CHAPTER 2

Terrestrial animal health status

Australia has a long history of freedom from the major epidemic diseases of livestock. The geographical isolation of the continent provides a natural biosecurity barrier, which is supported by sound biosecurity policies and a history of successful disease eradication campaigns.

The spread of some endemic diseases in animals in Australia is limited by climate and the animal production enterprises present in a particular area. Tick fever, for example, occurs only in parts of northern Australia where the climate is suitable for the tick vectors.

State and territory governments manage the control and eradication of animal diseases, often with the support of industry accreditation schemes. Chapter 1 describes the coordinating mechanisms that are in place to provide national consistency – for example, Animal Health Committee.

This chapter provides information about Australia's reporting system for animal diseases, Australia's status for all nationally significant terrestrial animal diseases, and control programs for endemic diseases of national significance in terrestrial animals.

2.1 NATIONAL NOTIFIABLE ANIMAL DISEASES

The National List of Notifiable Animal Diseases[28] of terrestrial animals facilitates disease reporting and control. It takes into account key diseases on the list of diseases that are notifiable to the World Organisation for Animal Health (OIE) and also includes endemic diseases of national significance. Occurrences of diseases on this list must be reported to government authorities. This ensures that unusual incidents involving animal mortality or sickness and diseases of public health significance are investigated. The list is reviewed periodically by Animal Health Committee; it was last reviewed in early 2015.

The requirement to report a notifiable disease is contained in state and territory legislation. State and territory lists of notifiable diseases contain all the diseases on the national list, as well as others that are of particular interest to an individual state or territory.

2.2 INTERNATIONAL REPORTING

Australia provides the OIE with routine information about OIE-listed diseases through reports every six months. Information on other diseases of interest to the OIE is reported through annual questionnaires. Tables 2.1 and 2.2 show Australia's status for both these categories in 2015.

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015

Disease	Status	Date of last occurrence and notes
Multiple-species diseases		
Anthrax	Present	Limited distribution
Aujeszky's disease virus (infection with)	Free	Never occurred
Bluetongue	Viruses present	Restricted to specific northern areas of Australia. Sentinel herd and vector monitoring programs are in place
Brucella abortus (infection with)	Free	Australia declared freedom in 1989
Brucella melitensis (infection with)	Free	
Brucella suis (infection with)	Serological evidence	Maintained in feral pigs in some parts of Australia. Rare occurrence in domestic pigs
Crimean Congo haemorrhagic fever	Free	Never occurred
Echinococcus granulosus (infection with)	Present	
Echinococcus multilocularis (infection with)	Free	Never occurred
Epizootic haemorrhagic disease	Virus present	Disease has not been reported
Equine encephalomyelitis (eastern)	Free	Never occurred
Foot-and-mouth disease	Free	1872. Australia is officially recognised by the OIE as free without vaccination
Heartwater	Free	Never occurred
Japanese encephalitis	Serological evidence	Detected annually in Torres Strait, and on Cape York in 1998 and 2004

28 www.agriculture.gov.au/animal-plant-health/pests-diseases-weeds/animal/notifiable

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Multiple-species diseases *continued*		
New World screw-worm fly (*Cochliomyia hominivorax*)	Free	Never occurred
Old World screw-worm fly (*Chrysomya bezziana*)	Free	Never occurred
Paratuberculosis	Present	National control and management programs are in place
Q fever	Present	
Rabies virus (infection with)	Free	1867
Rift Valley fever virus (infection with)	Free	Never occurred
Rinderpest virus (infection with)	Free	1923. With the global eradication of rinderpest in 2011, all countries are free
Surra (*Trypanosoma evansi*)	Free	Never occurred
Trichinella spp. (infection with)	Not reported	*T. spiralis* is not present. *T. pseudospiralis* is present in wildlife
Tularaemia	Free	Never occurred
West Nile fever	Australian variants present	A previously unknown Australian strain of West Nile virus was identified following an outbreak of neurological disease in horses in 2011. No cases were reported in 2015
Cattle diseases		
Bovine anaplasmosis	Present	
Bovine babesiosis	Present	
Bovine genital campylobacteriosis	Present	
Bovine spongiform encephalopathy	Free	Never occurred. The National Transmissible Spongiform Encephalopathies Freedom Assurance Program includes surveillance. Australia has official OIE 'negligible risk' status
Bovine tuberculosis	Free	Australia declared freedom in 1997. The last case in any species was reported in 2002
Bovine viral diarrhoea	Present	Bovine viral diarrhoea virus 1 (BVDV-1) is present. BVDV-2 has never occurred
Enzootic bovine leucosis	Very low prevalence in beef cattle	Australian dairy herd achieved freedom on 31 December 2012
Haemorrhagic septicaemia	Free	Never occurred. Strains of *Pasteurella multocida* are present, but not the 6b or 6e strains that cause haemorrhagic septicaemia
Infectious bovine rhinotracheitis/infectious pustular vulvovaginitis	Present	Bovine herpesvirus (BHV) 1.2b – present; BHV-1.1 and 1.2a – never occurred

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Cattle diseases *continued*		
Lumpy skin disease	Free	Never occurred
Mycoplasma mycoides subsp. *mycoides* small colony (contagious bovine pleuropneumonia) (infection with)	Free	1967. Australia declared freedom in 1973 and is officially recognised by the OIE as free
Theileriosis	Free	*Theileria parva* and *T. annulata* are not present
Trichomonosis	Present	
Trypanosomosis (tsetse borne)	Free	Never occurred
Sheep and goat diseases		
Caprine arthritis–encephalitis	Present	Voluntary accreditation schemes exist
Chlamydophila abortus (enzootic abortion of ewes, ovine chlamydiosis) (infection with)	Not reported	Never occurred
Contagious agalactia	Not reported	*Mycoplasma agalactiae* has been isolated, but Australian strains do not produce agalactia in sheep
Contagious caprine pleuropneumonia	Free	Never occurred
Maedi–visna	Free	Never occurred
Nairobi sheep disease	Free	Never occurred
Ovine epididymitis (*Brucella ovis*)	Present	Voluntary accreditation schemes exist in all states
Peste des petits ruminants (infection with)	Free	Never occurred. Australia is officially recognised by the OIE as free
Salmonellosis (*Salmonella* Abortusovis)	Free	Never occurred. Surveillance has shown no evidence of infection in sheep
Scrapie	Free	1952. The National Transmissible Spongiform Encephalopathies Freedom Assurance Program includes surveillance. Atypical scrapie has been detected several times
Sheep pox and goat pox	Free	Never occurred
Equine diseases		
African horse sickness virus (infection with)	Free	Never occurred. Australia is officially recognised by the OIE as free
Contagious equine metritis	Free	1980
Dourine	Free	Never occurred
Equid herpesvirus 1 (equine rhinopneumonitis) (infection with)	Present	
Equine encephalomyelitis (western)	Free	Never occurred
Equine infectious anaemia	Present	Limited distribution and sporadic occurrence

