fed to calves or, on rare occasions, to pigs. Unpasteurised colostrum and milk are sometimes sold or shared between properties for feeding newborn calves – see Section 2.1.6 for more detail on the legal requirements for these sales. (Note: In an EAD outbreak, the feeding of milk to susceptible species may be prohibited, other than feeding calves on the property of origin.)

High-risk dairy activities associated with milk processing can be divided into direct risk activities (where a person or fomite carries the disease agent from one source directly to another) and indirect risk activities (where a second fomite or person is involved in transmission). Examples of high-risk activities are in Table 3.2.

Table 3.2 Milk-based risk activities

Activity	Risk	Notes
Milking	Exposure of milking staff to contaminated milk or animal material	Only a risk to individual milking staff; however, they could act as fomites.
	Exposure of other cows to contaminated milk or animal material	Milking equipment or staff acting as fomites following contamination with animal material.
Movement of staff between locations	Contamination of other properties	Staff not adhering to biosecurity requirements between farms (staff may work on multiple farms) and/or acting as fomites. Staff bringing contamination with them from their own properties.
	Contamination of other animals	
	Contamination of equipment	
	Contamination of milk	
Movement of milk from vat to tanker	Exposure of staff to contaminated milk	Only a risk when the tanker is not empty and is being filled, as this is the only time when the tanker vents are open, allowing aerosolisation or spillage.
	Contamination of equipment	
	Exposure of tanker to contaminated milk	If contaminated milk is introduced to the tanker, there is a risk of contaminating milk from other farms that has already been collected. Risk of tanker acting as a fomite.

Activity	Risk	Notes
Transport of milk	Exposure of driver to contaminated milk	Tanker and driver acting as fomites. Highest risk when moving milk from vat into tanker.
	Contamination of other properties	
	Aerosolisation of contaminated milk	Rare, due to tanker design. Highest risk when moving milk from vat into tanker.
	Tanker rollover leading to milk spillage	Rare, due to increased driver training.
Disposal of contaminated milk	Exposure of environment to contaminated milk	If incorrect procedure and decontamination are used.
	Exposure of public to contaminated milk	
	Contamination of equipment	
	Exposure of other animals to contaminated milk	If fed to calves, pigs or other animals, or via contamination of environment and/or equipment.

The risk of milk-based transmission drastically decreases once the tanker has left the last property on its route and heads back to the processing facility.

People

Service providers and farm visitors who commonly visit dairy farms are listed in Table 3.3. Many dairy farmers are active members of discussion groups, which are usually held on a host farm and involve a farm walk by discussion group participants. Footwear is not usually sanitised before participants enter or leave the farm.

Table 3.3 Common dairy service providers

Service	Frequency of use	Description	Biosecurity considerations
Milk tanker	Twice daily to every second day	Collect milk to deliver to the milk processor.	Tanker driver picks up milk from multiple farms, and the order of pick-up may change. The driver can be expected to make contact with milk.
Livestock carrier	As required	Transport cattle to markets, abattoirs, or out-blocks and agistment.	Cattle being transported to markets and abattoirs are likely to travel with livestock from other farms. Trucks may be hosed out but are not routinely sanitised between clients.
Veterinary service provider	As required – time-critical	Treat sick or injured animals; provide	Equipment and workwear such as stethoscopes,

Service	Frequency of use	Description	Biosecurity considerations
		preventive treatment and consultation, and reproductive services, including pregnancy testing.	thermometers, head halters and gumboots may not be effectively sanitised between clients. Rectal gloves used to pregnancy test cows are not routinely changed between animals.
Milking machine technician, refrigeration technician, plumber, electrician, mechanic	As required – time-critical	Required for plant and equipment breakdowns.	Likely to service multiple farms in area. Biosecurity risk will depend on the type of service, and when and where it is applied, particularly in relation to milking yards, milking parlour, teat cups and calf sheds.
Stockfeed supplier	Weekly to monthly	Supplementary feed is used on most farms. Significant production drop could be expected if access is restricted. Restriction of concentrates for transition cows or calves is likely to have a significant effect on animal health and welfare.	Grain may be sourced from properties that graze cattle. Additives to feed (minerals, medications, supplements) may be imported from international suppliers.
Dairy supplier	Weekly to monthly	Required supplies include dairy plant chemicals, teat spray, milking gloves. Supplies can be important for food safety, animal welfare and personal protection.	
Artificial insemination technician	Daily in joining period	Artificial insemination is used on most dairy farms (approximately 87%). Many farms rely on an external technician to undertake the procedure. Delaying joining is likely to have an ongoing and major impact on profitability.	Workwear such as overalls and gumboots may not be effectively sanitised between clients. Rectal gloves are not routinely changed between animals.
Farm contractor – seeding, silage, hay, effluent spraying, fencing, fertilising	Time-critical when required, although short delay is often possible	Provide contracting services for essential tasks on farm, often requiring specialised and expensive equipment. If seeding, fodder conservation or fertiliser/urea application is delayed, considerable production loss may occur	Tractors in contact with effluent may travel from paddock to paddock and farm to farm without effective sanitisation between sites.

Service	Frequency of use	Description	Biosecurity considerations
		from reduced ability, or inability, to grow or preserve feed.	
Knackery service provider	As needed	In some instances, livestock may be euthanased and disposed of on farm.	High biosecurity risk because carcasses from multiple farms are collected by truck during a collection before returning to the knackery. Driver's workwear and truck are unlikely to be sanitised. In some instances, trucks may drive down farm laneways to access animals and carcasses.
Bobby calf collector	1–3 times weekly during calving season	Many farms (especially those with seasonal and split calving systems) do not have adequate infrastructure to house all calves. Inability to sell bobby calves may result in an unacceptable animal welfare outcome.[a]	Most farms have a designated 'bobby calf' pen. This is an area of high traffic flow as calves are continuously added and taken away from the pen during calving season. Truck drivers enter the pen and are unlikely to sanitise their workwear between farms. Farm staff also enter the pen and are unlikely to sanitise themselves afterwards.
Nonveterinary animal husbandry technician	As required	May be used for practices including hoof trimming, freeze branding, pregnancy testing and calf disbudding.	Equipment and workwear may not be effectively sanitised between clients.
Farm consultant, agronomist, stock agent, nutritionist	As required		Likely to walk through yards or paddocks without sanitisation of footwear or other workwear.
Herd testing technician	Monthly to quarterly	Test individual cow's milk for quality and quantity	Technicians may not sanitise workwear effectively between farms. Herd testing equipment may not be sanitised effectively between farms.

a Poor welfare outcomes could result from overcrowding of calf-rearing facilities, and resultant hygiene and disease outcomes. Alternatives to early slaughter include raising for beef, which is not practical for many dairy farms or for the breed of cattle (jersey and jersey cross) or euthanasia. Euthanasia should be performed by captive bolt or firearm by an authorised, trained individual. Carcasses should be disposed of in accordance with local environment protection authority requirements.

Carcass disposal

Mortalities that occur in the everyday management of dairy farms may be managed differently depending on location, the local environment and farmer preference. Knackeries operate in most states; however, only Victorian knackeries will remove farm mortalities. This is a preferred option for many dairy businesses. Dairy Australia encourages on-farm composting of mortalities or appropriate burial; however, burning or 'dead piles' left to decompose may still occur. Other options may include landfill and commercial composting sites.

As dairy farms have high water demands, many dairy farms are located close to watercourses, groundwater and floodplains. This means that some dairy farms do not have suitable locations for mass disposal of animals. In an EAD response, off-farm disposal of mass mortalities and destroyed animals needs to be considered. See the **AUSVETPLAN operational manual: *Disposal*** for further information.

3.4 Significant issues for the industry in the event of an EAD incident

3.4.1 Broad issues

The dairy industry relies on the ability to milk animals daily, and to move product off farm to processors for ongoing, continuous supply to markets. Processing plants also rely on a consistent supply to meet market requirements. The perishable nature of the product leads to logistical and refrigeration costs. Any change affecting these factors will affect the health and welfare of the animals, maintenance of market supply domestically and internationally, consistency in employment, and farm and processor income and sustainability.

Dairy farms are vulnerable to rapid spread of disease as a result of their intensive nature, movement between properties of transport vehicles, and often close proximity to neighbouring properties. These factors also provide an opportunity to detect disease incursions early – producers are regularly observing a significant proportion of their animals, and will quickly notice any drop in milk production or other health issues.

Australia's trading partners all have animal health requirements that would prevent importation of Australian dairy products for some period after an outbreak in Australia of an EAD for which dairy products are a risk. The time taken to resume trade can vary.

Movement controls that would be imposed in Australia, such as those relating to movement from a restricted area or a control area, may restrict the short- to medium-term movement of raw milk from farms to processing facilities. This may lead to dumping of milk, with consequent environmental impacts. The possible impacts of movement controls (including a national livestock standstill) on the dairy industry are discussed in more detail in Section 5.4.

Some milk may have left the farm or processing facility (for delivery to other processing plants) before an EAD outbreak has been confirmed. Ease of traceability of this milk relies on accurate record keeping by farmers, tanker drivers and processors. Processors already track milk from tankers back to individual farms when required.

3.4.2 Commercial implications

Commercial implications of an EAD outbreak affecting the dairy industry include:

- loss of income for people and companies that take ownership of milk and other dairy products along the dairy pipeline, including dairy farmers, processing plants and manufacturers
- loss of income for companies that provide services to the Australian dairy processing industry, such as
    - milk tanker companies
    - feed suppliers
    - suppliers of miscellaneous farm services (eg farm consultants, veterinarians, reproductive technicians, nutritionists)
- although most EADs are not a risk to public health, loss of consumer confidence in the Australian product, both domestically and internationally, leading to long-term reduction in demand or change in supplier
- potential loss of live export markets for heifers
- loss in the overall number of animals in areas affected by the EAD and loss of important genetics
- long-term sustainability impacts on producers, processors, allied industries and rural communities based in dairy areas.

3.4.3 Nature of the incurred losses

The perishable nature of dairy products means that losses are likely to be significant, with additional problems of refrigeration, storage space and animal welfare issues.

An EAD outbreak will create:

- financing issues (and associated interest charges) for recurring costs associated with business operations in the absence of all, or part, of the business's cash flow
- potential decrease, devalue or loss of domestic and international trade in dairy products and animals
- environmental issues resulting from dairy product disposal, where storage is limited and carcasses require on-farm disposal
- additional costs for any remedial treatment and monitoring
- potential losses due to depreciation in market value
- potential herd and genetic losses as a result of disease and disease control measures
- job losses as businesses respond to the reduced ability to maintain their normal business operations
- potential company closures.[22]

Compensation may be available for dairy producers if dairy animals, milk or property are destroyed. Details are available in the **AUSVETPLAN operational manual *Valuation and compensation***.

[22] Large multi-herd corporate enterprises will be as vulnerable as local and multinational corporate processors, so a single enterprise collapse may have an immediate widescale impact in affected and unaffected areas.

3.4.4 Possible longer-term implications

Long-term implications will vary with the type of EAD, its location and spread, and the export market response.

If loss of access to Australian dairy products in customer countries results in reputational damage and sourcing of products from competitor countries, reduction in demand for Australian dairy products and a loss of export income in the long term may result.

Australia may also lose live export markets for heifers.

3.5 Diseases of concern for the industry

Relevant features of each of the diseases included in the Emergency Animal Disease Response Agreement[23] and AUSVETPLAN that affect cattle, sheep, goats, buffalo and camels are summarised in Appendix 3.

For more information, refer to the relevant **AUSVETPLAN disease-specific response strategy.**

3.6 Work health and safety

Some diseases pose a potential risk to people handling infected animals or tissues. People responsible for handling infected or suspect animals must maintain due care and maximum personal hygiene at all times to limit the risk of becoming infected. Diseases presenting the most risk include rabies, screw-worm fly, vesicular stomatitis and Rift Valley fever.

