

# **NSW Zoonoses Annual Report 2018**



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## Table of Contents

Overview .....	1
Brucellosis.....	3
Leptospirosis .....	4
Psittacosis (Ornithosis).....	5
Q fever .....	6
Rabies and other lyssaviruses (including Australian Bat Lyssavirus).....	9
Outbreaks.....	11
Animal health events notified to NSW Health .....	12
Appendices .....	14
Appendix 1: Methods.....	14
Appendix 2: Zoonoses notifiable to NSW human and/or animal health authorities .....	15
Appendix 3: Additional sources of information.....	16
Appendix 4: List of acronyms .....	16
Contributors and acknowledgements.....	16
References.....	17

## Overview

A zoonosis is any disease or infection that is naturally transmissible from vertebrate animals to humans. Worldwide, at least 61% of all human pathogens are zoonotic organisms, and during the past decade up to 75% of emerging pathogens were zoonoses.<sup>1</sup>

This report focuses on:

- Notifications of selected zoonoses in humans to NSW public health authorities during 2018
- Animal health events investigated in collaboration with the NSW Department of Primary Industries (DPI) and Local Land Services (LLS) requiring a public health response
- Post-exposure risk assessments and treatments delivered for the prevention of rabies and Australian Bat Lyssavirus (ABLV).

Beyond the scope of this report are numerous zoonoses transmitted through food, water or vectors – many of which are notifiable to NSW public health and animal health authorities ([Appendix 2](#)).

Surveillance findings on enteric and other zoonoses are routinely published in other reports available via the [NSW Health website](#). A wealth of further information and resources are also available ([Appendix 3](#)).

### 2018 Highlights

- NSW observed a slight increase in the number of brucellosis and Q fever notifications in humans in 2018. There were fewer notifications of psittacosis in humans in the same period. A large increase in leptospirosis notifications was seen in 2018 due to an outbreak related to a single farm.
- No human infections of anthrax, avian/animal influenza, Hendra virus, rabies/ABLV or tularemia were reported (Table 1, overleaf).
- The numbers of people exposed to animals at risk of rabies and ABLV requiring assessment and prophylactic treatment remained high, with the 2018 figures similar to 2017. The large number was largely driven by the number of tourists exposed to potentially rabid animals overseas, especially in Southeast Asia. The majority of people with local bat exposure were members of the general public.
- Sporadic animal infections with anthrax, brucellosis, Hendra virus, equine chlamydiosis and ABLV were reported in NSW, requiring public health investigation of exposures and some interventions to prevent human infections.

**Table 1: Incidence of selected zoonotic diseases in humans notified in 2018 compared to the previous 5 years (2013–2017), by local health district (LHD) of residence<sup>a</sup>, NSW<sup>b</sup>**

LHD	n (Rate per 100,000 <sup>c</sup> )							
	Brucellosis		Leptospirosis		Psittacosis		Q fever	
	5yr mean 2013-2017	2018	5yr mean 2012-2016	2018	5yr mean 2012-2016	2018	5yr mean 2012-2016	2018
Central Coast	0	1 (0.29)	<1 (0.38)	0	<1 (0.19)	0	1 (0.41)	1 (0.29)
Far West	0	0	0	0	0	0	9 (28.62)	4 (13.10)
Hunter New England	3 (0.35)	3 (0.32)	2 (0.21)	4 (0.39)	<1 (0.07)	1 (0.11)	51 (5.50)	25 (2.67)
Illawarra Shoalhaven	<1 (0.05)	0	<1 (0.11)	0	<1 (0.05)	0	9 (2.17)	15 (3.64)
Mid North Coast	0	1 (0.45)	1 (0.64)	50 (22.51)	<1 (0.18)	0	24 (10.91)	32 (14.41)
Murrumbidgee	0	0	<1 (0.25)	0	2 (0.66)	1 (0.41)	13 (5.54)	13 (5.35)
Nepean Blue Mountains	0	0	<1 (0.11)	0	1.8 (0.48)	0	1 (0.32)	2 (0.52)
Northern NSW	<1 (0.07)	0	4 (1.24)	4 (1.31)	<1 (0.07)	0	34 (11.14)	28 (9.14)
Northern Sydney	<1 (0.04)	0	1 (0.46)	0	<1 (0.18)	0	4 (0.42)	4 (0.43)
South Eastern Sydney	0	0	1 (0.15)	1 (0.11)	<1 (0.04)	0	2 (0.24)	0
South Western Sydney	1 (0.14)	1 (0.10)	<1 (0.02)	0	<1 (0.04)	3 (0.30)	4 (0.39)	1 (0.10)
Southern NSW	0	0	0	0	<1 (0.10)	0	14 (6.90)	22 (10.32)
Sydney	<1 (0.03)	1 (0.15)	<1 (0.04)	0	<1 (0.02)	0	<1 (0.03)	1 (0.15)
Western NSW	0	1 (0.35)	1 (0.36)	0	1 (0.43)	1 (0.35)	46 (16.34)	47 (16.67)
Western Sydney	1 (0.11)	1 (0.10)	<1 (0.18)	0	<1 (0.04)	1 (0.10)	<1 (0.17)	1 (0.10)
<b>NSW total</b>	<b>7 (0.09)</b>	<b>9 (0.11)</b>	<b>15 (0.19)</b>	<b>57 (0.74)</b>	<b>8 (0.11)</b>	<b>7 (0.09)</b>	<b>212 (2.74)</b>	<b>224 (2.81)</b>

<sup>a</sup> Exposures may have occurred outside the LHD of residence.