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Equine diseases *continued*		
Equine influenza virus (infection with)	Free	Australia's first outbreak occurred between 24 August and 25 December 2007. Australia declared freedom according to OIE standards on 25 December 2008
Equine piroplasmosis	Free	1976
Equine viral arteritis (infection with)	Serological evidence	
Glanders	Free	1891
Venezuelan equine encephalomyelitis	Free	Never occurred
Swine diseases		
African swine fever	Free	Never occurred
Classical swine fever virus (infection with)	Free	1962. Australia is officially recognised by the OIE as free
Nipah virus encephalitis	Free	Never occurred
Porcine cysticercosis	Free	Never occurred
Porcine reproductive and respiratory syndrome	Free	Never occurred
Transmissible gastroenteritis	Free	Never occurred
Avian diseases		
Avian chlamydiosis	Present	
Avian infectious bronchitis	Present	
Avian infectious laryngotracheitis	Present	
Avian mycoplasmosis (*Mycoplasma gallisepticum*)	Present	
Avian mycoplasmosis (*M. synoviae*)	Present	
Duck virus hepatitis	Free	Never occurred
Fowl typhoid	Free	1952
Highly pathogenic avian influenza virus (infection with)	Free	2013
Infectious bursal disease (Gumboro disease)	Present	Infectious bursal disease occurs in a mild form. Very virulent strains are not present
Low pathogenicity notifiable avian influenza virus (poultry) (infection with)	Occasional	2013

Table 2.1 Australia's status for OIE-listed diseases of terrestrial animals, 2015 *continued*		
Disease	**Status**	**Date of last occurrence and notes**
Avian diseases *continued*		
Newcastle disease virus in poultry (infection with)	Lentogenic viruses present	Virulent Newcastle disease last occurred in poultry in 2002. In August 2011, a paramyxovirus not previously reported in Australia was detected in hobby pigeons in Victoria. Disease caused by this virus has not spread to poultry
Pullorum disease	Not reported	Last reported in 1992. *Salmonella* Pullorum has been eradicated from commercial chicken flocks
Turkey rhinotracheitis	Free	Never occurred
Lagomorph diseases		
Myxomatosis	Present	Used as a biological control agent for wild rabbits
Rabbit haemorrhagic disease	Present	Used as a biological control agent for wild rabbits. A new strain was detected in 2015[a]
Bee diseases		
Acarapis woodi (infestation of honey bees with)	Free	Never occurred
Paenibacillus larvae (American foulbrood) (infection of honey bees with)	Present	
Melissococcus plutonius (European foulbrood) (infection of honey bees with)	Present	
Aethina tumida (small hive beetle) (infestation with)	Present	Restricted distribution
Tropilaelaps spp. (infestation of honey bees with)	Free	Never occurred
Varroa spp. (varroosis) (infestation of honey bees with)	Free	*Varroa destructor* has never been reported in Australia
Other diseases		
Camel pox	Free	Never occurred
Leishmaniasis	Australian variant present	Rare. No Australian *Leishmania* was isolated from macropods in 2015. A case occurred in an imported dog in 2015

OIE = World Organisation for Animal Health
a www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=18075

Table 2.2 Australia's status for other diseases of terrestrial animals that are reported to the OIE each year, 2015		
Disease	**Status**	**Date of last occurrence and notes**
Actinomycosis	Present	
Avian encephalomyelitis	Present	
Avian leucosis	Present	
Avian salmonellosis (excluding fowl typhoid and pullorum disease)	Present	
Avian spirochaetosis	Present	
Blackleg	Present	
Botulism	Present	
Caseous lymphadenitis	Present	
Coccidiosis	Present	
Contagious ophthalmia	Present	
Contagious pustular dermatitis	Present	
Distomatosis (liver fluke)	Present	Restricted distribution
Enterotoxaemia	Present	
Equine coital exanthema	Present	
Filariasis	Present	
Footrot	Present	Restricted distribution
Infectious coryza	Present	
Intestinal *Salmonella* infections	Present	
Listeriosis	Present	
Melioidosis	Present	Restricted distribution
Nosemosis of bees	Present	
Salmonellosis (*Salmonella* Abortusequi)	Free	Never reported
Sheep mange	Free	1896
Strangles	Present	
Swine erysipelas	Present	
Toxoplasmosis	Present	
Ulcerative lymphangitis	Free	Never reported
Vibrionic dysentery	Present	
Warble fly infestation	Free	Never reported
Other clostridial infections	Present	
Other pasteurelloses	Present	

OIE = World Organisation for Animal Health

2.3 NATIONAL REPORTING SYSTEM FOR ANIMAL DISEASES IN AUSTRALIA

Australia's disease surveillance is based on targeted and passive disease surveillance activities under the authority of the Australian, state and territory governments (jurisdictions). Each jurisdiction delivers a disease surveillance business plan to comply with legislated obligations to detect the occurrence and prevalence of notifiable diseases. Data on these disease investigations are held in field and laboratory databases, enabling control programs to be informed by property, regional, state and national intelligence on diseases.

Some data are collated nationally. Australia's National Animal Health Information System (NAHIS) collates data from a wide range of government and non-government surveillance and monitoring programs to provide an overview of animal health in Australia. The information in NAHIS is essential for supporting trade in animal commodities and meeting Australia's international reporting obligations.

All applications managed by NAHIS use the same underlying Central Animal Health Database, but maintain separate and distinct web interfaces. NAHIS provides selected summaries of national animal health data, NAMPInfo provides the official interactive bluetongue virus zone map, and the Endemic Disease Information System (EDIS) has a searchable register of herds and flocks in the Australian Johne's Disease Market Assurance Program.

NAHIS data are routinely reported, together with case reports of veterinary investigations, in the *Animal Health Surveillance Quarterly* newsletter, and are used by the Australian Government in reports to the OIE, the Food and Agriculture Organization of the United Nations, and the World Health Organization. Current disease surveillance reports and publications are available on the NAHIS page of the Animal Health Australia (AHA) website.[29]

29 www.animalhealthaustralia.com.au/what-we-do/disease-surveillance/national-animal-health-information-system-nahis

2.4 ENDEMIC DISEASES OF NATIONAL SIGNIFICANCE

This section describes the status of, and programs for, endemic animal diseases of national significance in 2015. Disease notifications for the Australian Capital Territory are included in New South Wales reporting.

2.4.1 American foulbrood

American foulbrood (AFB) is a brood disease of honey bees caused by the spore-forming bacterium *Paenibacillus larvae* subsp. *larvae* (formerly *Bacillus larvae*). The disease attacks bee larvae, eventually killing the affected hive. It is very difficult to treat, because the bacteria form spores that are resistant to heat, drying and chemicals. The recommended treatment for AFB-infected hives is to depopulate the hives, burn or bury the dead bees, and then burn, bury or irradiate the hive material. AFB is nationally notifiable and subject to control programs in several states. It is endemic in New South Wales, Queensland, South Australia (except for Kangaroo Island, which remains free), Tasmania, Victoria and Western Australia. It has not been reported in the Northern Territory.

In 2015, the Australian Honey Bee Industry Council, state and territory governments, the Australian Government Department of Agriculture and Water Resources, and Plant Health Australia continued to work together on developing the Australian Honey Bee Industry Biosecurity Code of Practice and the National Bee Biosecurity Program.

The code and program will commence in 2016. They aim to improve the management of established bee pests and diseases (particularly AFB), increase the preparedness of beekeepers for exotic pests, and increase surveillance for exotic pests. The program will be funded by the honey bee industry through the honey levy, with state governments contributing extensive in-kind resources. It will be managed nationally by Plant Health Australia, and will include the employment of bee biosecurity officers in all state primary industries departments.

A national survey for honey bee pests and diseases (established and exotic) was conducted between August

2013 and April 2015, and published in October 2015.[30] The Commonwealth Scientific and Industrial Research Organisation (CSIRO) undertook the survey with funding from the Rural Industries Research and Development Corporation (RIRDC), the honey bee industry and the Australian Government. It is the first national survey for honey bee pathogens using modern molecular tools. It outlines the current prevalence of honey bee viruses, and reports on the distribution of endemic pests and diseases in Australia.