3.7 Other considerations

Dairy farmers have continued close contact with their cows, and therefore often form strong attachments to their animals. Although some farmers manage their animals in purely economic terms, many farmers are emotionally attached to individual animals, knowing genetic lineages and naming individuals. Some farms may have genetic lines going back multiple human generations.

Awareness of this strong attachment is important in an EAD response. Farmers' mental health may be at risk if they are not supported in the event of their herd being destroyed. Anecdotally, severe mental distress has been seen in Australian dairy farmers required to cull their animals following bushfires. This is validated by research on psychological distress in farmers following the United Kingdom's 2001 foot-and-mouth disease outbreak, with 73% of farmers experiencing psychological morbidity (Peck 2005). Furthermore, 48% of Dutch farmers who had animals culled in that outbreak exhibited signs of severe post-traumatic distress (Olff et al 2005). Availability of mental health services and support during a disease incursion needs to be considered during the preparedness phase.

[23] https://animalhealthaustralia.com.au/eadra

4 Emergency animal disease preparedness and management

4.1 Australia's animal health services

Australian governments, primary industries and other stakeholders work closely together to prevent, detect, control and manage pest and disease outbreaks, and minimise impacts on the economy, the environment and international trade. To do this effectively, governments, industries and stakeholders use consistent and collaborative approaches to determine national animal health priorities. The livestock industries are active partners in policy development, support targeted animal health activities and contribute to emergency responses.

4.2 National arrangements

Governance arrangements for the response to emergency animal diseases (EADs) are outlined in the **AUSVETPLAN *Overview***.

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

Australia's response planning and coordination are enhanced by collaborative national arrangements between governments and industry, and other key stakeholders. These arrangements include:

- the Emergency Animal Disease Response Agreement (EADRA)
- the Australian Veterinary Emergency Plan (AUSVETPLAN)
- training for EAD response personnel.

Coordination of the response to EAD incidents is further enhanced by the use of established consultative committees and management groups.

4.2.1 Emergency Animal Disease Response Agreement

The EADRA[24] is a legally binding agreement between the Australian Government, state and territory governments, livestock industries and Animal Health Australia. It supports a rapid and efficient response to an EAD outbreak.

The agreement establishes basic operating principles and guidelines, and defines roles and responsibilities of the parties that are involved. It provides for formal consultation and dispute resolution between government and industry on resource allocation, funding, training, risk management and ongoing biosecurity arrangements.

The signatories of the EADRA are committed to:

- minimising the risk of EAD incidents by developing and implementing biosecurity plans for their jurisdictions or industries

[24] The full title of the agreement is the Government and Livestock Industry Cost Sharing Deed in Respect of Emergency Animal Disease Responses. For more information, see https://animalhealthaustralia.com.au/eadra.

- maintaining capacity to respond to an EAD by having adequate numbers of trained personnel available to fill the response functions specified in AUSVETPLAN
- participating in decision making relating to EAD responses, through representation on the Consultative Committee on Emergency Animal Diseases (CCEAD) and the National EAD Management Group (NMG) established for the incident
- sharing the eligible response costs of EAD incursions using pre-agreed cost-sharing formulas.

Four categories of diseases are used to determine the liability for costs. These categories have been developed according to the benefits of controlling the disease, as assessed by the likely impact of the specific EAD on human health, socioeconomics, the environment and livestock production.

Table 4.1 describes the four disease categories and their respective cost-sharing arrangements.

Table 4.1 Disease categories and cost-sharing arrangements

Category	Cost-sharing arrangement
1	100% government
2	80% government 20% industry
3	50% government 50% industry
4	20% government 80% industry

The EADRA also contains many other important instructions that provide the basis for a coordinated national EAD response. In particular, it refers to using existing plans, such as AUSVETPLAN; sets standards for accounting, auditing and training personnel; and provides the incentive for developing and maintaining government and industry biosecurity measures.

4.2.2 AUSVETPLAN

This enterprise manual is part of AUSVETPLAN – the Australian Veterinary Emergency Plan.

AUSVETPLAN is Australia's nationally agreed approach to responding to EADs of national significance. It comprises resources that support efficient, effective and coherent responses to these diseases. It has been developed and agreed on by governments and relevant industries in non-outbreak times to ensure that a fast, efficient and effective EAD response can be implemented consistently across Australia with minimal delay.

AUSVETPLAN provides the contingency planning framework for Australia's response to EADs, and is complemented by a range of other plans and resources, including:

- national and state/territory standard operating procedures for the implementation of certain response measures
- plans involving other areas of state and territory emergency management arrangements (eg police, local government)
- diagnostic resources
- training materials.

4.2.3 Training for emergency animal disease response personnel

It is a requirement of the EADRA that, where possible, signatories (governments and industries) use appropriately trained staff to undertake the response functions outlined in AUSVETPLAN for an EAD response.

Governments provide training in response functions for their personnel.

Animal Health Australia's Training Services project provides training for government personnel and representatives of the Australian livestock industries to help prepare them to participate in the CCEAD and the NMG. The program also provides training for livestock industry representatives to prepare them to undertake the Liaison – Livestock Industry function in either a state coordination centre (SCC) or local control centre (LCC).

The responsibilities of the SCC and LCC Liaison – Livestock Industry functions are documented in the **AUSVETPLAN management manual *Control centres management*, Part 2**.[25]

4.3 Controlling an emergency animal disease incident

4.3.1 Governance

Control of an EAD outbreak is a complex operation, requiring rapid mobilisation of resources and coordination of a diverse team of people. An EAD response may require input from all tiers of government and from a range of portfolios, as it may need to address not only animal health issues, but also financial, social, economic, human, trade and recovery issues.

EAD responses are planned and implemented at three levels: national, state or territory, and local.

The Australian Government (through the Department of Agriculture, Fisheries and Forestry) provides international liaison during an EAD response; this includes market access negotiations, international reporting (eg to the World Organisation for Animal Health – WOAH, formerly the OIE), and coordination of access to overseas assistance through existing agreements. The Australian Government also provides national coordination for the response; more information is provided in the **AUSVETPLAN management manual *Control centres management*, Part 1**.

The CCEAD is the key technical coordinating body, providing the link between the Australian Government, states and territories, industry, Animal Health Australia and the NMG during an EAD response.

The NMG manages national policy and resourcing of the response. It determines whether a disease is eradicable and whether the direct costs of a response should be shared between Australia's governments and the relevant livestock industry(ies) under the EADRA.

Both the CCEAD and the NMG base their recommendations and decisions on current information provided by the affected state or territory, and on guidance provided in AUSVETPLAN.

In an EAD outbreak, relevant state or territory animal health officials manage all aspects of its control and eradication according to a nationally agreed plan (Emergency Animal Disease Response Plan – EADRP).

[25] https://animalhealthaustralia.com.au/ausvetplan

The chief veterinary officer (CVO) of the state or territory in which an EAD outbreak occurs implements disease control measures as agreed in the EADRP and in accordance with relevant legislation. State and territory animal health (or, in many cases, biosecurity) legislation provides broad powers to enable an effective response to EADs, including the ability to enter premises, examine records, order livestock musters, control livestock movements, request that animals or products be submitted for testing, and isolate and destroy diseased or suspected diseased livestock.

An SCC may be established to coordinate response activities across the state or territory, in accordance with the strategic direction provided by the CVO, the CCEAD and the NMG. The SCC maintains overall control of the incident under the CVO and is able to give specific directions to the LCCs to ensure that the CVO's intentions are met.

Disease control activities are managed from an LCC, usually established in the vicinity of the outbreak. The LCC is responsible for all operational activities within a defined area, assigned by the CVO, including investigations of reports of disease outbreaks; consultation with livestock producers and processors; specimen collection; property quarantine; valuation of livestock and property; livestock slaughter; livestock product tracing, treatment and disposal; and property decontamination.

Information on the structure, functions and responsibilities of the SCCs and LCCs is contained in the ***Control centres management*** **manual, Part 1**. Detailed descriptions of functions and associated activities in an EAD response are contained in the ***Control centres management*** **manual, Part 2**.

The CVO makes ongoing decisions on follow-up disease control measures in consultation with the CCEAD and, where applicable, the NMG, based on epidemiological information about the outbreak.

4.3.2 Response measures

The response to an EAD will be determined by the nature of the outbreak, including:

- how early the outbreak is detected
- the extent of the outbreak
- the location of infected, suspect, trace and dangerous contact premises
- which species of livestock are affected
- the characteristics of the disease agent involved.

The fundamental aim of national EAD control policy is to eradicate an EAD if this is reasonably feasible. Key factors taken into account are those related to the disease and affected population. For example, the principal option used for many EADs is eradication by stamping out where this is applicable to the EAD in question and is considered to be cost-effective. This may involve use of all or some of the following procedures:

- epidemiological assessment (to understand how the disease is behaving in that particular outbreak)
- quarantine of premises and/or movement controls on potentially infected or contaminated live animals, animal products, people, equipment, vehicles and other things – this will include a national livestock standstill if foot-and-mouth disease (FMD) is strongly suspected or confirmed; see the **FMD response strategy** for more information
- tracing of potentially infected animals, and potentially contaminated products and things (eg equipment, vehicles)
- surveillance of susceptible animals
- biosecurity measures for people and equipment
- management of animal welfare

- valuation and compensation for livestock and property (including milk and milk products) destroyed as part of the EAD response
- destruction and disposal of infected and exposed susceptible animals, animal products and contaminated materials
- decontamination of infected premises
- restriction of the activities of certain enterprises
- an industry and public information program.

Other measures that may be used where necessary include:

- vaccination
- vector or wild animal control
- treatment of affected animals
- treatment of affected products
- use of sentinel animals
- zoning and compartmentalisation.

In some circumstances, a modified stamping-out approach may be used – for example, by allowing the slaughter of animals at an accredited abattoir to produce a marketable product.

Sometimes, eradication is not considered feasible because the outbreak is already widespread when diagnosed or is considered likely to spread further despite the application of stamping out. In these cases, other control measures may be selected, such as vaccination, with a view to possible containment and eventual eradication; or a state or territory and/or industry-based control program to manage a disease that is likely to become endemic in the population. Where the NMG has reason to believe that eradication is not possible and the disease can only be contained, or in any situation where the cost of an EADRP will exceed an agreed limit on funding, the NMG may decide to stop cost sharing.

4.3.3 Overview of declared areas and premises classifications

Declared areas

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

Declared areas are declared under jurisdictional legislation. RAs are subject to strict disease control measures. CAs are disease-free buffers between an RA and the parts of Australia that are free of disease (the outside area – OA; see Figure 4.1).

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 CVO or their delegate, or a ministerial declaration, according to the appropriate legislation of the states and territories involved.

There are also other areas that are not legally declared, but are used for specific reasons:

- transmission areas (TAs), which are used for vector-borne diseases for epidemiological purposes, recognising that vectors are not confined by property boundaries
- the OA, which is used to describe the rest of Australia outside the declared areas.

Area definitions for non-vector-borne diseases

Restricted area (RA)

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

An RA will be a relatively small declared area[26] (compared with a CA – see below) drawn with at least 'x' km radius[27] 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, and other relevant disease 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.

Control area (CA)

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

A CA is a disease-free buffer between the RA and the OA (see below). Specific movement controls, surveillance strategies, and other relevant disease controls 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 'y' km,[28] encompassing the RA(s). 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 CA. The boundary will be adjusted as confidence about the extent and distribution of the incident increases.

[26] As defined under relevant jurisdictional legislation.
[27] For specific details, refer to the relevant AUSVETPLAN response strategy (https://animalhealthaustralia.com.au/ausvetplan).
[28] For specific details, refer to the relevant AUSVETPLAN response strategy (https://animalhealthaustralia.com.au/ausvetplan).

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 more likely to be permitted to move under permit within and from the area than those originating from the RA.