<sup>b</sup> There were no notifications of anthrax, avian or animal influenza, Hendra virus infection, Rabies/ABLV virus infection or tularemia in humans in NSW during this period.

<sup>c</sup> For population data source see Appendix 1.

## Brucellosis

Brucellosis is an infection that can be transmitted to humans from some animals such as cows, sheep, goats and pigs. *Brucella suis* remains a potential source of human infection in Australia, while other species have either been eradicated or never detected. Cases in NSW are rare and usually result from contact with feral pigs in north-western NSW, or from consuming unpasteurized dairy products while overseas.

### Key points:

- 9 confirmed cases notified in 2018
- 4 locally acquired infections, predominantly from pig hunting
- 5 overseas acquired

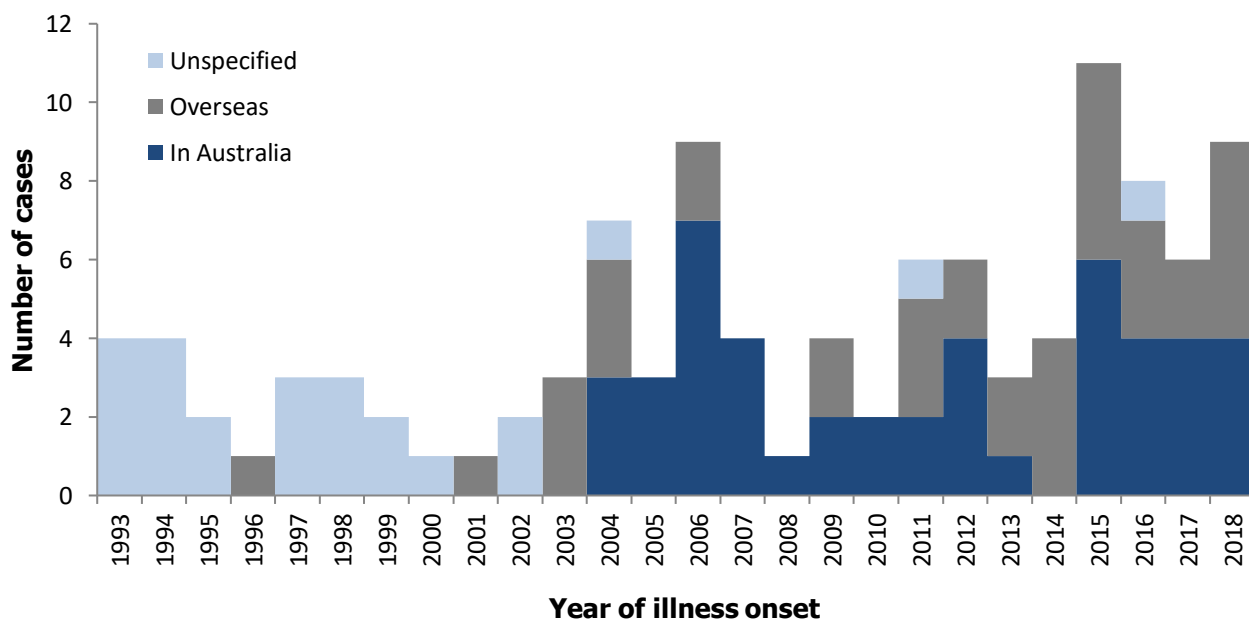
During 2018, 9 (0.11 per 100,000) confirmed cases of brucellosis were notified in NSW (Figure 1).

Four cases were acquired in NSW, all adult males aged between 28–45 years (mean: 40.5). None identified as Aboriginal. The four cases reported having direct contact with tissues and/or body fluids of pigs prior to onset of symptoms. Three reported pig hunting in the northern Hunter New England

LHD. The fourth case reported working on a commercial piggery as his only risk factor, but a joint inspection by DPI and LLS did not identify evidence of *Brucella suis* on the property; the source of infection therefore remains unknown. One of the four cases was confirmed by culture as *Brucella suis*.

The other five NSW residents acquired the infection overseas, in Iraq (n=2), Syria (n=1), Lebanon (n=1) and Vietnam (n=1). Cases were three females and two males aged 28 to 61 years. Two of the travellers to the Middle East reported consuming unpasteurised dairy products. These cases were confirmed by culture, and *Brucella melitensis* was isolated. The other three did not have culture confirmation or overseas food exposure collected.

**Figure 1: Trends in brucellosis notifications by place of acquisition, NSW, 1993–2018**



# Leptospirosis

Leptospirosis is a disease of humans and animals caused by *Leptospira* bacteria, found in infected animal urine and animal tissues. Although relatively rare in Australia, leptospirosis is more common in warm and wet areas such as northeastern NSW. Cases usually occur in people who have close contact with animals or who have been exposed to water, mud, soil, or vegetation contaminated by animal urine.