New South Wales

In areas with a high incidence of AFB, the Biosecurity Compliance Unit of the New South Wales Department of Primary Industries (NSW DPI) has conducted special apiary compliance operations. These aim to raise awareness of the apiary industry's responsibilities under the New South Wales *Apiaries Act 1985*, to detect breaches of the Act and to allow compliance action to be taken, where necessary. The apiary industry has worked closely with NSW DPI in providing departmental apiary inspectors with information about the location of abandoned, neglected and diseased hives, and helping with the removal of some of these hives for destruction.

The take-home messages to the apiary industry were:

- to use the diagnostic, advisory and compliance services provided by NSW DPI
- that industry is responsible for eradicating AFB from its own operations.

Queensland

AFB is widespread in Queensland, and its control is a routine part of apiary management. Apiary staff from the Queensland Department of Agriculture and Fisheries (DAF) hold monthly information sessions for beekeepers in various locations, which cover sterilisation, control and management techniques.

During 2015, 113 submissions, most of them consisting of multiple samples, were made to Queensland DAF's Biosecurity Science Laboratory for diagnosis of AFB and European foulbrood (see Section 2.4.2). Of these, 62 contained one or more samples that were diagnosed as positive for AFB by microscopic examination.

South Australia

AFB is endemic in South Australia, except for Kangaroo Island, which remains free from the disease. AFB control is achieved predominantly through a combination of apiarist reporting, packer testing and active disease surveillance. AFB surveillance and control will be managed by the industry-funded National Bee Biosecurity Program once it is in place.

During 2015, AFB was reported in 256 hives belonging to 37 apiarists.

Tasmania

The Tasmanian apiary industry has established the Apiary Industry Disease Control Program for voluntarily registered beekeepers, in the absence of a government control program for AFB. Registration fees fund the testing of honey samples for AFB. This assists with disease surveillance by encouraging broad participation by both commercial and recreational beekeepers. The Tasmanian Department of Primary Industries, Parks, Water and Environment offers free inspection of hives and an advisory service to apiarists when positive hives are identified from honey samples.

Victoria

AFB is endemic in Victoria, and beekeepers are encouraged to seek laboratory confirmation of AFB when it is suspected.

Western Australia

Beekeepers in Western Australia are required to register their beehives and report occurrences of AFB in their apiaries. Eradication action is also required, and failure to take action can lead to the imposition of quarantine measures and a requirement to follow a management plan. The Department of Agriculture and Food Western Australia (DAFWA) provides a diagnostic service that allows beekeepers to monitor the AFB status of their apiaries and the department to monitor infected apiaries. These measures support a quality assurance program, B-QUAL, which has been adopted by the industry (see Section 1.5.8). The percentage of infected apiaries in 2015 remained low (6–10%).

2.4.2 European foulbrood

European foulbrood (EFB) is a disease of bee larvae caused by the bacterium *Melissococcus plutonius*. The disease is usually acquired only by larvae less than 48 hours old, which generally die at 4–5 days of age, particularly in early spring when the colonies are growing rapidly. Colonies infected with

30 https://rirdc.infoservices.com.au/items/15-095

EFB release a characteristic odour, and infected larvae die and turn brown during the coiled stage, giving a peppered appearance to the brood comb. Because of the young age at which larvae are affected, cells with diseased larvae are usually unsealed. The disease causes high mortality of larvae and reduces the longevity of queens.

EFB occurs in many regions around the world. It was first reported in Australia in 1977, and is now found in all states and territories except Western Australia and the Northern Territory. Western Australia maintains stringent control measures to minimise the risk of introduction of the disease.

EFB is diagnosed intermittently in Tasmanian honey bees – the last case was detected in 2011. It is monitored by the Tasmanian apiary industry's Apiary Industry Disease Control Program for voluntarily registered beekeepers. No incidents of EFB were detected in Tasmania during 2015.

2.4.3 Asian honey bee

The Australian Government invested $2 million from July 2011 to June 2013 to move from eradication of Asian honey bee to management of the pest in Australia through establishment of the Asian Honey Bee Transition to Management (AHB T2M) program. This was done in partnership with Biosecurity Queensland and the Australian Honey Bee Industry Council, which contributed significant funding and activities. The program, which was administered by Plant Health Australia and concluded on 30 June 2013, focused on minimising the bee's spread, and providing a range of safe and effective tools to help the community manage this pest. An Asian Honey Bee Transition Management Group was established to oversee the program, monitor its delivery and ensure that its outcomes were achieved. An Asian Honey Bee Scientific Advisory Group was also established to provide technical advice, feedback, and consideration of specific projects and activities under the AHB T2M program.

Queensland

Since their first detection in Queensland in 2007, Asian honey bees have gradually spread as far north as Mossman, south to Mena Creek and west towards Mutchilba. Natural movement is expected to result in further slow spread of the bee. A number of research and development projects started under the AHB T2M program and are continuing in 2015–16. Projects are capitalising on opportunities to reduce the incidence and impact of bee pests and diseases, and build capacity to apply research findings through extension and education. Organisations such as the RIRDC, CSIRO and Horticulture Innovation Australia[31] are delivering this research.

2.4.4 Small hive beetle

Small hive beetle (SHB), *Aethina tumida*, invades honey bee hives. It can cause serious economic concern to producers through loss of bee colonies and infestation of honeycombs awaiting extraction, especially under the hot and humid conditions in which the beetle thrives. SHB is on the list of nationally notifiable diseases. Eradication from Australia has not been attempted; the agreed management strategies aim to reduce the impact of SHB on productivity, slow its spread and minimise damage in infested apiaries. Government apiary officers provide advice and guidance to the honey bee industry. Researchers have designed, tested and commercialised a chemical-based in-hive beetle harbourage (APITHOR) – a fipronil-impregnated cardboard trap – to minimise the impact of SHB. APITHOR has been approved by the Australian Pesticides and Veterinary Medicines Authority.

A research project funded by the RIRDC on the development of an external attractant trap for SHB commenced in 2015.[32]

New South Wales

SHB is widespread in New South Wales beehives.

Northern Territory

A survey of registered beekeepers in the Northern Territory in 2009–10 confirmed the absence of SHB. Import controls to restrict entry of the pest have been introduced. Beekeepers and the Northern Territory Department of Primary Industry and Fisheries conduct targeted surveillance. No detections were reported in 2015.

Queensland

SHB is a major pest species in Queensland, where it is endemic in most coastal regions. It is present in other, drier areas as a result of beekeepers moving their apiaries to access seasonal flora. The prevalence is increasing in the northern part of the state and increases after rain in warmer months of the year. Queensland DAF provides beekeepers with information on the most efficient trapping methods. Scientific research is continuing on fungal control, yeast identification and the relationship of yeast to the SHB life cycle.

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31 Previously Horticulture Australia Limited

32 www.rirdc.gov.au/research-project-details/custr10_HBE/PRJ-009334

South Australia

Despite two previous detections and a long border with Victoria, there was no evidence that SHB had established in South Australia until 2015, when it was detected in a number of apiaries in the Riverland area of South Australia. Subsequent delimiting surveillance (i.e. surveillance to establish the boundaries of the infested area) and industry consultation led to SHB being removed from the list of notifiable diseases; control is now the responsibility of individual apiarists.

Although large numbers of hives have been moved out of the Riverland area since SHB was detected, SHB has been reported from only one other location, as a result of voluntary industry notification.

Tasmania

There is no evidence of SHB in Tasmania. Apiarists are encouraged to inspect their hives regularly and to submit suspect insects to the state laboratory for identification. Queen bees, queen cells and escorts may be imported, but must be in SHB-proof containers and accompanied by a completed health certificate declaring freedom from SHB. Entry of used beekeeping equipment, packaged bees and unmelted beeswax into Tasmania is prohibited.