Outside area (OA)

The OA is **not** a declared area but is used to describe the rest of Australia outside the declared areas (CAs and RAs). 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 also be of interest for zoning[29] and compartmentalisation[30] for purposes of trade access, as well as for disease control (see below).

Area definitions for vector-borne diseases

Transmission area (TA)

A TA is an area, not legally declared, that is used for vector-borne[31] diseases for epidemiological purposes, recognising that vectors are not confined by property boundaries. It includes IPs and, where possible, SPs, TPs, DCPs and DCPFs. A TA is subject to an increased level of surveillance, and has movement controls appropriate to its associated RA.

Vector-borne diseases differ from non-vector-borne infectious diseases in that vectors cannot be contained by boundary fences. The TA is thus less concerned with property boundaries or definitions and more with including all infected vectors in the area surrounding known areas of transmission. It will be drawn around known sources of transmission, as evidenced by disease, seroconversion, trapping of infected vectors and any other confirmation of active disease transmission. There may be insufficient information at the start of a response to identify a TA, and an RA may be put in place before a TA can be determined.

In the presence of competent vectors, a TA of 'x' km[32] radius should be drawn. The TA does not need to be circular but can have an irregular perimeter, provided that the boundary is initially an appropriate distance from the nearest IP, DCP, DCPF, SP or TP. This distance will depend on the information gained about vector numbers and competence, environmental factors (eg prevailing winds, rainfall, temperature, humidity), and the number and distribution of infected and/or susceptible animals. In the absence of competent vectors, the TA may be reduced in size.

Restricted area (RA)

An RA will be a larger legally declared area around the TA. The boundary of the RA does not have to be circular or parallel to that of the TA but should be at least 'y' km[33] from the boundary of the TA; this distance may be influenced by WOAH standards or an official control program. The RA can include areas of known competent vector distribution. In general, surveillance may be less intense than in the TA, but movement controls will be the same.

[29] The process of defining, implementing and maintaining disease-free and infected areas, in accordance with WOAH standards. Zoning is based on geopolitical and/or physical boundaries and surveillance, in order to facilitate disease control and/or trade.

[30] The process of defining, implementing and maintaining one or more disease-free establishments, under a common biosecurity management system, in accordance with WOAH standards. Compartmentalisation is based on applied biosecurity measures and surveillance, in order to facilitate disease control and/or trade.

[31] In most cases, a TA is focused on insect (arthropod) vectors.

[32] For specific details, refer to the relevant AUSVETPLAN response strategy (https://animalhealthaustralia.com.au/ausvetplan).

[33] For specific details, refer to the relevant AUSVETPLAN response strategy (https://animalhealthaustralia.com.au/ausvetplan).

The boundary of the RA will be adjusted as confidence about the extent of the incident increases. It will take into account the relevant WOAH *Terrestrial animal health code* chapter on the disease and, if appropriate, WOAH standards on zoning and compartmentalisation (Chapter 4.3[34]).

Other types of areas

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

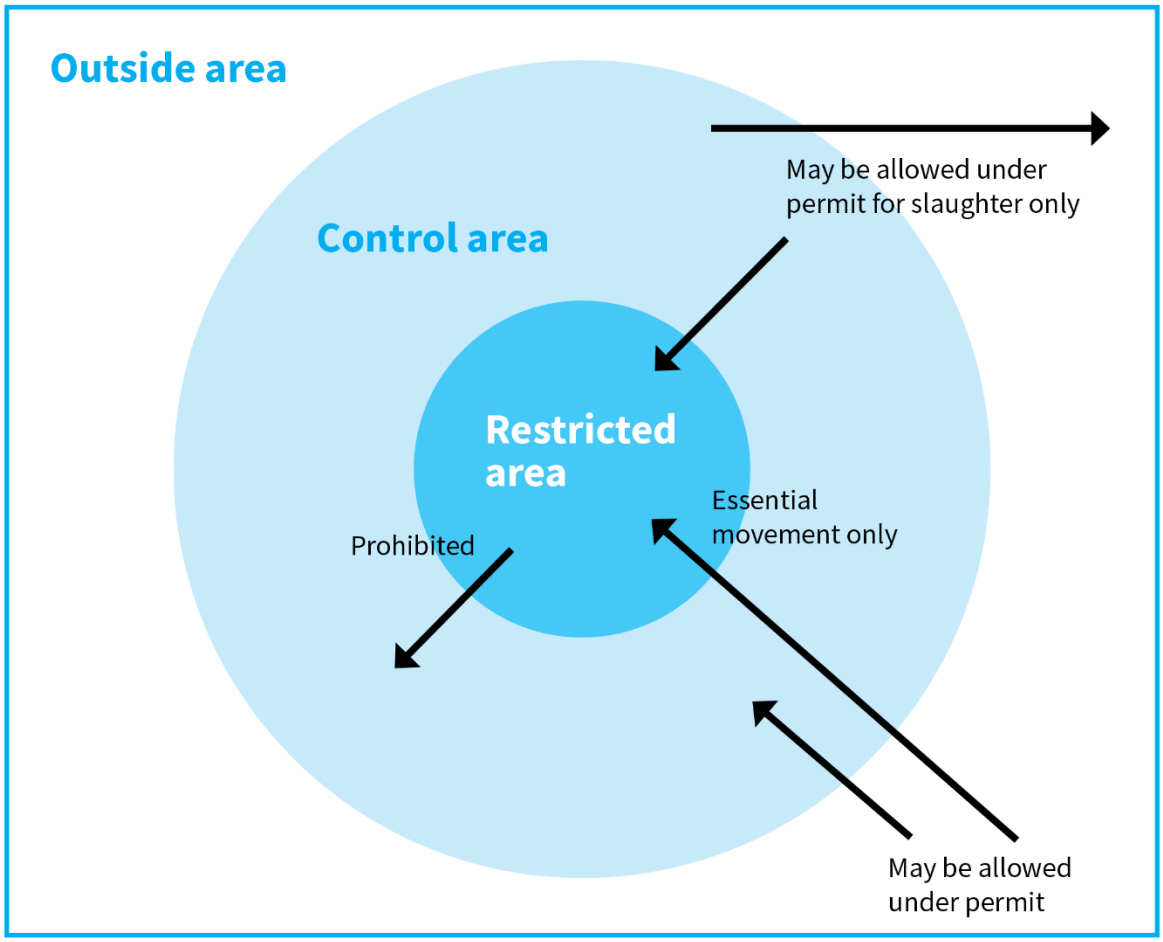

Figure 4.1 Schematic illustration of declared areas, indicating standard movement controls

Premises classifications

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

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

- approved disposal site (ADS)
- approved processing facility (APF)
- at-risk premises (ARP)
- dangerous contact premises (DCP)

[34] https://www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access

- dangerous contact processing facility (DCPF)
- infected premises (IP)
- premises of relevance (POR)
- resolved premises (RP)
- suspect premises (SP)
- trace premises (TP)
- unknown status premises (UP)
- zero susceptible species premises (ZP).

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

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

For example, an ARP that has been determined by the relevant jurisdictional authority as being 'assessed negative' should be recorded as 'ARP-AN', and an IP that has completed a vaccination program should be recorded as 'IP-VN'.[35]

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

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

4.3.4 Use of declared areas and premises classifications in an EAD incident

When an EAD incident is first suspected, the premises involved would undergo a clinical and/or epidemiological investigation. If the case definition, as defined in the relevant **AUSVETPLAN response strategy**, is met[36] (ie the index case[37]), the relevant CVO or their delegate will determine the premises classification and may declare the premises an IP.

After the identification of the first IP, an RA and a CA may be declared.[38] A TA may also be defined, if appropriate. All premises within these areas will be classified. At the beginning of an EAD incident, the initial premises classifications would be IP, ARP, POR, UP and ZP.

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

Once the first IP has been identified, intelligence gathering through veterinary epidemiological investigations would quickly lead to the identification of SPs and TPs. These will be high priorities for follow-up investigation by the relevant state or territory authorities. In a worst-case scenario, an SP could become an IP; therefore, SPs need to be investigated as a matter of very high priority. Similarly, investigation and risk assessment of a TP might identify it as an IP, DCP or DCPF. Both an SP and a TP

[35] Some jurisdictions might have a date associated with the 'assessed negative' qualifier.

[36] Note that case definitions are under development for some manuals and also that some diseases could be present without showing clinical signs.

[37] The first case to come to the attention of investigators.

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

might also be assessed as negative and qualified as SP-AN and TP-AN, and eventually reclassified as an ARP, POR or ZP.

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

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

5 Industry preparedness

5.1 National-level industry preparedness and response planning

On behalf of the national dairy industry, Australian Dairy Farmers (ADF) and Dairy Australia (DA) participate in a number of national emergency animal disease (EAD) preparedness and response planning activities. These include maintenance of the Emergency Animal Disease Response Agreement and AUSVETPLAN, and training for personnel to undertake roles as dairy industry representatives on the Consultative Committee on Emergency Animal Diseases (CCEAD) or National Management Group (NMG), or to fill the Liaison – Livestock Industry function in state coordination centres (SCCs) or local control centres (LCCs).

The dairy industry's national EAD response planning will be complementary to EAD response planning for the cattle, sheep and goat meat and fibre industries. Although there may be some overlap between these, each industry's response plans will have standalone status. Dairy farms produce at least two products – milk and meat – so meat industry response plans need to reflect this.

National Issues Management Framework

On behalf of the Australian dairy industry, DA manages a national Issues Management Framework (IMF). The IMF was established when DA was set up in 2003 with support from all industry representative organisations, to effectively and efficiently coordinate responses to issues on behalf of industry.

The IMF takes a risk-based approach. It involves ongoing scanning and development of background information shared with a trusted network of people to assist the industry to manage dairy issues and risks (Table 5.1).

Table 5.1 Current scope of IMF processes and documents

What	How	Resource
Identify An actual, perceived or potential issue that may affect the reputation of the industry as a whole	Monitor: Industry Scan meetings, DA staff, RDPs, ADF, ADPF, processors, government, media, inquiries, reception. Alert DA's issues manager and add to issues register.	Fortnightly Industry Scan meetings Issues register

Assess The issue and potential impact on industry reputation	Assemble an issues team with issues manager, media manager, DA subject matter expert(s), relevant RDP (if regional), ADF/ADPF if needed. Nominate leadership team as the decision maker and keep them informed. Use issues analysis worksheet to: • determine the situation and facts • clarify objectives • confirm team roles and responsibilities • identify immediate actions • agree on spokespeople and holding statement.	Issue analysis template Topical resources on DA website, issues notes, internal database
Communicate To DA, industry and stakeholders who may need or have information on the issue, so that they are well briefed and speaking with one voice	Depending on the scale and sensitivity of the issue, contact: • DA subject matter experts, executive leadership team, media manager, relevant RDPs, relevant state dairy farmer organisations, ADF, ADPF • DA emerging issues email group • relevant processors • relevant government authorities • industry issues management contacts through formal industry brief (copy to DA staff).	Issues key contacts Emerging issues email group on DA global list Issues management campaign list Industry brief template
Escalate To trigger the full rapid response process (if needed)	Implement process depending on whether issue is: • an emerging threat – industry issues response • a serious threat with potential to escalate – rapid response process (triggered by leadership team member) • a significant incident or emergency – scaling up of Rapid Response Team to a full Crisis Team (triggered by managing director).	Rapid response process Rapid response action plan Rapid response job cards
Review The response and resolution	Prepare, share and store a review of what happened, what DA did, what worked and what did not work, what can be learned.	Issue review template

ADF = Australian Dairy Farmers; ADPF = Australian Dairy Products Federation; DA = Dairy Australia; RDP = Regional Development Program

Where issues – such as an EAD outbreak – affect the operations, business continuity, profitability or reputation of the industry, the IMF is used to coordinate industry-wide response efforts and, where necessary, establish a Rapid Response Team (RRT). An RRT includes representation from ADF, the

Australian Dairy Products Federation (ADPF), DA and other stakeholders, such as manufacturers, regulators and technical experts, as appropriate.