### Key points:

- 57 confirmed cases notified in 2018
- 52 infections acquired in NSW linked to an outbreak amongst workers on a raspberry farm
- No infections acquired during overseas travel in 2018

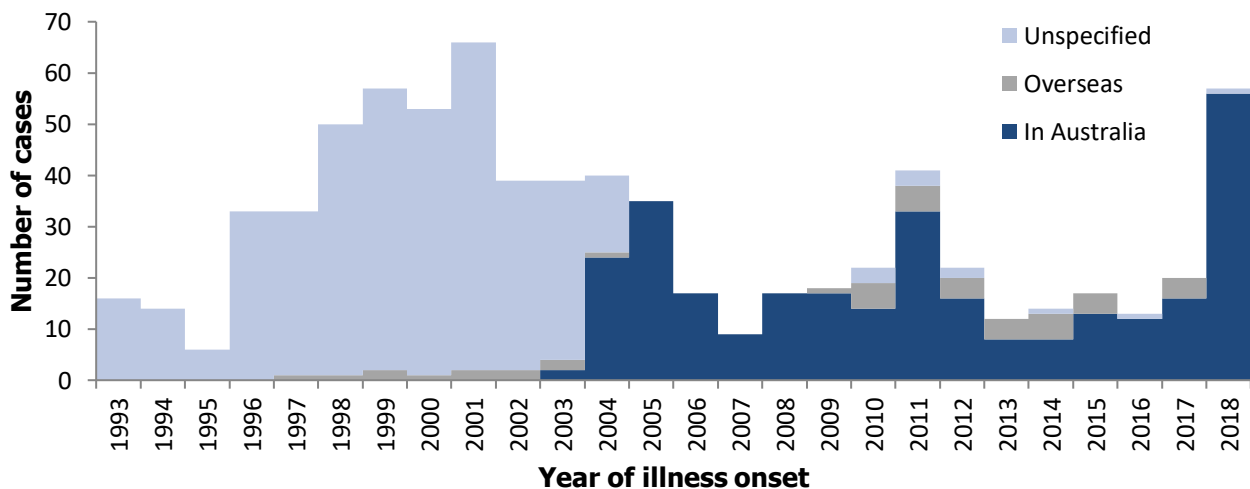
During 2018, 57 (0.74 per 100,000) confirmed cases of leptospirosis were notified in NSW. This is an increase compared to recent years, and 70% higher than the sharp increase in 2011 when an outbreak linked to a mouse plague occurred in southern NSW (Figure 2). Cases were predominately male (68%, n=39), ranging in age from 16–62 years (mean:

33.3 years). One case identified as Aboriginal (0.42 per 100,000).

Fifty-two cases acquired their infection in NSW whilst working on a raspberry farm. The infection was thought to have occurred due to exposure to mouse urine via scratches on the hands while picking fruit from raspberry vines. Further information is provided in the outbreaks section on page 9.

Exposures for the remaining five cases included: contact with farm animals (n=1), working in an abattoir (n=2) and contact with rodents or environments potentially soiled by urine from rodents (n=1). One case was not able to be interviewed.

**Figure 2: Trends in leptospirosis notifications by place of acquisition, NSW, 1993–2018**



## Psittacosis (Ornithosis)

Psittacosis is an uncommon disease caused by the bacterium *Chlamydia psittaci*. The bacteria can also cause disease in other animals which is usually called chlamydiosis. Most cases in NSW develop the disease by inhaling dust containing feathers, secretions and droppings from infected birds but more rarely can contract the disease from other animals, such as sheep, cattle and horses.

### Key points:

- Two confirmed cases notified in 2018
- Five probable cases reported

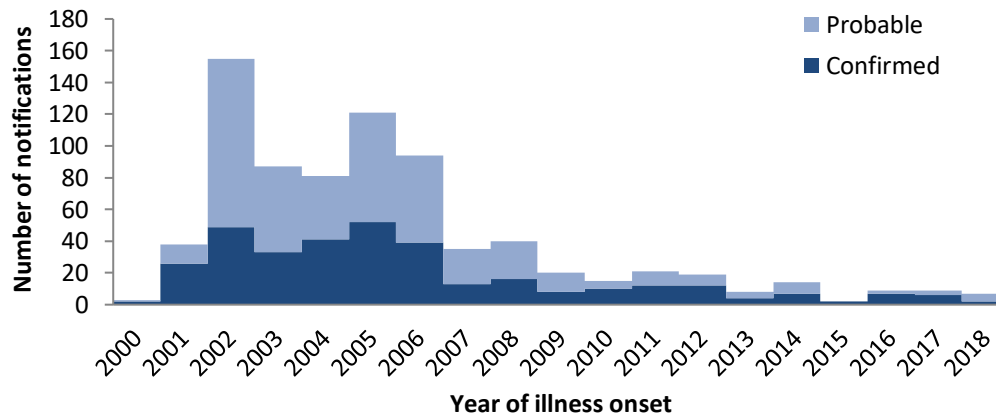
Since surveillance began in 2000, relatively high case incidence rates and sporadic outbreaks were observed from 2002–2006 in NSW, followed by a steady decline (Figure 3).