Victoria

SHB is endemic in Victoria, and its occurrence is monitored by the Victorian Department of Economic Development, Jobs, Transport and Resources.

Western Australia

In September 2007, SHB was detected in Western Australia in the Ord River Irrigation Area at Kununurra. Surveillance, monitoring and tracing have contained the beetle within the Ord River Irrigation Area. Zoning under legislation has identified an SHB-infested area and an SHB-free area within the state. Targeted surveillance continues; no samples collected have confirmed the presence of SHB in the free area. Import controls to restrict entry of SHB are in place.

2.4.5 Anthrax

Anthrax is on the list of nationally notifiable diseases. It is subject to compulsory government controls, including quarantine, disposal of carcasses, and vaccination and tracing of at-risk animals and their products. Areas at risk of anthrax occurrence, which are well defined, include the northern and north-eastern districts of Victoria, and central New South Wales. In these areas, anthrax has a low prevalence and occurs only sporadically.

Anthrax has never been recorded in the Northern Territory. In Queensland, the most recent confirmed cases were in 2002


Image credit: Glynda Bluhm

(six animals) and 1993 (one animal). South Australia's last recorded anthrax outbreak was in 1914, and Tasmania's was in 1933. The only case in Western Australia was an isolated case in 1994.

All suspected cases of anthrax are investigated and controlled according to an agreed jurisdictional program.

New South Wales

Three anthrax incidents occurred during 2015, all involving beef cattle. In March, a single animal died from a herd of 25 in the Condobolin district of the Central West Local Land Services region. In November, deaths occurred on two nearby properties in the Forbes district of the Central West region. Nine mixed yearlings died on one property from a herd of 220, and 19 died on the other from a herd of 142. The immunochromatographic test (ICT; see 'Victoria', below) was used, with positive results in each case, and laboratory confirmation followed. All three properties are in the known anthrax endemic area. The National Livestock Identification System database was used to trace a number of animals that had recently moved off the Forbes properties. All animals were accounted for and either returned to the property of origin, detained for 21 days or destroyed.

The three properties were managed according to NSW DPI anthrax policy. The properties were quarantined for 42 days, contaminated areas were disinfected, and all carcasses were burnt to ash. All at-risk cattle and other livestock were vaccinated.

During 2015, anthrax was excluded in 102 investigations of livestock mortality: 70 in cattle, 25 in sheep, 4 in pigs, 2 in horses and 1 in alpaca. Alternative diagnoses for cattle included clostridial infection, hypocalcaemia or hypomagnesaemia, pneumonia and plant poisoning. Alternative diagnoses for sheep included bloat, hypocalcaemia, pneumonia and intestinal parasitism. The alpaca death was diagnosed as rodenticide toxicity and the diagnoses in pigs included erysipelas.

Victoria

Victoria had one confirmed case of anthrax during 2015. A total of 76 anthrax exclusion investigations were undertaken – 64 on cattle, 11 on sheep and 1 on a horse. An 'animal-side' ICT, developed by the then Victorian Department of Primary Industries, has been used for the past several years in Victoria. This field test enables rapid screening for anthrax when government or private veterinarians are investigating sudden, unexplained deaths in ruminant livestock. Following approval of this test in 2010 by the then Sub-Committee on Animal Health Laboratory Standards, the ICT kits have been manufactured by the department and are being supplied for use in other states.

2.4.6 Caprine arthritis–encephalitis

Caprine retrovirus causes caprine arthritis–encephalitis (CAE), a multisystemic, inflammatory condition of goats. The disease is found in most countries, including Australia. It has been reported in all Australian states and territories except the Northern Territory. CAE is not included on the list of nationally notifiable diseases. Although Australia has no regulatory control programs for CAE, there are some voluntary accreditation programs based on serological testing in New South Wales, Queensland, South Australia and Tasmania. Animals testing positive are removed from the herd.

New South Wales

In New South Wales, a voluntary control program is available to goat producers. Virologists at the Elizabeth Macarthur Agricultural Institute are researching better diagnostic tests, with the aim of improving detection and providing an avenue for possible eradication of the disease.

Queensland

Queensland has had a voluntary control program for dairy goats since 1987. In December 2015, the program had 103 CAE-accredited herds.

South Australia

In South Australia, where CAE is present, the Dairy Goat Society of South Australia has a voluntary market assurance scheme.

Tasmania

A voluntary herd accreditation scheme for CAE was introduced in Tasmania in late 2011. The Department of Primary Industries, Parks, Water and Environment maintains a register of accredited-free herds. CAE is not a notifiable disease in Tasmania.

Victoria

In Victoria, where CAE is a notifiable disease, up to 100 goat herds annually are tested for CAE, either for export, for breeding or showing, or for lameness investigations. In 2015, serologically CAE-positive goats were confirmed on five properties; of these, three herds were endemically infected.

Western Australia

CAE is not a notifiable disease in Western Australia.

2.4.7 Cattle tick and tick fever

The cattle tick, *Rhipicephalus microplus* (previously *Boophilus microplus*), was introduced to Australia in the late 19th century. It spread steadily from Darwin across northern Australia, stabilising to its current distribution in the northern and north-eastern coastal regions by about 1918. The distribution of cattle tick is determined largely by climatic factors: the tick needs high humidity and ambient temperatures of at least 15–20 °C for egg laying and hatching. Cattle ticks mainly infest cattle, but may occasionally affect horses, sheep, goats, camelids, deer and water buffalo.

Tick infestations damage hides, reduce production, and cause anaemia and death. Cattle tick can also transmit tick fever (bovine babesiosis or anaplasmosis), caused by *Babesia bigemina*, *B. bovis* or *Anaplasma marginale*. Babesiosis and anaplasmosis are nationally notifiable diseases in tick-free areas.

Acaricide treatment (dipping, pour-on treatments or spraying) has been widely used for tick control in endemic areas. Inspection and treatment are compulsory for cattle leaving defined tick areas in the Northern Territory, Queensland and Western Australia, and for cattle leaving known infested properties in New South Wales. The spread of ticks from endemic areas is restricted by state-managed zoning policies. Many producers in the tick endemic area have changed to *Bos indicus*–type cattle because these breeds have greater resistance to tick infestation.

No incursions of cattle ticks or cases of tick fever were reported in South Australia, Tasmania or Victoria during 2015.

New South Wales

New infestations of cattle tick regularly occur in New South Wales; they are generally confined to the far north-eastern corner of the state. NSW DPI maintains a surveillance program at all far North Coast saleyards, where all cattle presented for sale are inspected. Inspectors treat cattle returning to a property from a sale with acaricide (by dipping) before their dispatch. Regular surveillance also occurs at North Coast abattoirs. Infested and at-risk properties are quarantined, and eradication programs and movement controls are implemented.

Surveillance cameras at eight sites along the New South Wales – Queensland border monitor livestock movements into New South Wales from the tick-infested areas of Queensland. Led and tractable livestock may be treated at the Kirra border crossing before they enter New South Wales from tick-infested areas of Queensland. Other stock originating from tick-infested areas are treated at official clearing facilities on the Queensland tick line before entering New South Wales.

During 2015, 169 new cattle tick infestations were recorded, an increase on the figures for the previous three years. Most outbreaks were directly attributable to failures of on-farm biosecurity, which allowed straying of cattle and access to land where cattle tick larvae were present. The majority of outbreaks were identified through abattoir and saleyard surveillance rather than on-farm detection. This meant that spread to other holdings had often occurred before quarantine was put in place. Acaricide resistance is not currently an issue in New South Wales isolates – amitraz resistance is only rarely recorded, usually associated with introductions of infected hosts from Queensland.