Where an incident or emergency rises to the level of a crisis, requiring a more focused allocation of resources for industry response (eg major natural disasters, pandemics), the highest level of response is triggered. This involves escalation of the RRT to a Crisis Team and formation of a National Response Group, with representation of ADF, ADPF and DA directors, to facilitate rapid national industry decision making.

As part of the IMF, the dairy industry maintains networks:

- of trained representatives to participate in national committees such as the CCEAD and NMG
- of trained industry liaison personnel to represent industry at the state and local levels during an EAD response, in SCCs and LCCs, respectively
- of industry spokespeople
- for communication with dairy producers and others in the supply chain (including milk transporters and processors). For example, processors know where dairy farms are located and can track milk tankers. They can contact dairy farmers and tankers very quickly, and pass on messages such as those relating to declared areas and movement restrictions. They also have access to customer and market intelligence.

5.2 Enterprise-level industry preparedness and response planning

EAD response planning is a critical part of the dairy industry's preparedness for an outbreak, or suspicion of an outbreak, of an EAD in Australia.

Response planning will assist dairy farmers and others in the dairy industries to:

- reduce the risk of introducing disease to their enterprise
- if the premises is already infected or contaminated, reduce the risk of spreading the disease within the premises or to other premises
- work with government biosecurity officers to manage an EAD outbreak with the highest degree of mutual understanding and efficiency
- minimise the time out of domestic and export markets.

In addition to disease control principles, factors that need to be taken into account in developing appropriate response plans include:

- protection of valuable breeding stock (where possible)
- animal welfare
- use and/or disposal of milk
- milk collection operations
- environmental impacts
- business continuity.

Enhancing routine on-farm biosecurity, as part of contingency planning, provides a solid basis for protecting dairy farms and the industry in the event of an EAD outbreak. Guidelines on how to enhance on-farm biosecurity as best management practice are available from DA.[39] DA is also developing tools to help dairy farmers develop a customised biosecurity plan for their farm. The Farm Biosecurity

[39] https://www.dairyaustralia.com.au/animal-management-and-milk-quality/animal-health/biosecurity#.YwgifXZByUk

website also provides guidance on how to improve on-farm biosecurity and how to develop an EAD action (or response) plan.[40] Food Standards Australia New Zealand guidance documents (FSANZ 2008, 2009ab), providing detailed guidance on compliance with Standard 4.2.4 for dairy farmers, transporters and processors, also support many of the requirements of contingency planning for EADs.

5.3 Biosecurity measures and the industry

As outlined in Section 5.2, the type of biosecurity measures applied during an EAD response will depend on the specific disease, and the disease status and risks associated with the premises. Guidance is available in the **AUSVETPLAN disease-specific response strategies**.[41] Information specific to each outbreak will be available from animal health authorities (generally via the SCC and LCC) and through the 'National pest and disease outbreaks' website.[42]

5.3.1 General biosecurity

For many EADs, disease can be spread before signs of disease are obvious. This makes the implementation of strong biosecurity practices important regardless of whether an EAD has been reported in Australia.

Effective biosecurity practices should be in place at all times to help manage endemic diseases, and will assist in preparing for and responding to an EAD an outbreak. These practices include measures to prevent contact with potentially infected animals or contaminated items, and to decontaminate people, equipment and other items on entry to and exit from dairy premises.

The dairy industry will implement increased biosecurity measures for its operations when an EAD is declared. Biosecurity measures applicable to the industry in general will include:

- increased surveillance for signs of the EAD (eg by dairy farmers, veterinarians, workers, tanker drivers, processors) and prompt reporting if an EAD is suspected (see Section 5.3.2)
- enhanced record keeping for movements of dairy animals, products, visitors, equipment and vehicles onto and off the premises (see Section 5.3.3)
- measures to prevent spread of disease (eg by restricting the movement of people, equipment and vehicles onto and off dairy farms and processing premises); in the event of foot-and-mouth disease, this will involve immediate implementation of a minimum 72-hour national livestock standstill.

Detailed guidance for measures to be implemented on farm, at processing facilities, by milk tanker drivers and for decontamination of vehicles is provided in Appendixes 4–7. The potential impact and implications of key measures are discussed in Section 5.4.

[40] www.farmbiosecurity.com.au/wp-content/uploads/2014/07/Preparing-your-business-to-survive-an-emergency-animal-disease-outbreak.pdf
[41] https://animalhealthaustralia.com.au/ausvetplan
[42] www.outbreak.gov.au

5.3.2 Surveillance

Rapid recognition and reporting of new cases will greatly assist disease control by allowing appropriate measures to be implemented on infected premises, limiting the potential for the disease to spread.

Personnel on premises with susceptible animals should regularly observe the livestock for signs of EADs, in addition to any surveillance undertaken by the government animal health authority. Signs will vary with the disease, and may include drops in production and/or unusual physical signs. Guidance on signs to look out for, and how to report them, is provided in Appendix 3. Additional guidance is available:

- in disease-specific AUSVETPLAN response strategies
- from government animal health agencies (including through their websites)
- during an outbreak, from the 'National pest and disease outbreaks' website.[43]

The effectiveness of surveillance on farm will be enhanced if awareness materials are displayed on-site and training in EAD awareness is routinely provided to staff. Adoption of on-farm biosecurity plans will be invaluable in preparing owners and staff for an EAD incursion.

5.3.3 Record keeping

Sound record keeping will help with tracing potentially infected animals and contaminated material. It may also aid the assessment of the disease status of premises and any applications for movement permits. Sound record keeping is important at all points in livestock transactions and along the milk supply chain, including on farm, for milk tanker collections and routes, and at processing facilities (see Appendixes 4–7).

Sound record keeping includes keeping the records readily accessible, current, comprehensive and complete. For records of movements onto and off premises, it includes keeping details of the origin, transit points, destinations, relevant dates, permissions and items moved.

Maintaining appropriate livestock identification records, and a current and accurate inventory of livestock, infrastructure and equipment, will also expedite the process of valuing animals and items to be destroyed (and so help with the preparation of claims for compensation).

5.4 Impact of movement controls and a national livestock standstill

5.4.1 Impact of movement controls

Controls on the movement of animals, people, vehicles, equipment, product (including milk and milk products) and other material that may be infected or contaminated are an essential component of a response to prevent spread of an EAD. In an EAD outbreak, all enterprises, including those that handle milk and milk products, are responsible for avoiding the risk of disease spread through their routine activities. However, movement controls will limit dairy farm and processing operations, especially

[43] www.outbreak.gov.au

when they are maintained for an extended period. Operations that may be particularly affected include:

- daily collection of unprocessed (raw) milk from dairy farms, and transport of the raw milk to a milk processing plant
- movements on, off and between dairy farms of feed trucks, utility providers and service providers, such as veterinarians, artificial breeding technicians and employed staff
- maintenance of separate premises for growing and mating of heifers and dry cows.

Perhaps the most challenging aspect is that, for some EADs, milk may not be collected from higher-risk premises (infected premises, dangerous contact premises, suspect premises and trace premises). This will rapidly have an impact on operations on these premises, creating issues for storage of milk, inactivation of the disease agent in the milk, disposal of milk (on-site or elsewhere), and animal welfare (with the rapid drying-off of lactating animals).

Guidelines for the inactivation of EAD agents in milk and for disposal of milk on farm are provided in the **AUSVETPLAN operational manuals *Decontamination*** and ***Disposal***.

Guidelines for drying off dairy cows in emergency situations are provided in Appendix 1. Industry experts should be consulted for advice on drying off other dairy species in emergency situations.

5.4.2 Impact of a national livestock standstill

A national livestock standstill is currently relevant only to movements of live animals susceptible to foot-and-mouth disease. When a national livestock standstill is in place, essential husbandry movements that involve crossing public roads – such as moving the milking herd to the milking shed – may continue unless advised otherwise, provided that the farmer had prior appropriate approval from the state road authority or local council. The cows must be managed to minimise faecal contamination of the road (eg hold mob for a period before crossing) and be walked directly across the road. Cows may be walked within the farm premises for milking.

Appendix 1 Drying off dairy cows in an emergency

During an outbreak of an emergency animal disease, producers may need to dry off cows in peak production.

Cows in peak production may be producing 30 L or more of milk per day. Early drying off can create a number of health and welfare issues for cows, and needs to be carefully and gradually achieved. The method used to dry off cows can also significantly influence how many udder infections establish during the dry period.

The aim is to shut down milk secretion and seal the teat canal as rapidly as possible – this usually takes about 2 weeks. Most new infections occur in quarters where the teat canal has not sealed.

It is important to consider the ration that cows will be fed once they have been dried off, and to start moving cows towards that ration. As a guide, the level of concentrates should not change by more than about 0.5 kg every 2 days.

The ration fed to dry (nonlactating) cows will depend on availability of hay and silage, and whether there is any infrastructure that might allow the continued feeding of concentrates to dry cows. Running dry cows through the dairy to feed them is possible, but it may cause letdown of milk and predispose cows to mastitis.

It may be wise to consult a veterinarian or nutritionist, since modifying the composition of the ration, including its protein content, can help to partition energy away from milk production. It is important to consider the effect of reducing the ration on additives such as monensin, which may be ineffective when fed at reduced doses.

For cows producing more than 12 L, careful steps need to be taken to reduce production to 12 L or less before drying off. These steps require special management, and involve reducing food intake and changing routine.

The following procedure is suggested to reduce yields sufficiently for drying off:

- Start changing the ration towards the ration you intend to feed your dry cows, as described above.
- Take cows off concentrate feed gradually (sudden changes can induce metabolic issues).
- Do not reduce water intake.
- Ensure that adequate roughage is provided.
- Gradually reduce feed intake to maintenance level (about 7–8 kg of hay for a 500 kg cow).
- Once cows have reduced milk production sufficiently to consider drying off (about 3 days before drying off), change the routine of milking.
    - Cease milking cows producing 12 L or less per day at drying off.
    - Dry off abruptly; do not skip days, and preferably do not skip milkings, before drying off.
    - Milk cows as usual at each milking until drying off (do not deliberately leave milk in the udder). Intermittent milking provides a stimulus to produce milk and impedes sealing of the teat canal. The risk of mastitis is greatly increased if cows are milked every second day.

The decision whether to use a dry cow therapy product and/or teat sealant should be made in conjunction with a veterinarian. This will be based on factors such as herd test records, bulk milk cell

count, mastitis levels and the future outlook of the herd. A dry cow therapy product with a broader spectrum of action may be appropriate in circumstances where post–drying off hygiene is difficult.

It is important to minimise the number of bacteria on teats by teat dipping (with approved iodine- or chlorhex-based teat dip or spray) after the last milking, and not allowing cows to lie down on bare ground or areas that are soiled with manure in the 2 hours immediately after dry cow treatment is given. Cows are particularly susceptible to infection until the keratin plug forms.

Do not leave cows in laneways or yards immediately after drying off. Put them in a dry, clean paddock (not heavily soiled with manure, no bare ground, no exposure to dairy effluent) for 3–4 days after drying off.

Milk leaking from the udder, particularly under pressure, will impede the development of the keratin plug and increase the chance of infection. It is often useful to keep recently dried off cows in a paddock well away from the milking herd and milking area, to reduce the possibility of milk ejection being triggered.

Continue the 'maintenance only' diet for another 3–4 days for cows that were producing 12 L or more per day in the week before drying off.

Health and welfare issues

During this process, producers need to be vigilant in observing cows for signs of mastitis or metabolic issues. Any signs of mastitis should be treated as advised by the veterinarian. The *Countdown farm guidelines for mastitis control*[44] provide information on this issue, as well as practical recommendations for successfully drying off milking cows with the minimum risk of infection under normal conditions.

Metabolic issues are of greater risk for cattle that are in poorer condition at the start of the process (condition score 3 or less). Special care needs to be taken when reducing these cows to a maintenance diet.