During 2018, two (0.03 per 100,000) confirmed cases were notified in NSW. Five probable cases

were also reported. These seven cases were predominately male (86%, n=6), ranging in age from 19–56 years (mean: 40.3). No cases identified as Aboriginal. Of the seven cases interviewed, three cases reported exposure to wild birds, and one reported exposure to poultry.

None of the cases exposed to wild birds or poultry reported signs of illness or deaths among the flock before their illness.

**Figure 3: Trends in psittacosis notifications by case classification, NSW, 2000<sup>a</sup>–2018**



<sup>a</sup> Psittacosis notifications are not available prior to 2000.



## Q fever

Q fever is caused by the bacterium *Coxiella burnetii*. The main carriers of the disease are cattle, sheep and goats but other animals, including marsupials, can also be infected. People are usually infected by inhaling aerosols or dust when working with infected animals, animal tissues or animal products. The bacteria survive for long periods in the environment as they are resistant to heat, drying and many disinfectants.

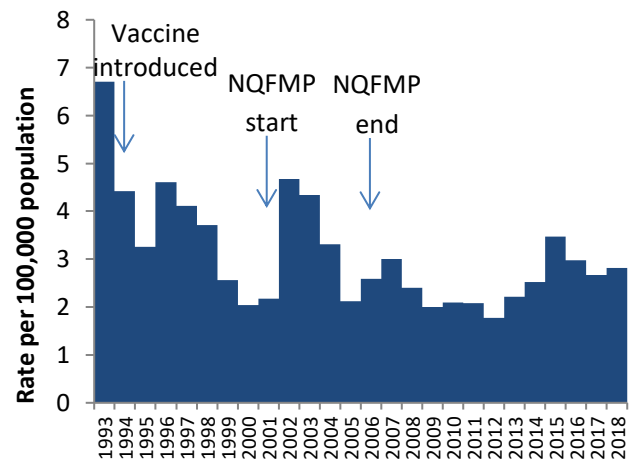
### Key points:

- 224 confirmed cases notified during 2018
- Adult males, Aboriginal people and populations in regional/remote areas were disproportionately affected
- Seven cases were reported in children aged less than 16 years
- Most adult cases (82%) worked in a known high-risk occupation
- Most cases (95%) were exposed to animals or animal products, tissues or discharges

During 2018, 224 confirmed cases of Q fever (2.8 cases per 100,000) were notified in NSW. This was higher than the five year annual mean (212 cases, 2.7 cases per 100,000) (Figure 4).

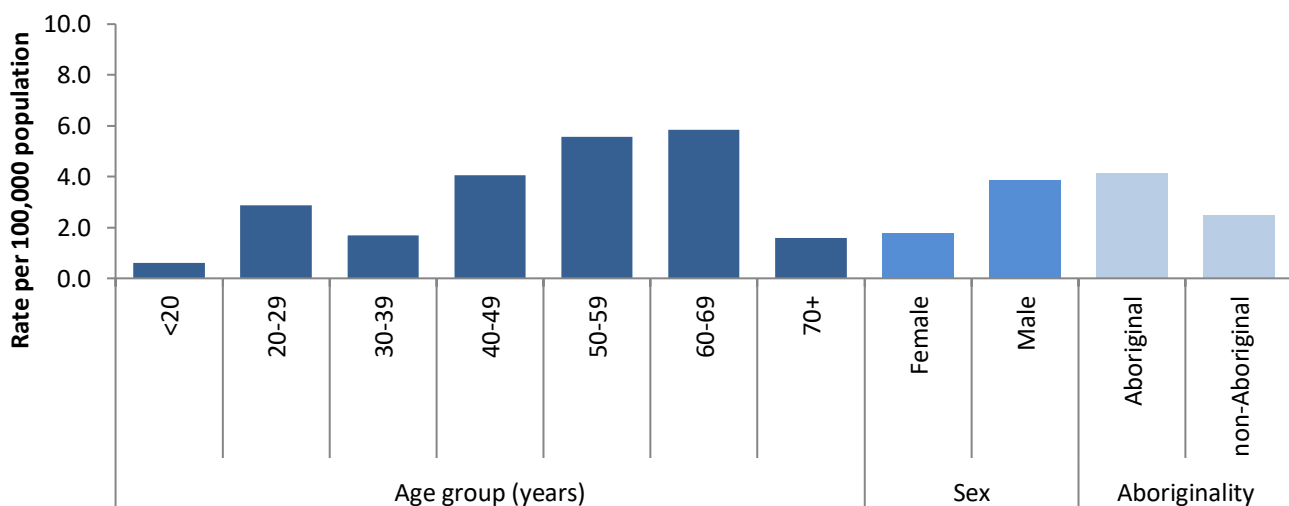
The majority of cases notified in 2018 were males (n=153, 68%), and cases ranged in age from 3–89 years (mean 48 years) (Figure 5). Indigeneity was reported for 91% (n=203) of cases, wherein a disproportionate rate of disease was observed in

**Figure 4: Trends in Q fever notifications, NSW, 1993–2018**



Aboriginal NSW residents (n=10, 4.15 cases per 100,000) when compared to non-Aboriginal residents (n=193, 2.50 cases per 100,000). An enhanced surveillance project examining the reasons for the higher rates among Aboriginal people has found that the disproportionate burden occurs in Aboriginal residents of Western NSW and Far Western NSW LHDs.