Tick fever was confirmed on four occasions in New South Wales in 2015, in three beef herds and one dairy herd, where cattle ticks were also present. The dairy herd had only one mortality, while the three beef herds had mortalities of 23, 3 and 7, respectively. The herd with 23 mortalities was infected with *B. bigemina*, whereas the other two beef herds were infected with *B. bovis*. Tick fever occurs in New South Wales infrequently; 17 outbreaks have been recorded in the past five years.

Northern Territory

Four declared areas for cattle tick are gazetted under Northern Territory legislation, and movement restrictions are in place to prevent the spread of cattle ticks between zones and interstate. The cattle tick–infested zone occurs only in the northern tropical and subtropical regions; the southern half of the Northern Territory is a cattle tick–free zone. A buffer zone, known as the cattle tick control zone, separates the infested and free areas. Cattle tick may be present on properties within this zone, and is managed by regulated movement conditions and approved programs for property management of cattle tick. An active surveillance program is in place to detect changes in cattle tick distribution. No spread of cattle tick was detected during 2015 surveillance.

A Parkhurst-infested zone was declared in 2011 around Darwin. Parkhurst-strain cattle ticks, which are resistant to synthetic pyrethroid and organophosphate chemicals, were

Western Australia

CAE is not a notifiable disease in Western Australia.

2.4.7 Cattle tick and tick fever

The cattle tick, *Rhipicephalus microplus* (previously *Boophilus microplus*), was introduced to Australia in the late 19th century. It spread steadily from Darwin across northern Australia, stabilising to its current distribution in the northern and north-eastern coastal regions by about 1918. The distribution of cattle tick is determined largely by climatic factors: the tick needs high humidity and ambient temperatures of at least 15–20 °C for egg laying and hatching. Cattle ticks mainly infest cattle, but may occasionally affect horses, sheep, goats, camelids, deer and water buffalo.

Tick infestations damage hides, reduce production, and cause anaemia and death. Cattle tick can also transmit tick fever (bovine babesiosis or anaplasmosis), caused by *Babesia bigemina*, *B. bovis* or *Anaplasma marginale*. Babesiosis and anaplasmosis are nationally notifiable diseases in tick-free areas.

Acaricide treatment (dipping, pour-on treatments or spraying) has been widely used for tick control in endemic areas. Inspection and treatment are compulsory for cattle leaving defined tick areas in the Northern Territory, Queensland and Western Australia, and for cattle leaving known infested properties in New South Wales. The spread of ticks from endemic areas is restricted by state-managed zoning policies. Many producers in the tick endemic area have changed to *Bos indicus*–type cattle because these breeds have greater resistance to tick infestation.

No incursions of cattle ticks or cases of tick fever were reported in South Australia, Tasmania or Victoria during 2015.

New South Wales

New infestations of cattle tick regularly occur in New South Wales; they are generally confined to the far north-eastern corner of the state. NSW DPI maintains a surveillance program at all far North Coast saleyards, where all cattle presented for sale are inspected. Inspectors treat cattle returning to a property from a sale with acaricide (by dipping) before their dispatch. Regular surveillance also occurs at North Coast abattoirs. Infested and at-risk properties are quarantined, and eradication programs and movement controls are implemented.

Surveillance cameras at eight sites along the New South Wales – Queensland border monitor livestock movements into New South Wales from the tick-infested areas of Queensland. Led and tractable livestock may be treated at the Kirra border crossing before they enter New South Wales from tick-infested areas of Queensland. Other stock originating from tick-infested areas are treated at official clearing facilities on the Queensland tick line before entering New South Wales.

During 2015, 169 new cattle tick infestations were recorded, an increase on the figures for the previous three years. Most outbreaks were directly attributable to failures of on-farm biosecurity, which allowed straying of cattle and access to land where cattle tick larvae were present. The majority of outbreaks were identified through abattoir and saleyard surveillance rather than on-farm detection. This meant that spread to other holdings had often occurred before quarantine was put in place. Acaricide resistance is not currently an issue in New South Wales isolates – amitraz resistance is only rarely recorded, usually associated with introductions of infected hosts from Queensland.

Tick fever was confirmed on four occasions in New South Wales in 2015, in three beef herds and one dairy herd, where cattle ticks were also present. The dairy herd had only one mortality, while the three beef herds had mortalities of 23, 3 and 7, respectively. The herd with 23 mortalities was infected with *B. bigemina*, whereas the other two beef herds were infected with *B. bovis*. Tick fever occurs in New South Wales infrequently; 17 outbreaks have been recorded in the past five years.

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A Parkhurst-infested zone was declared in 2011 around Darwin. Parkhurst-strain cattle ticks, which are resistant to synthetic pyrethroid and organophosphate chemicals, were

first detected on properties in the area in the 1990s and were originally managed by quarantining individual properties. A declared area was gazetted following active surveillance across the area, which identified spread to other properties. Movement controls, such as clean inspections and supervised treatment of livestock with an acaricide effective against Parkhurst-strain ticks, are used to minimise the risk of further spread of these ticks outside the declared area.

Surveillance on properties at the boundary of the declared area in 2015 showed no further spread of Parkhurst-strain ticks. There were no new detections of Parkhurst-strain ticks on properties outside the Parkhurst-infested zone. The only quarantined property outside the declared area was released from quarantine following completion of an intensive surveillance and management program.

Tick fever is not commonly diagnosed in the Northern Territory, although the organisms responsible for babesiosis and anaplasmosis are present. Tick fever is seen mainly in cattle that have had little or no previous exposure to ticks.

Queensland

Queensland regulates the movement of stock to control cattle ticks through the declaration of three zones: infested, free and control. The control zone is used as a buffer between the free and infested zones in parts of Queensland, to minimise the risk of incursions. Owners of stock are encouraged to take measures to eradicate or prevent the spread of cattle ticks.

Stock moving from the infested zone or from restricted properties in either of the other zones are required to meet regulated movement conditions, which may include inspection and/or treatment.

For movements from the infested zone, Queensland DAF uses a system of approved providers to provide cattle tick inspection services. Approved providers inspect and supervise treatments of stock at official clearing facilities, accounting for more than 95% of stock clearances from the infested zone. Currently, 67 approved providers are available to provide services at 26 clearing dips and 2 livestock inspection centres (spray stations). Approved providers are trained and monitored by Queensland DAF biosecurity officers.

Queensland DAF inspectors provide regulatory and advisory services for cattle tick control, eradication and management. They also provide inspection and treatment services for the restricted properties in the free and control zones, and at three clearing facilities that have not progressed to operation by an approved provider. Queensland DAF provides laboratory services for the analysis of dip fluids, and for testing and identifying acaricide-resistant strains of cattle ticks.

At the end of June 2015, when the Queensland cattle tick season ended, 142 infested properties in the free zone and 184 infested properties in the control zone were under movement restrictions. An additional 1500 properties in the free and control zones had a cattle tick status of either at risk (high) or at risk (low).

During 2015, 79 incidents of babesiosis (with an average mortality rate of 6% – range 0–40% – of at-risk animals) and 14 incidents of anaplasmosis (with an average mortality rate of 8% – range 0–13% – of at-risk animals) were confirmed through the Queensland DAF veterinary laboratory.

Live vaccines produced by Queensland DAF's Tick Fever Centre are used to control babesiosis and anaplasmosis. During 2015, the centre sold 684 000 doses of trivalent vaccine (96% chilled and 4% frozen).