Cows should be carefully observed when feed intake is reduced to maintenance level, to ensure that an acceptable body condition is maintained. Cows that are losing too much weight may need to be separated into a different group, with the feed reduced more slowly.

Reducing or changing feed intake will affect cow fertility. If cows are currently joining or have recently joined, any feed reduction needs to be carefully considered because it will affect joining success and could result in aborted fetuses. Advice should be sought from veterinarians, industry representatives or department of primary industry dairy staff.

[44] www.dairyaustralia.com.au/animal-management-and-milk-quality/mastitis-and-milk-quality/mastitis/countdown-resources#.YVZgjppBxaQ

Appendix 2 Other dairy species

Dairy goats

The Australian dairy goat industry is relatively small but geographically diverse.[45] Australian goat milk production is estimated at 16 million L per year, with a farm gate value of approximately $20 million. As at May 2017, there were around 68 dairy goat farms and 15 goat milk factories in Australia. There are several very large, intensively managed (sometimes in feedlots) dairy goat herds (around 400–2000 animals), as well as small extensively managed herds (less than 50 animals). The industry services the demand for alternatives to cow milk and for exotic cheeses. In Australia, milk from dairy goats is mostly sold as fresh milk, or used to produce cheese, yoghurt or milk powder.[46] There is also a small, high-quality export market for stud dairy goats.

A typical dairy goat lactation lasts for 300 days. Herd production averages are 2–3 L per doe per day. At peak lactation, this increases to 3.5 L per day, with some individuals producing much more. A large proportion of dairy goat farms process their own milk and supply direct to wholesalers.

The Goat Industry Council of Australia (GICA)[47] is the peak national body that represents and promotes the national interests of Australian goat meat, fibre and dairy producers. GICA is a member of Animal Health Australia and a signatory to the Emergency Animal Disease Response Agreement (EADRA).

The Dairy Goat Society of Australia[48] is committed to the breeding and promotion of pedigreed dairy goats. It is an associate member of GICA.

Dairy sheep

In 2017, there were 13 commercial dairy sheep farms in Australia, with an estimated total flock size of 5500 sheep. The main dairy sheep are various crossbreeds, along with Awassi and East Friesians. Annual production is about 550 000 L of milk, of which more than half is used to make yoghurt and almost all the remainder is made into cheese.[49] The estimated gross value of sheep milk products at the farmgate was around $5.5 million in 2017.

A typical dairy sheep lactation is 180–240 days. Average production is approximately 2 L per ewe per day.

Unlike cow milk in Australia, which is delivered to central processors, sheep milk is usually processed on farm.

Sheep Producers Australia[50] is the peak national body that represents and promotes the national interests of Australian sheep producers. It works to enhance the productivity, profitability and sustainability of the Australian sheep and lamb industry. Sheep Producers Australia is a member of Animal Health Australia and a signatory to the EADRA.

The main industry associations that cater for dairy sheep are the Australian Specialist Cheesemakers' Association[51] (the peak body for Australia's specialist and artisan cheese makers) and the Dairy

[45] www.gica.com.au/history-of-goats/dairy-goats
[46] www.agrifutures.com.au/farm-diversity/dairy-goats
[47] www.goatindustrycouncil.com.au
[48] http://dairygoats.org.au
[49] www.agrifutures.com.au/farm-diversity/dairy-sheep
[50] https://sheepproducers.com.au
[51] https://australiancheese.org

Industry Association of Australia[52] (a not-for-profit industry association for dairy product manufacturers and allied trades, which also covers aspects of the sheep milk industry).

Milking buffalo

The milking buffalo industry in Australia is small, but increasing. Buffalo milk production is lower than that for cows, typically 6–10 L per day per buffalo (milked once daily). The type of buffalo milked are river, or riverine, buffalo (*Bubalus bubalis*). The main use for buffalo milk, due to its high milk solids (twice the level of cow milk), is to produce dairy products – mainly mozzarella cheese, yoghurt, feta cheese, labneh cheese and ice-cream (gelato).

Buffalo milk has significantly lower levels of cholesterol and higher levels of calcium than cow, sheep or goat milk. It is also a rich source of iron, phosphorus, vitamin A and protein. Buffalo milk is also suitable for people who suffer cow milk allergy.

The Australian Buffalo Industry Council[53] is the peak body representing buffalo growers. It promotes and consolidates the buffalo industry throughout Australia, and encourages research and development to improve husbandry, processing and marketing of buffalo.

Milking camels

The camel milk industry is a niche milk-producing industry, which is experiencing growth and high demand. AgriFutures Australia predicts that the industry will grow to a much larger scale in the next few years.[54] The Australian Camel Industry Association is the primary organisation supporting the Australian camel industry.

Milk production in camels is highly variable, ranging from 2 to 30 L per day (rarely more).

[52] https://diaa.asn.au

[53] www.buffaloaustralia.org/web

[54] www.agrifutures.com.au/publications/market-assessment-new-and-emerging-animal-industries-tranche-1-mohair-alpaca-and-camel-milk

Appendix 3 Diseases of concern for the dairy industry

The table below shows relevant features of each of the diseases included in the Emergency Animal Disease Response Agreement[55] and AUSVETPLAN that affect cattle, sheep, goats, buffalo and camels.

For more information, refer to the relevant **AUSVETPLAN disease-specific response strategy.**

Disease	Main species impacted	Human health risk	Agent	Main transmission pathways	Present in milk	Destroyed by pasteurisation	EADRA category
Anthrax (major outbreaks)	All mammals	Yes	Bacterium	Dead animal	Yes (only at point of death)	Yes	3
Aujeszky's disease	Pig is natural host; also seen in cattle, sheep, goats	No	Virus	Close contact with live animal or ingestion	No	NA	4
Bluetongue	Sheep, goats, cattle, buffalo, camels, antelopes, deer	No	Virus	Vector	NA (midge vector)	NA	3
Borna disease	Horses, sheep	?	Virus	Live animal	No	NA	4
Bovine spongiform encephalopathy	Cattle, cats	Yes	Prion	Product	Not known	Not known	2
Bovine tuberculosis due to *Mycobacterium bovis*	Cattle, buffalo, deer, camelids, rhinoceros, elephants, giraffe	Yes	Bacterium	Live animal	Yes	Yes	4
Brucellosis (due to *Brucella abortus*)	Cattle, horses	Yes	Bacterium	Live animal, fomites	Yes	Yes	2
Brucellosis (due to *Brucella melitensis*)	Goats, sheep	Yes	Bacterium	Live animal, product	Yes	Yes	2

[55] https://animalhealthaustralia.com.au/eadra

Disease	Main species impacted	Human health risk	Agent	Main transmission pathways	Present in milk	Destroyed by pasteurisation	EADRA category
Contagious bovine pleuropneumonia	Cattle	No	Mycoplasma	Live animal	Yes (not spread by milk)	NA	3
East coast fever	Cattle	No	Parasite	Live animal, vector	NA (tick borne)	NA	4
Encephalitides (tick-borne)	Sheep, cattle, horses, pigs, deer	Rare	Virus	Live animal, vector	Yes (louping ill can be transmitted in milk)	Yes	3
Foot-and-mouth disease	All cloven-hoofed animals, elephants	Rare	Virus	Live animal, product, fomites, aerosol, semen	Yes	No	2
Haemorrhagic septicaemia	Buffalo, bison, cattle	No	Bacterium	Live animal, fomites	No	NA	4
Heartwater	Cattle, water buffalo, sheep, goats	No	Rickettsia	Live animal, vector	No (tick borne)	NA	4
Jembrana disease	Bali cattle, other cattle (mild or subclinical)	No	Virus	Vector, mechanical, live animal	Yes	Probable	4
Lumpy skin disease	Cattle, buffalo	No	Virus	Mechanical	Yes	Unknown	3
Maedi–visna	Sheep, goats	No	Virus	Live animal, aerosol	Yes	Yes	4
Nairobi sheep disease	Sheep, goats	Yes	Virus	Vector	NA (tick borne)	NA	4
Peste des petits ruminants	Sheep; goats; cattle, pigs (possibly affected, either subclinically or very mildly)	No	Virus	Live animal, aerosol, semen	Probably	Unknown	2

Disease	Main species impacted	Human health risk	Agent	Main transmission pathways	Present in milk	Destroyed by pasteurisation	EADRA category
Pulmonary adenomatosis	Sheep, goats	No	Virus	Live animal, aerosol	Probably	Unknown	4
Rabies	All mammals	Yes	Virus	Live animal	Occasionally	Yes	1
Rift Valley fever	Cattle, sheep, goats, dogs	Yes	Virus	Live animal, vector	Probably	Yes	2
Rinderpest	Cattle, sheep, pigs	No	Virus	Live animal	Yes	Yes	2
Scrapie	Sheep, goats	No	Prion	Live animal	Yes	No	3
Screw-worm fly	All mammals	Yes	Parasite	Live animal as vector	NA	NA	2
Sheep pox and goat pox	Sheep, goats	No	Virus	Live animal, mechanical	Yes	Unknown	2
Sheep scab	Sheep	No	Parasite	Live animal, product	NA (mite)	NA	4
Surra	Horses, cattle, deer, camelids, dogs, cats	No	Parasite	Mechanical	Experimentally	Unknown	4
Vesicular stomatitis	Cattle, horses, pigs, sheep, goats	Yes	Virus	Live animal, vector	Yes	Yes	2
Wesselsbron disease	Sheep, goats, humans	Yes	Virus	Live animal, vector	No (mosquito borne)	NA	4

EADRA = Emergency Animal Disease Response Agreement; NA = not applicable

Appendix 4 Biosecurity measures for dairy farms during an emergency animal disease outbreak

The specific emergency animal disease (EAD) involved will influence the biosecurity measures required and the movement restrictions applied to dairy animals, milk and other products. For detailed requirements, refer to the relevant **AUSVETPLAN disease-specific response strategy**.

Depending on the disease, short-distance or local spread may occur through direct contact between animals or vectors; airborne spread of aerosols between animals in near proximity; and people, animals, vehicles or equipment acting as fomites. Vector-borne diseases are expected to spread more widely, depending on prevailing environmental conditions, as well as along transport routes (in livestock vehicles). It is often not possible to determine which mechanism actually resulted in local disease transmission. Some diseases can also spread rapidly over long distances with fomite movements.

Good farm biosecurity should be practised at all times. Having the right measures in place at the time of an outbreak can prevent or reduce spread of the disease. A pre-prepared EAD action plan can assist in rapid implementation and understanding of requirements. Once an EAD is diagnosed in a previously free area, prompt implementation of movement controls should minimise the potential for long-distance spread. Enhanced biosecurity measures on individual farms will greatly reduce their risk of becoming infected. These measures are described below.

Note: Disinfection will only be effective if an appropriate chemical is used that is approved for use for the EAD agent and used according to instructions. Prior removal of organic material and sufficient contact time between the disinfectant and the surface are crucial. If conditions are hot, windy or sunny, or if the surface is curved, reapplication of the disinfectant could be required. Cleaning of the dairy will produce runoff and slurry. Systems for effluent and manure management may vary considerably; the pollution produced during cleaning of dairies must comply with the environment protection authority guidelines in the affected state or territory.

Minimising risks during continued operation

Livestock

Keep animals separate

- Movement on or off the property of milk and other dairy products, animals, carcasses and genetic material (semen and embryos) may require a permit:
    - Do not move (accept or release) animals, animal products (including milk and milk products), and associated equipment and vehicles unless allowed by government authorities.
    - Tracing may be conducted on previous movements, before the first notified case of disease.
    - Keep records of all movements of animals and animal products onto and off the property.
- Where possible, keep a buffer such as an empty paddock, road, fenced windbreak or plantation, or river between groups of cattle, or other susceptible species, especially neighbours' animals.
- Keep boundaries secure, as straying animals could carry infection to or from the premises. Check that fences and gates are secure.