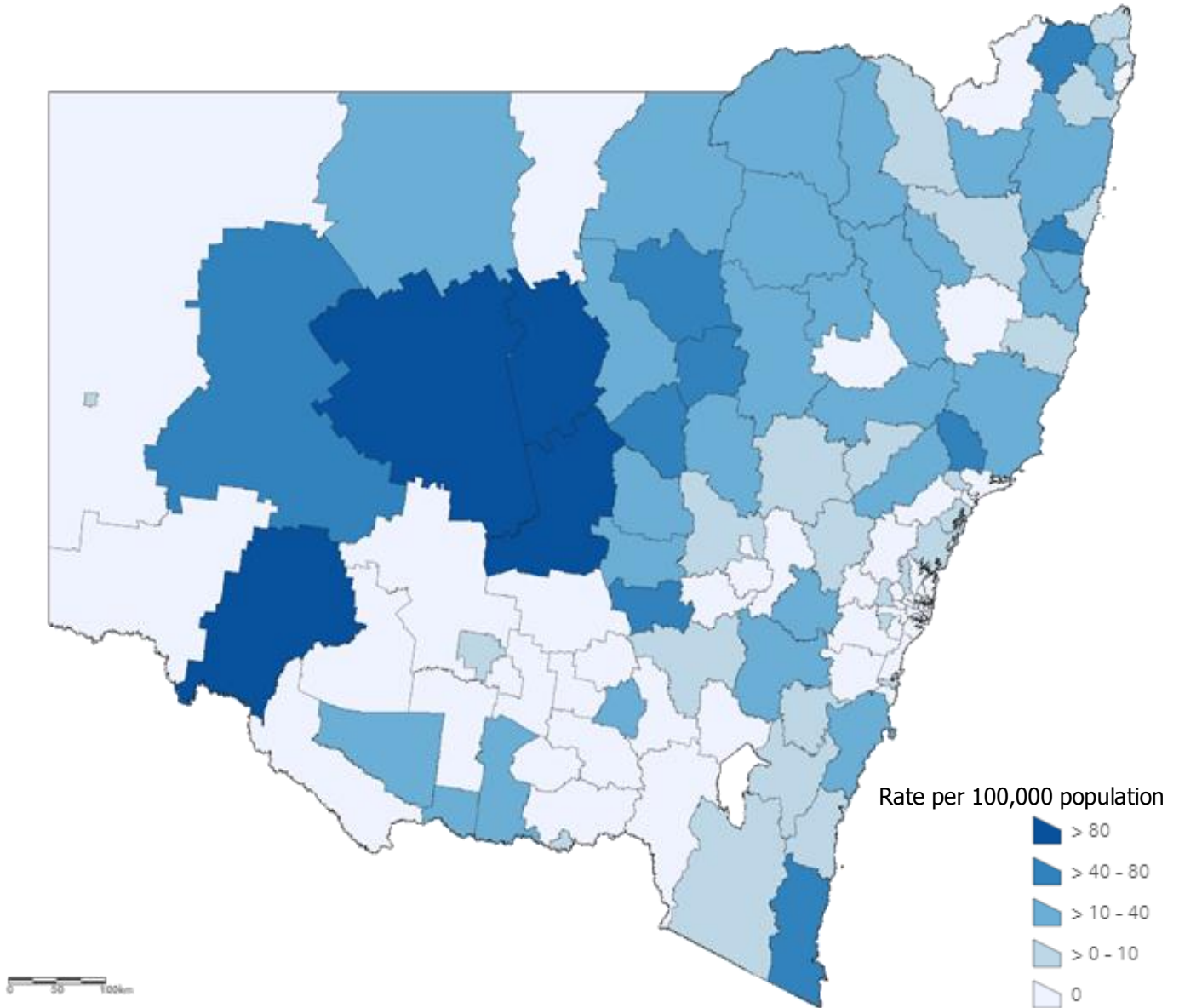
**Figure 5: Q fever incidence rate by age, gender and Aboriginality, NSW, 2018**



The most substantive increases were observed in Southern NSW and Mid North Coast LHDs (Table 1). The highest incidence of disease was observed in remote areas of the state (Figure 6) – especially Lachlan Shire (n=9, 142.5 per 100,000),

Bogan Shire (n=4, 142.3 per 100,000), Balranald Shire (n=2, 87.3 per 100,000) and Cobar Shire (n=4, 84.3 per 100,000) local government areas (LGAs).