Western Australia

The cattle tick–infested area in Western Australia includes the Kimberley in the north; the southern boundary is generally at latitude 20°S. Cattle moving from the tick-infested area to the tick-free area of the state are inspected and treated for ticks. There are no regulatory control measures for ticks within the tick-infested area, and there is almost no strategic treatment for ticks or vaccination for tick fever.

The last two detections of cattle tick in the tick-free area were in 1979 and 2001, and the cattle ticks were eradicated successfully. Acaricide-resistant ticks have not been detected in Western Australia.

2.4.8 Equid herpesvirus 1

Equid herpesvirus 1 (EHV-1) is a respiratory pathogen of horses that occasionally causes abortion and, rarely, neurological disease. The abortigenic and neurological strains are on the list of nationally notifiable diseases. EHV-1 abortions are generally sporadic, but outbreaks do occur. EHV-1 neurological disease is an emerging disease of increasing prevalence overseas, and new cases have been diagnosed in recent years in Australia.

Herpesvirus infection can be tentatively diagnosed if intranuclear inclusion bodies are detected during examination of tissue samples under a microscope. However, definitive diagnosis of EHV-1 infection – in cases of either

abortion or neurological disease – requires the virus to be detected by polymerase chain reaction or virus isolation. Virus detection and categorisation are essential when EHV-1 is suspected, because there are nine EHV serotypes. There is evidence that EHV-1 neurological disease could be associated with a nucleotide substitution in the EHV-1 polymerase gene. Virus isolation and sequence analysis can provide information on the prevalence of this mutation in Australian isolates.

In 2015, DAFWA diagnosed EHV-1 in a nine-year-old mare that aborted mid-term. This was the only mare affected on the property. The EHV-1 abortigenic strain was diagnosed on the basis of the clinical signs and demonstration of a rising antibody titre.

In Victoria in 2015, abortion due to EHV-1 infection was diagnosed in two mares from separate properties. It was also diagnosed in a neonatal foal that died at three days of age.

2.4.9 Hendra virus infection

Numerous Hendra virus incidents have occurred in Queensland and New South Wales since 1994, involving more than 90 horses. Most infected horses have died as a result of the disease.

Seven people are known to have been infected with the virus. Four of these have died, and one is reported to have ongoing health problems. Antibodies to Hendra virus have also been detected in two dogs that were in close contact with infected horses. Both dogs remained clinically normal, with no occurrence of related illness, but were euthanased to manage public health risks.

Flying foxes (fruit bats) are the natural host for Hendra virus, and infection is periodically present in flying fox populations across Australia. The virus has been isolated from all four species of flying fox: black (*Pteropus alecto*), grey-headed (*P. poliocephalus*), little red (*P. scapulatus*) and spectacled (*P. conspicillatus*). Spillover of infection from flying foxes to horses occurs as rare, sporadic events. To date, cases of Hendra virus infection in horses have only been detected in Queensland and northern New South Wales.

Horse-to-horse transmission of the virus has been seen in some incidents. Humans who have become infected have had very close contact with sick or dead infected horses. Seropositive dogs have also been in close contact with infected horses. Person-to-person or bat-to-person transmission of the virus has not been reported.

The incidents are not known to be linked, beyond a common exposure of horses to flying foxes. Wherever flying foxes and horses are together, there is potential for spillover of the virus to horses and then transmission to other horses, dogs or people. Regardless of the likelihood that flying foxes in any particular area are infected, it is prudent risk management for horse owners to take steps to minimise the potential for contact between flying foxes and horses, and to vaccinate their horses against Hendra virus.

In 2015, three incidents were reported: in June in Murwillumbah, New South Wales; in July in the Atherton Tableland, Queensland; and in September in Lismore, New South Wales (see also Section 4.6.1). The Queensland[33] and New South Wales[34] governments implement well-established biosecurity and public health responses to Hendra virus incidents.

2.4.10 Infectious bovine rhinotracheitis

Infectious bovine rhinotracheitis is caused by bovine herpesvirus 1 (BHV-1), which also causes infectious pustular vulvovaginitis, infectious balanoposthitis and several other clinical syndromes. BHV-1 occurs in most cattle-raising countries.

Three subtypes of BHV-1 are recognised worldwide: BHV-1.1, BHV-1.2a and BHV-1.2b. Subtypes 1.1 and 1.2a are more virulent than subtype 1.2b, and subtype 1.2a can cause severe respiratory disease and several other syndromes, including abortion. These virulent subtypes are present in North America, Europe and many other parts of the world, but only the relatively benign BHV-1.2b is present in Australia. The absence of more virulent subtypes and a predominance of pasture-based grazing means that disease due to infectious bovine rhinotracheitis is rare in Australia.

2.4.11 Johne's disease

Johne's disease (paratuberculosis) is a chronic mycobacterial infection, primarily of the intestines, that causes ill-thrift, wasting and death in several species of grazing animals. In Australia, there are two main types of the causative organism (*Mycobacterium avium* subsp. *paratuberculosis*); the sheep strain is largely restricted to sheep, whereas the cattle strain

33 www.daf.qld.gov.au/animal-industries/animal-health-and-diseases/a-z-list/hendra-virus/general-information

34 www.dpi.nsw.gov.au/agriculture/livestock/horses/health/general/hendra-virus

affects cattle, goats, alpaca and deer. In 2012, a novel 'bison' (B) strain was detected in cattle in Queensland. It is being investigated to better understand its characteristics and extent.

The livestock industries, governments and the veterinary profession collaboratively manage the Australian National Johne's Disease Control Program, which aims to reduce the impact of both the infection and the measures taken to control it. In partnership with governments, each affected industry has implemented strategies that suit its particular needs and disease situation. Key elements of the program are the Australian Johne's Disease Market Assurance Programs for cattle, sheep, goats and alpaca. These provide a high level of assurance that participating herds and flocks are not infected with Johne's disease. Details of herds and flocks in the Market Assurance Programs are maintained in NAHIS, and are available on the AHA website.[35]

In 2015, Western Australia retained its status as a bovine Johne's disease (BJD)–Free Zone. Queensland, the Northern Territory and northern South Australia's Protected Zones maintained controls on introductions to manage the risk of entry of BJD. Johne's disease is rare in the alpaca industry, and no cases were detected in 2015.

The mid-term review of the National BJD Strategic Plan commenced in 2015. This review is considering the future approach to managing BJD. A major part of the approach is a move away from zoning towards encouraging producers to take increased responsibility for their own biosecurity – for both Johne's disease and other endemic diseases. The new program is expected to commence in early 2016.

Beef cattle

BJD has rarely been detected in the northern and western beef industry. After detections in 2011 and 2012 in Queensland, most traced herds have now been released from quarantine. A small number are still in quarantine while investigation continues.

BJD is also uncommon in beef herds in south-eastern Australia. To help protect this situation, producers whose herds have had little or no contact with dairy cattle are encouraged to make a written declaration that the breeding cattle they are selling meet the criteria to be classified as low risk ('Beef Only').

Although the disease is uncommon, the impacts can be serious for individual infected herds. The National BJD Financial and Non-Financial Assistance Package helps owners of infected herds to eliminate BJD, thus contributing to the low prevalence of BJD in the beef industry. Since the scheme started in 2004, it has assisted 492 producers, about 392 of whom have had the infected or suspect statuses of their herds resolved. A key element of the scheme is the non-financial aspect. Two BJD counsellors are employed under the program to conduct a situation assessment, assist with considering management and trading options, develop a disease management plan and liaise with the supervising veterinarian.