- Ensure that susceptible livestock are not in near proximity to the milk tanker during loading.
- Minimise contact between visitors and livestock.
- Ensure that biosecurity measures are applied even during visits to out-paddocks and other locations.
- The farm owner or manager should provide a clean roadway for the milk tanker to approach and leave the milk pick-up point (free from animal excrement, runoff and susceptible livestock).
- Where susceptible animals cross public roads, ensure that roads are left clean and disinfected. Avoid allowing animals to cross dirt or gravel public roads that cannot be disinfected.
- Keep horses, dogs and pets under control and prevent them from straying, as they could introduce infected material.
- Prevent effluent from milking sheds and yards, vehicle washing areas and paddocks used by livestock from entering drains or leaving the premises.
- Disinfect milk spills using appropriate disinfectants as advised by disease control authorities. Refer to the **AUSVETPLAN operational manual *Decontamination*** for appropriate disinfectants for specific disease agents.
- Milk that needs to be disposed of on-farm should be disposed of in accordance with biosecurity and environmental guidelines.[56]
- Calves on a dairy farm in a restricted area (RA) or control area (CA) may be fed raw milk only from their own farm (since this will not introduce any new disease agents) or commercial milk replacer produced in accordance with the standards applying to animal feed.
- Personnel involved in sampling during milk collection or for herd testing must observe biosecurity measures on entry to and exit from the premises. However, herd testing may be suspended in the RA and CA. Sampling equipment should be disinfected internally and externally before it is removed from the property.

Report unusual illness in livestock

- Immediately report any unusual disease signs, such as lameness, salivating/slobbering, blisters or ulcerations on the teats or mouth, depression or sudden drop in milk production (or other disease signs, as advised by milk processing plant and dairy industry groups), to a government or private veterinarian. The **Emergency Animal Disease Watch Hotline** (**1800 675 888**) can be used for notification of suspicion of EADs.
- Animal health authorities will rapidly implement programs to raise awareness among farmers and workers who have day-to-day contact with livestock, as well as veterinarians, veterinary paraprofessionals and diagnosticians.
- Reporting of suspicion of EADs is a legal requirement.
- Notify the milk company of illness in livestock or a sudden drop in milk production, so that milk collection can be suspended until the case is investigated.

[56] https://agriculture.vic.gov.au/livestock-and-animals/dairy/managing-effluent/emergency-disposal-of-milk

National livestock standstill (for foot-and-mouth disease)

- Unless for essential husbandry movements – such as moving the milking herd to the milking shed – or other declared movements, approval will be required for all livestock movements, other than within the confines of a property or to contiguous properties, including across any public road.
- Apply enhanced animal biosecurity measures and enhanced monitoring for disease (see above).
- Vehicle and visitor movements should be restricted (see below).
- Necessary vehicle movements onto the property should have decontamination procedures applied (see below).
- Apply strict biosecurity, hygiene and sanitation measures to potentially contaminated materials, including effluent, runoff and milk.
- Undertake personnel biosecurity measures (see below).

Vehicles

Minimise vehicle access

- Minimise the number of vehicles entering the farm. These include feed trucks; milk tankers; and vehicles of hay contractors, veterinarians, artificial insemination technicians and milkers.
- Where possible, leave visitors' vehicles at the gate and travel in farm vehicles.
- Keep a record of the date and time for all vehicles, including tankers, that enter the farm and whether they had contact with animals or potentially contaminated areas (eg cattle yards, stock laneways).
- Minimise vehicle access to areas containing animals. Keep cattle and other livestock off farm roads used for regular service vehicles, such as milk tankers and feed trucks.
- Prevent contact of milk tanker and feed truck drivers with animals.

Decontaminate vehicles on and off the farm

Note: Specific requirements for vehicle decontamination will be provided within the general or special permit conditions required for vehicle movements into, within and out of declared areas.

- Provide equipment for decontamination of vehicles and people, including water, disinfectant, tubs, and brushes or power sprayers.
- Ensure that all vehicles and machinery (including the farmer's vehicle and machinery moving between sites) that come onto the farm are washed clean of soil, mud and manure, and are free of plant material, and then disinfect them with a disinfectant appropriate for the EAD agent:
    - Special attention should be paid to wheels and wheel arches, and underneath the vehicle and tray, as well as upper areas.
    - Stock transport vehicles must have the trays, ramps, and so on thoroughly cleaned and disinfected.
    - The interior of the cab should also be clean; rubber mats should be cleaned and disinfected.
    - Upon collection, the milk collection tankers must have the hose capped, and the outside of the hose and the connecting nut disinfected before returning the hose to the tanker.
- Ensure that disinfectants are properly diluted according to manufacturers' recommendations and are freshly prepared; many disinfectants are ineffective in the

presence of organic matter, such as mud and manure, and therefore visible material should be removed before disinfectant is applied.
- Keep a record of vehicle decontamination, including the disinfectant used, concentration and time.
- Ensure that drivers and others wash and disinfect boots and wear clean clothing. If clothing is soiled with mud, urine or manure, or has been used when handling animals, ensure a change into clean clothes before drivers enter (and leave) the farm.
- Avoid driving vehicles and machinery through manure and mud, and avoid driving onto other farms. Runoff from paddocks or the dairy should be directed away from any drive paths that are likely to be used by vehicles that are coming onto, or going off, the property.
- The milk collection area and other parking areas must be clean and kept free of stock. If used by stock, the area should be decontaminated and disinfected before each tanker visit.

Further details are provided in Appendix 5.

Personnel

Cleaning

- Wash all organic matter off outer clothing and footwear before spraying or brushing with disinfectant; there is no benefit in using disinfectants on dirty clothes or boots.
- Change into clean outer clothing and footwear, and wash hands and exposed skin with soap and water before handling different groups of animals.
- Place dirty clothes in a plastic bag that is sealed and has the outer surface disinfected before placing in vehicle.
- After handling livestock or items contaminated with mud, manure, milk, urine, and so on, wash hands and scrub fingernails with soap and hot water.
- Never wear work clothes when entering the house or leaving the farm, especially if you are visiting other farms, or contacting other people who handle livestock or visit places where livestock are present.
- Avoid visiting other farms and places of animal congregation, such as saleyards. If you have visited livestock or saleyards, clean and disinfect your vehicle before entering and on leaving the other farm, and before returning to your own farm, and change your clothes before you visit your own animals.
- Wash with detergent, at the highest temperature possible, all clothes worn when handling livestock or contaminated by materials.

Visitors

- Minimise the number of visitors having access to animals.
- Ensure that visitors always follow biosecurity measures for both their vehicles and themselves.
- Ensure that visitors wear clean clothes and boots before entering the premises. If clothing is soiled with mud, urine or manure, or has been used when handling animals, ensure a change into clean clothes before visitors enter (and leave) the farm.
- Tanker drivers and other visitors must use protective clothing and rubber boots.
- Keep a record of the date and time for all people and vehicles, including tankers, that enter the farm and whether they had contact with animals or potentially contaminated areas (eg cattle yards, stock laneways).

Appendix 5 Biosecurity measures for approved milk processing plants receiving milk from a declared area

Although milk processing plants operate to high levels of hygiene under statutory quality assurance programs, some additional measures may be required during an emergency animal disease (EAD) outbreak, as well as reinforcement of the routine procedures.

Site security for vehicles and people

- Ensure that vehicles cannot enter the processing plant, especially milk reception areas, without approval.
- Ensure that people cannot enter the processing plant without approval.

Biosecurity of vehicles and people entering the site

- Establish a vehicle washing station at the entrance to the milk reception area to clean and disinfect the exterior of vehicles, particularly milk tankers, on entry to, and exit from, the site.
- Ensure that people working with raw milk (eg unloading tankers) wear gloves (and other disease-appropriate personal protective equipment) that are regularly disinfected, especially if they are contaminated with milk.
- Maintain normal interior and exterior cleaning and disinfection of tankers every 24 hours.
- Ensure that people entering the processing plant wear protective clothing and boots.
- Ensure that boots are disinfected before people enter and leave the plant.
- Ensure that employees working in the milk reception area, and the processing and processed product storage areas are not exposed to susceptible animals while off-site (eg living on a lifestyle farm with susceptible animals).
- Maintain records of all vehicles and people who enter the plant.

Internal segregation of raw milk areas from processing and product areas

- Segregate the raw milk areas of the plant from the processing and processed product storage areas:
    - Cross-contamination of the processed product by unprocessed milk must be prevented.
    - People working in the raw milk areas must not enter the processing and product storage areas.
- For movement of people between the raw milk areas and the processing and product storage areas of the plant, ensure:
    - change of protective clothing and boots, and washing of hands
    - cleaning and disinfection of boots before movement between areas
    - maintenance of disinfectants in accordance with manufacturers' specifications.

Milk tanker management

- Milk tankers used for farm collections in the restricted area and control area must be modern, low-frothing bottom-filling or minimal-splashing tankers, with automatic opening and closing breathers that are closed when not under pressure.
- Thoroughly inspect milk tankers daily to ensure that there are no leaks, with visual inspection before leaving each farm.
- Schedule farm collection tankers to minimise the number of collections per run and to collect from lower-risk farms first, and have routes approved by relevant authorities.
- Collaborate with other processors to allow collection of milk from farms contracted to other processors to minimise movement of tankers between areas of different risk.
- Ensure that tanker drivers are contactable at all times after leaving until they return to the plant.
- Ensure that tankers are locatable at all times, and that routes are traced by GPS monitoring (although real-time tracing is not required).
- Monitor milk production on farms:
    - If a sudden drop in milk production that has not been notified is noticed on a farm, the farm owner/manager should be contacted by the tanker driver or milk company receivals supervisor to establish the reason.
    - If the reason is associated with an issue related to livestock, milk collection should be suspended and the local control centre (LCC) notified to investigate (although other clinical signs may not be initially observable). If the reason is associated with a mechanical or other non-livestock-related issue, no further action is warranted.

Processing to the required standards

Note that this example is for foot-and-mouth disease (FMD). See the relevant **AUSVETPLAN response strategy** for details for specific EADs.

- Raw milk must be processed to at least the minimum standards specified. The standard used will depend on a number of factors, including the original pH of the milk, and the end product and its use:
    - Standard 1[57] – minimum treatments required for milk and other dairy products for human consumption
    - Standard 2 – minimum treatments required for milk and other dairy products for animal consumption.

Waste management

Note that this example is for FMD.

- Treat all waste – including reject raw milk (eg because of antibiotics), white water, sludge, off-specification products, product scraps and samples, unsold products, recalled products and out-of-date products – to inactivate any FMD virus before disposal by either:
    - acidification – reducing the pH to less than 5 and holding for at least 1 hour
    - heating – further heat treatment to Standard 2.

[57] Standards 1 and 2 specifications are outlined in the AUSVETPLAN FMD response strategy.

- Where applicable, ensure that waste products are not fed to FMD-susceptible animals unless further processed to meet Standard 2.

Monitoring and validation of processing standards

- Monitor and record processing of all milk (in line with the Food Standards Code[58]).
- Undertake additional monitoring and recording as required by the relevant authorities.

Record maintenance for processing, production and distribution

- Maintain records of all movements into and out of the plant, including:
    - vehicles
    - people
    - milk and other inputs
    - products, ensuring that product can be traced.

Internal and external auditing

- Conduct regular internal audits of processing and record keeping to ensure compliance with requirements.
- External audits may be required by the animal health agencies to ensure compliance with approved processing facility (APF) accreditation and to support certification.

Designation of a liaison person to communicate with the LCC

- Appoint a responsible officer to liaise with the LCC. The responsible officer must:
    - ensure compliance with APF accreditation
    - provide information and advice to the LCC Liaison – Livestock Industry function (see the ***Control centres management*** **manual, Part 2**), the LCC Controller or other officials, as required, on operations and the impact of the response on the industry.