**Figure 6: Q fever incidence rate by LGA, NSW, 2018**



Occupations were reported for 154 cases aged 16 years or over in 2018. Of these 82% (n=126) worked in high-risk occupations, including farmers, farm hands or property managers (n=84), graziers (n=7), abattoir and other meat industry workers (n=7), veterinarian or vet nurse (n=6), shearer (n=4), stockyard worker (n=4), dairy and animal transporter (n=3) or other high-risk occupations.

The remainder of adult cases (18%, n=28) were retired, unemployed or worked in a non-animal related occupation.

Seven infections were reported in children under 16 years of age, all of whom were resident on or adjacent to a farm during the exposure period.

Exposure history was available for 189 cases in 2018. Of these, most (95%, n=179) reported one or more types of exposure to animals or animal products, including exposures to livestock or their products (42%, n=93), direct contact with animal tissues or discharges (26%, n=48), incidental exposures to native wildlife (12%, n=23), or exposure to animal faeces or other products (8%, n=15). The remainder reported no discernible exposure to livestock or wildlife (5%, n=10).

In 2018 NSW Health launched a campaign to increase awareness about Q fever in the community and amongst GPs, including advertising in mass media and development of an [on-line learning module](#) hosted on the Australian College of Rural and Remote Medicine website.

Further information and resources can be downloaded from the [NSW Health Q fever webpage](#).

## Rabies and other lyssaviruses (including Australian Bat Lyssavirus)

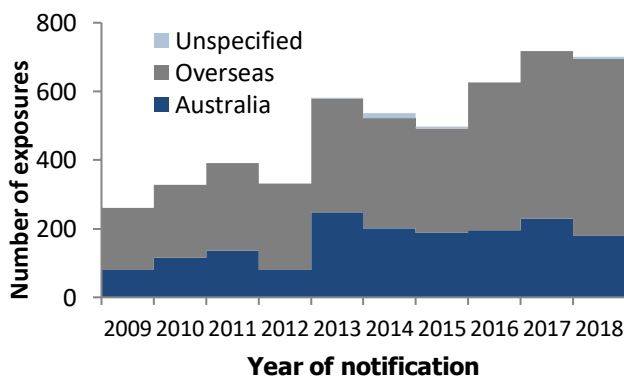
Lyssaviruses are a group of viruses that includes rabies and bat lyssavirus. Lyssavirus is carried by bats in Australia and worldwide. Rabies is carried by terrestrial mammals in many overseas countries. Both are spread by bites and scratches, which affect the central nervous system and are usually fatal. These diseases can be prevented by rapid and thorough cleaning of the wound and post exposure prophylaxis.

### Key points:

- No human cases notified in 2018
- 700 exposures to potentially infected animals, of which 98% were assessed as requiring post-exposure prophylaxis to prevent infection
- 504 exposures requiring post exposure prophylaxis occurred overseas, of which 75% were in Southeast Asia and 45% were from monkey bites/scratches
- 181 local exposures to bats requiring post exposure prophylaxis, of which 74% were from flying-foxes. Five bats were positive for ABLV
- 2,005 doses of vaccine and 2,064 vials of human rabies immunoglobulin (HRIG) were distributed as post exposure prophylaxis

During 2018, while there were no human infections of classical rabies or ABLV, a total of 700 potential exposures to lyssaviruses were notified to public health units. The continuing increase in reported exposure events has been driven by overseas exposures (Figure 7).

**Figure 7: Exposures to rabies and other lyssaviruses by location, NSW 2009–2018**



Of all exposures, 684 (98%) required post exposure prophylaxis with either rabies vaccine or HRIG.

**Overseas exposures** - Of 514 exposures overseas (73%), post exposure prophylaxis was initiated or continued for 504 people exposed to potentially infected animals (98%). Of these, slightly over half occurred in females (n=259, 51%) and travellers aged 18–34 years accounted for the greatest proportion (n=260, 52%) – mean age: 30 years. The vast majority of overseas exposures requiring prophylaxis occurred in Southeast Asia (n=378, 75%); predominantly Indonesia or Thailand (Table 3). Most incidents involved bites or scratches from monkeys (n=228, 45%), followed by dogs (n=193, 38%) and cats (n=58, 12%).

**Table 3: Potential overseas exposures to rabies and other lyssaviruses by location, NSW, 2018**

Location	n	%
Southeast Asia:	378	75
Indonesia (including Bali)	205	41
Thailand	107	21
Philippines	30	6
Vietnam	18	4
Other <sup>b</sup>	18	4
South Asia <sup>c</sup>	55	11
China or Taiwan	32	6
Americas	17	3
Africa	11	2
Europe (including Eastern and Southern)	7	1.5
Oceania	2	0.5
Other or unknown	2	0.5
<b>Total</b>	<b>504</b>	<b>100</b>