Dairy cattle

In south-eastern Australia, the dairy industry promotes hygienic calf rearing to help reduce the incidence of BJD in replacement heifers. Buyers seeking BJD assurance are also encouraged to ask the seller for a written declaration of the National Dairy BJD Assurance Score for the cattle. A score of 10 indicates a very high level of confidence that the cattle are not infected. New South Wales and South Australia require sellers to declare the dairy score when selling dairy cattle.

Sheep

Following a major review in 2012, a revised five-year control program for Johne's disease in sheep (ovine Johne's disease – OJD) commenced from 1 July 2013. The main elements of the revised program are the implementation of regional biosecurity areas (groups of producers working together voluntarily to keep disease out of the area) and continued use of the National Sheep Health Statement. This is a declaration by the owner about the sheep that enables buyers to assess the risk of OJD and other diseases.

Abattoir surveillance provides feedback to individual farmers and the wider sheep industry on the occurrence of OJD and other significant endemic diseases. In 2014, the sheep industry continued working with AHA and the meat-processing industry to support abattoir surveillance at several sites across southern Australia. In the 2014–15 financial year, approximately 10 459 consignments, comprising 2 132 170 adult sheep, were inspected for evidence of OJD. The data from this project are used each year to assess the regional flock prevalence of OJD.

Goats

The goat industry has established a risk-based trading approach, which uses a National Goat Health Statement with a nationally agreed risk ranking system. This owner

35 www.animalhealthaustralia.com.au/what-we-do/endemic-disease/market-assurance-programs-maps

declaration includes a risk rating for Johne's disease and provides herd information on other conditions that can easily spread from herd to herd with movements of goats. A component of the strategy is a National Kid Rearing Plan to help protect young goats from infections such as Johne's disease and CAE.

2.4.12 Newcastle disease

Newcastle disease (ND) is a viral disease of domestic poultry and wild birds. It can cause gastrointestinal, respiratory and nervous signs. Avirulent strains of ND are endemic in Australia. Australia has been free from outbreaks of virulent ND since 2002, when two incidents of virulent ND of Australian origin occurred in Victoria and New South Wales. These outbreaks were eradicated as prescribed by the Australian Veterinary Emergency Plan (AUSVETPLAN). Subsequently, the National Newcastle Disease Management Plan was developed to minimise the risk of Australian-origin virulent ND outbreaks in Australian commercial chicken flocks.

The plan is overseen by a steering committee, which includes representatives from the commercial chicken sector, the Australian Government, most state governments and the CSIRO Australian Animal Health Laboratory. Membership also includes experts in poultry vaccination and poultry disease management. AHA manages the plan and chairs the committee.

The goal of the *National Newcastle disease management plan 2013–16*[36] is a vaccination program that mitigates the risk of Australian-origin ND outbreaks by strategically applying vaccination – using attenuated (live) V4 and inactivated (killed) vaccines – together with surveillance and poultry industry biosecurity plans.

The primary objective of the vaccination program is for the vaccine strain of the virus to outcompete potential precursor strains of ND virus – that is, strains with genome sequences similar to the virulent sequence that might result in the emergence of virulent ND virus. Based on the risk level of an outbreak of Australian-origin virulent ND in each state or territory, chickens of different classes (meat chickens, laying hens, and chickens used for breeding) are vaccinated and surveyed according to standard operating procedures. Vaccination compliance is monitored through reconciliation of data on vaccine sales with commercial chicken numbers, and industry intelligence.

The *National Newcastle disease management plan 2013–16* does not propose any changes to the vaccination requirements for long-lived birds (layers and broiler breeders) from the requirements in previous management plans. However, consistent with relaxation of the rules for short-lived birds in Tasmania and Western Australia in the 2008–12 plan, the 2013–16 plan provides for relaxed rules in such birds in Queensland and South Australia. However, if poultry owners opt for reduced vaccination in their flocks, the surveillance protocols detailed in the plan must be implemented.

New South Wales

The standard operating procedures for vaccination in New South Wales poultry were unchanged in 2015 from the previous year.

Queensland

In Queensland, vaccination of poultry against ND is in accordance with the *National Newcastle disease management plan 2013–16* for a low-risk state, as agreed by the national steering committee.

The 2013–16 management plan has removed the compulsory vaccination requirements for broilers in Queensland, based on the assessed risk of an outbreak of virulent ND in Australia. Although vaccination of broilers is no longer compulsory in Queensland, producers can still voluntarily choose to vaccinate them. The Queensland broiler industry has indicated to Biosecurity Queensland that it is keen to adopt the reduced vaccination requirement for the Queensland broiler flock. Stock Amendment Regulation 2014 was passed by the Queensland Parliament in August 2014 to enable non-vaccination of broilers, combined with surveillance activity. Two major broiler companies have chosen this option and ceased ND vaccination from October 2014; the other major broiler company in Queensland is continuing to vaccinate its broiler flocks.

During 2015, no virulent ND or precursor ND viruses were detected in Queensland. All detections of ND virus were categorised as V4 or V4-like strains.

South Australia

Legislation in South Australia requires that all egg-laying and breeding chickens, and chickens over 24 weeks of age

36 www.animalhealthaustralia.com.au/what-we-do/endemic-disease/newcastle-disease

in commercial poultry flocks are vaccinated against ND and are serologically monitored to demonstrate vaccination efficacy, unless otherwise approved by the Chief Inspector of Stock. In addition, no person may introduce into South Australia any chickens for egg-laying or breeding purposes, or any chickens over 24 weeks of age within the commercial poultry industry unless the birds have been vaccinated against ND. This requirement is in accordance with the ND vaccination program standard operating procedures. Vaccination is in accordance with the *National Newcastle disease management plan 2013–16*, as agreed by the national steering committee.

During 2014 and 2015, a surveillance project was carried out, as approved under the *National Newcastle disease management plan 2013–16*, on a sample of broiler farms that had ceased vaccinating for ND. Surveillance was undertaken on 43 eligible poultry farms. Each growing area in the state was tested twice, at six-monthly intervals. Four serologically positive farms were identified. Where virus was detected, it was found to be the V4 strain (identical to that found in the live ND vaccine).

There were no other detections of ND in South Australia during 2015.

Tasmania

In Tasmania, compulsory vaccination requirements apply to growers with 1000 or more birds. Meat chicken producers are exempt from vaccinating flocks, provided that they comply with passive surveillance requirements under the *National Newcastle disease management plan 2013–16* and birds are grown for less than 24 weeks. Meat chicken breeders are not included in this exemption. Vaccine is obtained from the supplier under licence from the Chief Veterinary Officer and must be used according to the manufacturer's instructions.

Victoria

Owners of commercial poultry flocks with more than 1000 birds are required by law in Victoria to vaccinate against ND. In 2015, 9 permits were issued for the purchase and use of approximately 37 million doses of ND vaccine on 66 properties.

Western Australia

In Western Australia, owners of 1000 or more chickens are required to vaccinate long-lived birds, keep vaccination records, and report and collect samples from any flock meeting the ND case definition. ND vaccination of meat chickens kept for less than 24 weeks is not required, and permits to purchase ND vaccine are no longer required. Vaccination compliance is assessed by comparing census data and vaccine sales. The nationally agreed biosecurity standards are strongly promoted to industry, and biosecurity practices are monitored.

Image credit: iStock

2.4.13 Ovine brucellosis

Ovine brucellosis, caused by *Brucella ovis*, is endemic in commercial sheep flocks in some states, but its prevalence is low. It is not on the list of nationally notifiable diseases. Accreditation schemes for stud flocks are well supported, and are managed by state animal health authorities and breed societies. The numbers of accredited flocks at the end of 2015 are shown in Table 2.3.