[58] www.foodstandards.gov.au/code/userguide/Documents/WEB%20Dairy%20Processing.pdf

Appendix 6 Vehicle decontamination

This appendix provides general concepts for vehicle decontamination; specific details will be dictated by the incident response and risk assessment.

Depending on the disease, milk tankers and other vehicles could potentially spread disease through spilled milk, contaminated manure or soil, or contamination of the driver's clothes and boots.

Milk tankers must be disinfected before entering and exiting a dairy farm in a restricted area or control area. This will generally be at a specified location such as the farmgate.

Requirements for the decontamination site and equipment are:

- a decontamination site or work area, preferably hard-standing (bitumen or concrete), with good drainage, at or near the farm entrance; a bund may be necessary to prevent wash water from entering drains or waterways
- exclusion of animals (susceptible species and potential fomites) from the decontamination site area and its drainage area
- adequate water supply (permanent or temporary) for pumps, including any equipment necessary to maintain supply
- pressure cleaner with long hose and lance
- pump, hose and nozzle for spraying disinfectant
- tank to mix disinfectant, and mixing equipment
- disinfectant suitable for the particular disease (refer to the **AUSVETPLAN operational manual *Decontamination***)
- scraper or broom for removing hard mud, if applicable.

Safety measures to be observed are as follows:

- Normal occupational health and safety procedures must be observed.
- Ensure that people carrying out the decontamination are aware of the safety specifications (ie safety data sheet, personal protective equipment) for the agent being used.
- Clean, waterproof protective clothing must be used at all times.
- Mixing of the disinfectant (from concentrated to dilute form) must be performed carefully, following instructions on the label and/or safety data sheet.
- Smoking should be prohibited because some disinfectants are flammable; as well, smoking during the operation is unhygienic.
- Hearing protection should be used where noise from pumps and motors is excessive.
- A first aid kit should be available.

Tanker drivers must be briefed by the company on the disinfection actions that will be taken upon entry to and exit from all dairy farms. The recommended tanker decontamination procedure is as follows:

- Ensure that the tank is sealed.
- Wash the exterior underbody of the vehicle with a pressure cleaner, preferably using a detergent and disinfectant, with particular attention to
    - tyre treads
    - stairs
    - inner side of mudguards
    - chassis and underbody.

- Check to ensure that the vehicle is clean. Mud and faeces must be completely removed.
- Spray and wipe the cabin interior with an effective disinfectant.

The driver must undertake personal disinfection procedures, particularly for boots and gloves.

Suitable disinfectants are listed in the **AUSVETPLAN operational manual *Decontamination***.

Specific requirements for vehicle decontamination will be described in the general or special permit required for vehicle movement into declared areas.

Method

Various methods can be used for washing and disinfecting milk tankers, including:

- fixed-point decontamination station
- mobile decontamination unit
- self-contained decontamination equipment.

These are described below.

Fixed-point decontamination station

Fixed-point decontamination stations are suitable at dairy processing plants to wash the underside of tankers (and other vehicles) before they enter the plant, to remove all soil, mud and manure contamination. They may also be suitable at farm entrances.

These points require a tank to hold water, preferably containing a detergent to assist cleansing. Disinfectant may be included in the washing water, if compatible, or may be in a second tank for spraying after washing (this may also be more economical). The decontamination point must be staffed at all times that tankers and other vehicles are arriving at and leaving the site.

Straw mats, foam rubber mats, carpet or similar materials soaked in disinfectant are inadequate for disinfecting vehicles because they only apply disinfectant to the tyre treads. As well, it is difficult to ensure that the disinfectant retains the correct degree of acidity or alkalinity.

All drainage from the site must be contained (eg by sandbags, straw bales, sump pumps), and disinfected and managed appropriately. It will be disposed of in accordance with a protocol that has been approved by the relevant environment protection authority and the jurisdictional authorities. Preferably, the site should have a bitumen or concrete hard-standing area.

Mobile decontamination unit

A mobile decontamination unit could be a truck- or trailer-mounted tank and pump, or pressure sprayer unit. This type of unit may be suitable on farms to allow decontamination to be undertaken at different locations on the farm. A mobile unit could also be used to follow a tanker to decontaminate it before entry to and exit from farms, or in cases where tankers are to move between disease control areas.

Decontamination procedures are the same as for fixed decontamination sites.

Drainage from the site must be contained and not allowed to enter drains, creek or rivers.

Self-contained decontamination equipment

Self-contained decontamination equipment could be fitted to milk tankers and operated by the driver. Decontamination could then be readily performed without having to rely on the availability of the

farmer or another appropriate person when decontamination is required. This is probably the preferred option for milk tankers.

The equipment must hold sufficient water and disinfectant to perform decontamination at each farm on the run before returning to the processing plant, where refilling can occur. The pump may have its own engine or be driven by the truck power take-off.

Appendix 7 Role statement for a tanker driver

Many disease agents can be readily spread on contaminated vehicles and equipment, or on contaminated boots, hands and clothing. Guidance for tanker drivers to prevent the spread of disease is provided below. This could be laminated or provided in a waterproof folder for ease of reference.

Tanker design recommendations

Milk tankers used in declared areas must:

- be checked regularly for leaks
- have a modern, low-frothing design, with bottom-filling or a manifold to avoid splash and frothing
- have automatic opening and closing breathers that allow air exhaust during filling, and entry of air during unloading; these are closed during travel to prevent aerosols
- be easily cleaned and disinfected, including the connecting hose, sample boxes and equipment, and the hose-carrying tube
- have an uncluttered cab interior
- be able to be tracked by GPS so the route can be verified.

Route management recommendations for drivers

Drivers of tankers operating within a declared area must:

- plan tanker collection routes to pick up from lower-risk farms (ie furthest from the higher-risk premises) first and higher-risk farms last
- be continuously contactable by the company despatcher (so that notification can be provided of new higher-risk herds that may be on the collection schedule and should not be collected)
- not enter cattle yards or other cattle areas.

Movement restrictions

During an outbreak of an emergency animal disease (EAD), an area around the infected farm will be designated a restricted area (RA). Movement of vehicles and livestock out of this area and the control area (CA) will be strictly controlled. Vehicle checkpoints may be established, and permits will be required.

Depending on the EAD, tracing of milk tankers that have accessed infected premises will be required for up to 14 days before the first suspected case.

Verification of the cleanliness of the vehicle will be established by local control centre personnel at vehicle checkpoints if the tanker is permitted to move between the RA and CA.

Procedure when leaving the factory

Tankers must not leave the factory to collect milk unless they have a supply of disinfectant and a portable spray unit, if required, together with a general permit (or special permit) for movement.

Procedure at each farm

- Before entering the farm, stop at the farmgate to check whether there is a notice warning that the declared disease is suspected and the farm is quarantined. If there is a notice, **do not enter the farm**.
- Before entering the farm, put on waterproof boots, outer protective clothing and gloves, which have all been sprayed with disinfectant. Carry a plastic tub large enough to stand in with boots on, plus a firm-bristle brush.
- Disinfect boots and gloves on alighting from, and before entering, the tanker cab.
- Decontaminate the underbody of the tanker on entry to and exit from farms, paying particular attention to wheels and hose inlets (further detail on decontamination is in Appendix 6).
- If the milk tanker cannot reach the normal milk pick-up point without driving over a manure-contaminated area, an alternative route to pick up milk on farm should be pre-planned.
- If there is no notification, or signage, indicating disease on the property, proceed to the milk vat room.
- Commence milk collection. **Do not overfill the tanker (maximum 90%)**. Restrict movements to the immediate vicinity of the tanker and vat room. Do not go into areas used by animals. Do not touch electrical switches that cannot be disinfected (eg the switch for the automatic vat cleaning system):
    - If any milk is spilled from the vat or hose, immediately spray disinfectant on the spillage.
    - Cap hose, and disinfect the outside of the hose and the connecting nut before returning the hose to the tanker. Spray the vat room door handle and any other farm equipment handled (eg vat valve).
    - Disinfect the outsides of sample bottles for milk components and quality testing after filling. This could be by dipping them in disinfectant or by thoroughly wetting them with a mist sprayer of disinfectant. The bottles must then be stored in racks separate from the empty bottles.
    - If fabric clothing gets contaminated by milk, take off the item of clothing and put on a clean item before leaving the premises. Place the dirty clothing in a plastic bag and seal it. On return to the processing plant, the dirty clothing should be soaked in disinfectant before being laundered.
    - Minimise movements around the vat room.
- Proceed to the farmgate and stop.
- Ensure that the tanker is washed clean of soil, mud and manure, and is free of plant material, and then disinfect the tanker with an approved disinfectant:
    - Special attention should be paid to wheels and wheel arches, and underneath the vehicle and tray, as well as upper areas.
    - The interior of the cab should also be clean; rubber mats should be cleaned and disinfected.
    - Runoff from disinfection must be contained.
- Ensure that disinfectants are properly diluted according to manufacturers' recommendations and are freshly prepared.
- Keep a record of vehicle decontamination, including the disinfectant used, concentration, and time and length of application.
- Avoid driving vehicles and machinery through manure and mud.

- If you are advised by the farmer during milk collection that they suspect a disease outbreak, **stop further collection** and **contact the factory for advice**; do not leave the farm. If the disease is confirmed, all of the tanker load may be treated and disposed of on the farm. The tanker will then be cleaned and disinfected.
- Wash and disinfect boots and ensure that clothing is clean. If clothing is soiled with mud, milk, urine or manure, or has been used when handling animals, change into clean clothes before entering (and leaving) the farm.
- Protective clothing may be removed between farms. Clean protective clothing is required on each farm attended.
- Keep a record of each property visited.

Procedure on exit from a declared area

- Decontamination and inspection of the tanker may be required on exit from a declared area.
- Instructions for the procedure to be followed will be given by the government authority.

On return to the factory

- On arrival at the factory, and before entering the milk reception area and pumping out, decontaminate and disinfect the underside of the tanker at the disinfection point.
- Connect and pump out the tanker, taking every precaution to minimise spillage.
- Wash all leaks and spills of milk with a copious amount of the disinfectant provided.
- Before departure on the next run, ensure that the driver's cab is clean.
- Avoid moving to parts of the factory other than the milk reception areas.
- Change out of work clothes and boots and into clean street clothes before leaving the processing plant after ceasing work.

Glossary

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, hoofs, bones, fertiliser).
Animal Health Committee	A committee whose members are the chief veterinary officers of the Commonwealth, states and territories, along with representatives from the CSIRO Australian Centre for Disease Preparedness (CSIRO-ACDP) and the Australian Government Department of Agriculture, Fisheries and Forestry. There are also observers from Animal Health Australia, Wildlife Health Australia, and the New Zealand Ministry for Primary Industries. The committee provides advice to the National Biosecurity Committee on animal health matters, focusing on technical issues and regulatory policy. See also National Biosecurity Committee
Animal products	Meat, meat products and other products of animal origin (eg eggs, milk) for human consumption or for use in animal feedstuff.
Approved disposal site	A premises that has zero susceptible livestock and has been approved as a disposal site for animal carcasses, or potentially contaminated animal products, wastes or things.
Approved processing facility	An abattoir, knackery, milk processing plant or other such facility that maintains increased biosecurity standards. Such a facility could have animals or animal products introduced from lower-risk premises under a permit for processing to an approved standard.
At-risk premises	A premises in a restricted area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, dangerous contact premises, dangerous contact processing facility, suspect premises or trace premises.
Australian Chief Veterinary Officer	The nominated senior veterinarian in the Australian Government Department of Agriculture, 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	Australian Veterinary Emergency Plan. Nationally agreed resources that guide decision making in the response to emergency animal diseases (EADs). It outlines Australia's preferred approach to responding to EADs of national significance, and supports efficient, effective and coherent responses to these diseases.
Carcase	The body of an animal slaughtered for food.
Carcass	The body of an animal that died in the field.
Chief veterinary officer (CVO)	The senior veterinarian of the animal health authority in each jurisdiction (national, state or territory) who has responsibility for

Term	Definition
	animal disease control in that jurisdiction. See also Australian Chief Veterinary Officer
Compartmentalisation	The process of defining, implementing and maintaining one or more disease-free establishments under a common biosecurity management system in accordance with WOAH guidelines, based on applied biosecurity measures and surveillance, to facilitate disease control and/or trade.
Compensation	The sum of money paid by government to an owner for livestock or property that are destroyed for the purpose of eradication or prevention of the spread of an emergency animal disease, and livestock that have died of the emergency animal disease. See also Cost-sharing arrangements, Emergency Animal Disease Response Agreement
Consultative Committee on Emergency Animal Diseases (CCEAD)	The key technical coordinating body for animal health emergencies. Members are state and territory chief veterinary officers, representatives of CSIRO-ACDP and the relevant industries, and the Australian Chief Veterinary Officer as chair.
Control area (CA)	A legally declared area where the disease controls, including surveillance and movement controls, applied are of lesser intensity than those in a restricted area (the limits of a control area and the conditions applying to it can be varied during an incident according to need).
Cost-sharing arrangements	Arrangements agreed between governments (national and state/territory) and livestock industries for sharing the costs of emergency animal disease responses. See also Compensation, Emergency Animal Disease Response Agreement
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.