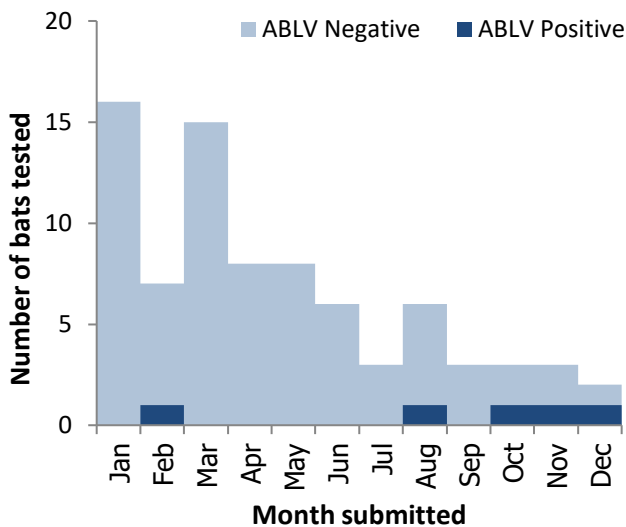
<sup>b</sup> Cambodia, Malaysia, Laos, Singapore

<sup>c</sup> India, Sri Lanka, Nepal, Bangladesh, Bhutan

**Local exposures** - Of 181 exposures to bats in Australia reported during 2018 (26%), 174 required post exposure prophylaxis (96%). The average age of persons exposed was 47 years, however

exposures occurred most often among younger persons aged 20–29 years (20%, n=34). A slightly higher proportion were in males (n=99, 57%). Occupation was reported for 154 exposures, of which 10% (n=16) were considered high risk occupations (including wild life workers/volunteers, veterinarians, etc.) and the remainder were members of the general public. The majority of bat exposures were megabats, which includes flying-foxes (n=128, 74%).

**Figure 8: Number of bats tested for ABLV by month, NSW, 2018**



Of 85 bats submitted for testing during 2018, five tested positive (6%) (see page 11). Submissions for testing peaked in January and March (Figure 8). The first positive bat was reported in February, followed by August and then one per month from October to December.

**Post-exposure prophylaxis** - NSW Health provides post-exposure prophylaxis, including vaccination and rabies immunoglobulin, free of charge to people potentially exposed to rabies and ABLV following a risk assessment with their medical professional (see [NSW Rabies and other lyssavirus infections control guidelines](#)). During 2018, NSW Health distributed 2,005 doses of rabies vaccine and

2,064 vials of human rabies immunoglobulin (HRIG) to prevent infections, at a cost of approximately AUD 871,500.

Most overseas exposures requiring post-exposure prophylaxis occurred among residents of metropolitan Sydney, particularly South Eastern Sydney and Northern Sydney LHDs. The highest number of local exposures requiring post-exposure prophylaxis occurred among residents of Northern NSW (Table 4).

**Table 4: Distribution of rabies vaccine and human rabies immunoglobulin (HRIG) by LHD, NSW, 2018**

LHD	n		Total (%)
	Overseas	Local	
Central Coast	26	4	30 (4.4%)
Far West	0	0	0
Hunter New England	46	23	69 (10.2%)
Illawarra Shoalhaven	18	13	31 (4.6%)
Mid North Coast	8	9	17 (2.5%)
Murrumbidgee	6	2	8 (1.2%)
Nepean Blue Mountains	16	8	24 (3.5%)
Northern NSW	28	35	63 (9.3%)
Northern Sydney	83	23	106 (15.6%)
South Eastern Sydney	99	12	111 (16.4%)
South Western Sydney	40	10	50 (7.4%)
Southern NSW	7	5	12 (1.8%)
Sydney	70	8	78 (11.5%)
Western NSW	6	7	13 (1.9%)
Western Sydney	51	15	66 (9.7%)
<b>NSW total</b>	<b>504</b>	<b>174</b>	<b>678</b>

Distribution rates peaked in January and July 2019; corresponding with peak periods of overseas travel and bat testing (Figure 10).

## Outbreaks

### Leptospirosis linked to raspberry pickers

In May 2018 a cluster of febrile illnesses was recognised among raspberry workers from a farm on the mid-north coast of NSW. Laboratory testing detected *Leptospira borgpetersenii* serovar Arborea, of which rodents are the predominant animal reservoir.

Cases were detected through a range of routine and active surveillance measures, including reviewing berry workers presenting to local hospitals. Confirmed cases had symptoms plus laboratory-definitive evidence of leptospirosis, as per the [NSW control guidelines](#). Probable cases had symptoms and laboratory-suggestive evidence (IgM or PCR positive). Possible cases had a clinically-compatible illness with no specimen available for testing.

Eighty-four cases (50 confirmed<sup>1</sup>, 19 probable, 15 possible) developed symptoms between April and August 2019 (Figure 9). All cases worked in raspberry teams, despite the farm also growing blueberries. No other local farms were involved.

The farm was inspected to assess a range of risks, including work practices and water supply. Rodent trapping was increased, with a sample of trapped rodents tested for leptospirosis. Evidence of rodent activity around raspberry plants was observed on the farm. Three of 13 trapped mice tested positive

for *Leptospira* Arborea. Protective clothing use was inconsistent and workers used fingerless cotton gloves while picking. There was no evidence of any likely sources of drinking water contamination.