Table 2.3 Ovine brucellosis accredited-free flocks, at 31 December 2015

Jurisdiction	Accredited-free
New South Wales	846
Queensland	79
South Australia	530
Tasmania	62
Victoria	471
Western Australia	183
Australia	**2171**

New South Wales

The New South Wales Ovine Brucellosis Accreditation Scheme has been operating since 1981, with some flocks maintaining continuous accreditation. The scheme requires producers to adopt a biosecurity plan and a testing regime. Flocks are tested by accredited private veterinary practitioners either annually or every second or third year, depending on how long they have been in the scheme. The program is strongly supported by the New South Wales sheep industry and show societies, and accreditation is a requirement for entry to many major shows and sales. At the end of 2015, the scheme covered 846 flocks, predominantly stud flocks.

Queensland

Queensland has a voluntary ovine brucellosis accreditation scheme for stud flocks. In December 2015, 79 flocks were accredited. Although a number of new flocks were accredited during 2015, severe drought conditions and dispersal of some flocks are likely to have contributed to a number of flocks exiting the scheme.

South Australia

A voluntary ovine brucellosis accreditation scheme operates in South Australia. It is administered by Primary Industries and Regions South Australia, and provides assurance of ram freedom from ovine brucellosis. As of December 2015, there were 422 producers, and 530 flocks were accredited free from ovine brucellosis.

Tasmania

The Tasmanian Department of Primary Industries, Parks, Water and Environment – in conjunction with veterinary practitioners and industry – has developed a voluntary ovine brucellosis accreditation scheme to control the disease in Tasmanian flocks. Accredited private veterinary practitioners test the flocks, and the department maintains the records. Tasmania has about 64 accredited ovine brucellosis–free flocks at any one time. Ovine brucellosis has not been confirmed in any sheep in Tasmania since 1988.

Victoria

Ovine brucellosis is present at low levels in Victorian sheep flocks. During 2015, infection was detected in five flocks.

A voluntary ovine brucellosis accreditation scheme, which is administered by the Victorian Department of Economic Development, Jobs, Transport and Resources, provides assurance that rams are free from ovine brucellosis. This assurance is required for sales, interstate movement, overseas export and attendance at shows. The scheme is based on property risk assessment, regular testing, adherence to best-practice flock management and investigation of suspect cases. Both departmental staff and private veterinary practitioners are involved in implementing the program across Victoria. As of December 2015, 471 flocks were accredited as free from ovine brucellosis.

Western Australia

DAFWA administers a voluntary ovine brucellosis accreditation scheme for ram breeders. Registered veterinarians inspect properties, advise on property biosecurity, and inspect and blood-test rams on studs participating in the scheme. As of December 2015, the scheme had 183 accredited flocks.

2.4.14 Ovine footrot

Ovine footrot, caused by *Dichelobacter nodosus* infection, was probably introduced in the early days of the Australian sheep industry. Virulent ovine footrot causes significant economic loss in southern Australia. Ovine footrot is not on the list of nationally notifiable diseases.

Several states have eradication or control programs. New South Wales has implemented the NSW Footrot Strategic Plan since 1988, and the state has been declared a protected area for footrot since August 2009. The prevalence of virulent footrot in New South Wales has remained at less than 0.1% of flocks, and the state maintained protected area status in 2015. This was in spite of a series of seasons that were highly conducive to footrot in the southern parts of the state, which resulted in localised outbreaks of disease.

The major threat to the protected area status of New South Wales is the introduction of sheep from control areas in other states. New South Wales requires sheep moving from interstate to be accompanied by a National Sheep Health Statement, which includes a declaration about the footrot status of the flock.

South Australia and Western Australia also operate control programs. In Western Australia, less than 1% of flocks are infected with virulent footrot. Tasmania and Victoria do not have official control programs for footrot, although legislation is available to quarantine properties, if required. The ability of strain-specific footrot vaccines to eradicate footrot from large sheep flocks is being trialled in Tasmania. A similar trial is being undertaken in Western Australia.

Footrot is not regarded as a significant problem in Queensland, and no clinical cases were reported in 2015.

There are no commercial sheep flocks in the Northern Territory.

2.4.15 Pigeon paramyxovirus 1

Pigeon paramyxovirus 1 (PPMV-1) was first identified in hobby and domestic pigeons in Victoria in 2011. It is now considered endemic in domestic and feral pigeons in Victoria. During February and May 2015, the Victorian Department of Economic Development, Jobs, Transport and Resources monitored an increase in the incidence of pigeons showing signs of PPMV-1. Hobbyists reported 21 cases, 16 of which were confirmed by laboratory testing. Most of the cases were in the greater Melbourne area.

PPMV-1 is considered endemic in the New South Wales feral pigeon population and has been detected occasionally in pigeon lofts in New South Wales since 2011. It was detected in single lofts of racing pigeons in the Sydney region in July and November 2015, respectively.

In November 2015, DAFWA confirmed Western Australia's first case of PPMV-1 in a flock of fancy pigeons in the Perth metropolitan area. Testing at the CSIRO Australian Animal Health Laboratory confirmed the strain as identical to that previously isolated from Victoria. Affected pigeons had significant neurological signs, and approximately 25% of the flock died. DAFWA implemented movement controls and monitoring for the affected loft, and reiterated advice on biosecurity practices, including vaccination, to the wider pigeon industry to reduce the likelihood of PPMV-1 being introduced into other pigeon lofts.

2.4.16 Swine brucellosis

Swine brucellosis resulting from infection with *Brucella suis* causes sterility and abortion in sows, and orchitis in boars. Other livestock species may be infected but do not show clinical signs; however, orchitis has been seen in antibody-positive pig-hunting dogs. The disease is a zoonosis – humans can also be infected.

New South Wales

Serological evidence of *B. suis* infection has been detected at a low prevalence in feral pigs in northern New South Wales.

Queensland

In Queensland, *B. suis* is confined to some populations of feral pigs. A *B. suis* Accredited Herd Scheme is administered by Queensland DAF on behalf of the industry and currently has 10 member herds. The scheme aims to ensure piggery freedom from *B. suis* and to provide a secure source of disease-free breeding stock for pig producers.

South Australia

To protect the disease-free status of farmed pigs in South Australia, movement controls are maintained for domestic pigs originating from states where *B. suis* can occasionally be detected in feral populations. In 2015, no cases of *B. suis* infection were reported in South Australia.

2.4.17 Theileriosis

Theileria orientalis, the blood parasite that causes benign theileriosis, has been in Australia for more than 100 years. It is established in coastal regions of eastern Australia. Historically, it has rarely caused disease. Australia is free from East Coast fever (*T. parva* infection) and Mediterranean theileriosis (caused by *T. annulata*), which are diseases listed by the OIE.

Since late 2005, the number and severity of disease cases due to *T. orientalis* infection in cattle in eastern Australia have increased. Disease has been seen in areas where it had not previously been found, often associated with introduction of animals from areas where the disease is known to be present.

New South Wales

In New South Wales in 2015, 34 investigations from 34 properties were reported. As in previous years, investigations occurred in districts where disease had been reported previously, predominantly coastal districts.

Victoria

In Victoria in 2015, 24 cases from 24 properties were reported – 15 cases were in dairy cattle and 9 were in beef cattle. As in previous years, cases occurred in Gippsland and north-east Victoria.

Western Australia

In May 2013, the first case in Western Australia of bovine anaemia due to *T. orientalis* type Ikeda was detected on a beef cattle property in the Southern Agricultural Region. Cases have continued to be reported in the region, and sporadic cases have also occurred in the South West Agricultural Region.

Image credit: AHA