Term	Definition
Depopulation	The removal of a host population from a particular area to control or prevent the spread of disease.
Destroy (animals)	To kill animals humanely.
Disease agent	A general term for a transmissible organism or other factor that causes an infectious disease.
Disease Watch Hotline	24-hour freecall service for reporting suspected incidences of exotic diseases – 1800 675 888.
Disinfectant	A chemical used to destroy disease agents outside a living animal.
Disinfection	The application, after thorough cleansing, of procedures intended to destroy the infectious or parasitic agents of animal diseases, including zoonoses; applies to premises, vehicles and different objects that may have been directly or indirectly contaminated.
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. See also Endemic animal disease, Exotic animal disease
Emergency Animal Disease Response Agreement	Agreement between the Australian and state/territory governments and livestock industries on the management of emergency animal disease responses. Provisions include participatory decision making, risk management, cost sharing, the use of appropriately trained personnel and existing standards such as AUSVETPLAN. See also Compensation, Cost-sharing arrangements
Endemic animal disease	A disease affecting animals (which may include humans) that is known to occur in Australia. See also Emergency animal disease, Exotic animal disease
Enterprise	See Risk enterprise
Enzyme-linked immunosorbent assay (ELISA)	A serological test designed to detect and measure the presence of antibody or antigen in a sample. The test uses an enzyme reaction with a substrate to produce a colour change when antigen–antibody binding occurs.
Epidemiological investigation	An investigation to identify and qualify the risk factors associated with the disease. See also Veterinary investigation
Epidemiology	The study of disease in populations and of factors that determine its occurrence.

Term	Definition
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.
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 or electronic version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. See also Special permit
In-contact animals	Animals that have had close contact with infected animals, such as noninfected animals in the same group as infected animals.
Incubation period	The period that elapses between the introduction of a pathogen into an animal and the first clinical signs of the disease.
Index case	The first case of the disease to be diagnosed in a disease outbreak. See also Index property
Index property	The property on which the index case is found. See also Index case
Infected premises (IP)	A defined area (which may be all or part of a property) on which animals meeting the case definition are or were present, or the causative agent of the emergency animal disease is present, or there is a reasonable suspicion that either is present, and that the relevant chief veterinary officer or their delegate has declared to be an infected premises.
Local control centre (LCC)	An emergency operations centre responsible for the command and control of field operations in a defined area.
Modified stamping out	A stamping out policy that is modified – based on risk assessment – to culling only a selected group of animals instead of all susceptible animals that are either infected or exposed to the agent of disease. This modified strategy may be implemented when the destruction of all susceptible animals is not financially or practically feasible. The term 'modified' is used when the stamping out measures are not implemented in full.
Monitoring	Routine collection of data for assessing the health status of a population or the level of contamination of a site for remediation purposes. See also Surveillance

Term	Definition
Movement control	Restrictions placed on the movement of animals, people and other things to prevent the spread of disease.
National Biosecurity Committee (NBC)	A committee that was formally established under the Intergovernmental Agreement on Biosecurity (IGAB). The IGAB was signed on 13 January 2012, and signatories include all states and territories except Tasmania. The committee provides advice to the Agriculture Senior Officials Committee and the Agriculture Ministers' Forum on national biosecurity issues, and on the IGAB.
National Management Group (NMG)	A group established to approve (or not approve) the invoking of cost sharing under the Emergency Animal Disease Response Agreement. NMG members are the Secretary of the Australian Government Department of Agriculture, Fisheries and Forestry 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
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.
Premises of relevance (POR)	A premises in a control area that contains a live susceptible animal(s) but is not considered at the time of classification to be an infected premises, suspect premises, trace premises, dangerous contact premises or dangerous contact processing facility.
Prevalence	The proportion (or percentage) of animals in a particular population affected by a particular disease (or infection or positive antibody titre) at a given point in time.
Proof of freedom	Reaching a point following an outbreak and post-outbreak surveillance when freedom from the disease can be claimed with a reasonable level of statistical confidence.
Qualifiers	
– assessed negative	Assessed negative (AN) is a qualifier that may be applied to ARPs, PORs, SPs, TPs, DCPs or DCPFs. The qualifier may be applied following surveillance, epidemiological investigation, and/or laboratory assessment/diagnostic testing and indicates that the premises is assessed as negative at the time of classification.

Term	Definition
– sentinels on site	Sentinels on site (SN) is a qualifier that may be applied to IPs and DCPs to indicate that sentinel animals are present on the premises as part of response activities (ie before it can be assessed as an RP).
– vaccinated	The vaccinated (VN) qualifier can be applied in a number of different ways. At its most basic level, it can be used to identify premises that contain susceptible animals that have been vaccinated against the EAD in question. However, depending on the legislation, objectives and processes within a jurisdiction, the VN qualifier may be used to track a range of criteria and parameters.
Quarantine	Legally enforceable requirement that prevents or minimises spread of pests and disease agents by controlling the movement of animals, persons or things.
Resolved premises (RP)	An infected premises, dangerous contact premises or dangerous contact processing facility that has completed the required control measures, and is subject to the procedures and restrictions appropriate to the area in which it is located.
Restricted area (RA)	A relatively small legally declared area around infected premises and dangerous contact premises that is subject to disease controls, including intense surveillance and movement controls.
Risk enterprise	A defined livestock or related enterprise that is potentially a major source of infection for many other premises. Includes intensive piggeries, feedlots, abattoirs, knackeries, saleyards, calf scales, milk factories, tanneries, skin sheds, game meat establishments, cold stores, artificial insemination centres, veterinary laboratories and hospitals, road and rail freight depots, showgrounds, field days, weighbridges and garbage depots.
Sensitivity	The proportion of truly positive units that are correctly identified as positive by a test. See also Specificity
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

Term	Definition
	person moving the animal(s), commodity or thing must obtain prior written permission from the relevant government veterinarian or inspector. A printed or electronic version of the permit must accompany the movement. The permit may impose preconditions and/or restrictions on movements. See also General permit
Specificity	The proportion of truly negative units that are correctly identified as negative by a test. See also Sensitivity
Stamping out	The strategy of eliminating infection from premises through the destruction of animals in accordance with the particular AUSVETPLAN manual, and in a manner that permits appropriate disposal of carcasses and decontamination of the site.
State coordination centre (SCC)	The emergency operations centre that directs the disease control operations to be undertaken in a 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. or An animal not known to have been exposed to a disease agent but showing clinical signs requiring differential diagnosis.
Suspect premises (SP)	Temporary classification of a premises that contains a susceptible animal(s) not known to have been exposed to the disease agent but showing clinical signs similar to the case definition, and that therefore requires investigation(s).
Swill	Also known as 'prohibited pig feed', means material of mammalian origin, or any substance that has come in contact with this material, but does not include: (i) Milk, milk products or milk by-products either of Australian provenance or legally imported for stockfeed use into Australia. (ii) Material containing flesh, bones, blood, offal or mammal carcases which is treated by an approved process.[1] (iii) 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. (iv) Material used under an individual and defined-period permit issued by a jurisdiction for the purposes of research or baiting. [1] In terms of (ii), approved processes are:

Term	Definition
	1. rendering in accordance with the 'Australian Standard for the Hygienic Rendering of Animal Products' 2. under jurisdictional permit, cooking processes subject to compliance verification that ensure that a core temperature of at least 100 °C for a minimum of 30 minutes, or equivalent, has been reached. 3. treatment of cooking oil, which has been used for cooking in Australia, in accordance with the 'National Standard for Recycling of Used Cooking Fats and Oils intended for Animal Feeds' 4. under jurisdictional permit, any other nationally agreed process approved by AHC for which an acceptable risk assessment has been undertaken and that is subject to compliance verification. The national definition is a minimum standard. Some jurisdictions have additional conditions for swill feeding that pig producers in those jurisdictions must comply with, over and above the requirements of the national definition.
Swill feeding	Also known as 'feeding prohibited pig feed', it includes: • feeding, or allowing or directing another person to feed, prohibited pig feed to a pig • allowing a pig to have access to prohibited pig feed • the collection and storage or possession of prohibited pig feed on a premises where one or more pigs are kept • supplying to another person prohibited pig feed that the supplier knows is for feeding to any pig. This definition was endorsed by the Agriculture Ministers' Council through AGMIN OOS 04/2014.
Trace premises (TP)	Temporary classification of a premises that contains susceptible animal(s) that tracing indicates may have been exposed to the disease agent, or contains contaminated animal products, wastes or things, and that requires investigation(s).
Tracing	The process of locating animals, people or other items that may be implicated in the spread of disease, so that appropriate action can be taken.
Unknown status premises (UP)	A premises within a declared area where the current presence of susceptible animals and/or risk products, wastes or things is unknown.
Vaccination	Inoculation of individuals with a vaccine to provide active immunity.
Vaccine	A substance used to stimulate immunity against one or several disease-causing agents to provide protection or to reduce the

Term	Definition
	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.
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	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).
WOAH Terrestrial Code	WOAH Terrestrial animal health code. Describes standards for safe international trade in animals and animal products. Revised annually and published on the internet at: www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-code-online-access/.
WOAH Terrestrial Manual	WOAH Manual of diagnostic tests and vaccines for terrestrial animals. Describes standards for laboratory diagnostic tests, and the production and control of biological products (principally vaccines). The current edition is published on the internet at:

Term	Definition
	www.woah.org/en/what-we-do/standards/codes-and-manuals/terrestrial-manual-online-access/.
Wool	Sheep wool.
Zero susceptible species premises (ZP)	A premises that does not contain any susceptible animals or risk products, wastes or things.
Zoning	The process of defining, implementing and maintaining a disease-free or infected area in accordance with WOAH guidelines, based on geopolitical and/or physical boundaries and surveillance, to facilitate disease control and/or trade.
Zoonosis	A disease of animals that can be transmitted to humans.

Abbreviations

Manual-specific abbreviations

Abbreviation	Full title
ADF	Australian Dairy Farmers
ADPF	Australian Dairy Products Federation
AI	artificial insemination
DA	Dairy Australia
FSANZ	Food Standards Australia New Zealand
HACCP	hazard analysis and critical control points
IMF	Issues Management Framework
QA	quality assurance

Standard AUSVETPLAN abbreviations

Abbreviation	Full title
ACDP	Australian Centre for Disease Preparedness
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

Abbreviation	Full title
IETS	International Embryo Technology Society
IP	infected premises
LCC	local control centre
NASOP	nationally agreed standard operating procedure
NMG	National Management Group
OA	outside area
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
WOAH	World Organisation for Animal Health
ZP	zero susceptible species premises

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