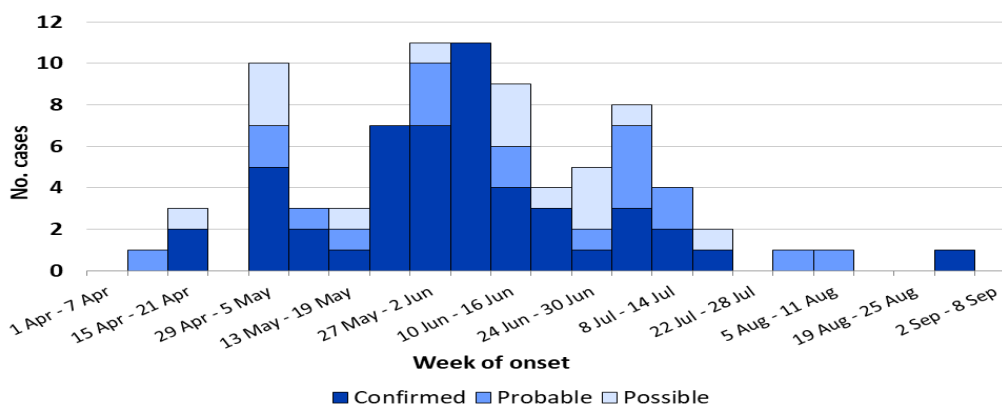
A case-control study among raspberry workers on the farm was conducted. Statistical analysis was used to compare confirmed and probable cases to seronegative controls and risk and protective factors were assessed by odds ratios. The study showed that, among other possible factors, cases were less likely than controls to wear cotton gloves and had been employed for shorter periods than controls.

Control measures, including enhanced glove use, were implemented on-site. In addition, antibiotic prophylaxis was provided to 114 workers for a one-month period. The outbreak subsequently subsided, although one further case was detected among workers in September.

This is the largest known outbreak of leptospirosis in NSW and the largest point-source outbreak in Australia. Leptospirosis was likely transmitted to workers through scratches that came into contact with infected mouse urine while harvesting berries.

<sup>1</sup>One case was detected through serological screening that met the confirmed surveillance case definition as per the [NSW control guidelines](#), but as they had no symptoms they were not counted as a confirmed outbreak case.

**Figure 9: Epicurve of leptospirosis outbreak**





## Animal health events notified to NSW Health

### Key points:

- Sporadic cases of ABLV, anthrax, brucellosis, psittacosis and Hendra virus infection were reported in animal populations in 2018

Notifications of significant zoonotic animal health events to Department of Primary Industries (DPI) or Local Land Services (LLS) are rapidly communicated to NSW public health authorities. Depending on the disease and nature of the event, public health units (in collaboration with DPI, LLS and other relevant parties) will investigate human exposures and advise appropriate actions, which may include monitoring for symptoms and referral for laboratory testing and treatment. While animal health authorities work to confirm the diagnosis through laboratory tests at the Elizabeth Macarthur Agriculture Institute (EMAI) and the Australian Animal Health Laboratory (AAHL) and control spread in animal populations, public health authorities take steps to prevent human infections, such as providing education to reduce risk and post-exposure treatment, where indicated.

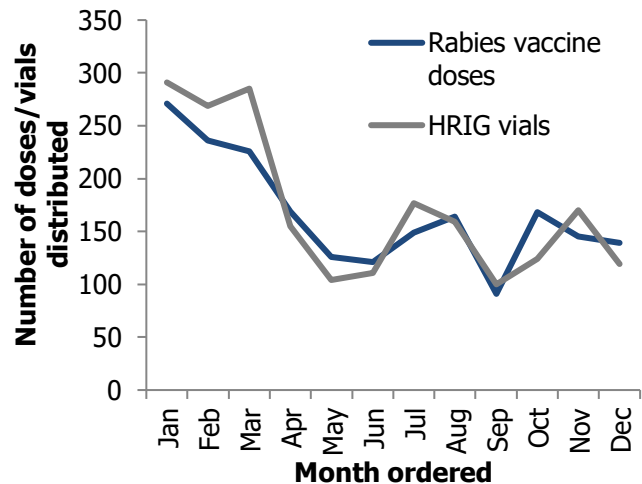
There were no incidents or clusters of highly pathogenic avian influenza, avian psittacosis, leptospirosis, terrestrial rabies or tularemia reported in NSW animal populations during 2018.

During 2018, NSW authorities collectively responded to the following animal health events:

**ABLV** – 85 bats were submitted for testing following human exposures, exposure of a pet, or exhibiting signs suggestive of ABLV infection.

Five bats tested positive for ABLV. All five flying foxes had clinical signs consistent with ABLV; only one of the five positive bats had human contact (a bite on the finger), but that person was a bat carer who was vaccinated against lyssavirus and had recent evidence of high titres (see also [Rabies and other lyssaviruses](#)).

**Figure 10: Distribution of rabies vaccine and human rabies immunoglobulin (HRIG) by month, NSW, 2018**



**Anthrax** – was investigated on 201 occasions as the cause of death of stock, of which three incidents were confirmed. These occurred in March and September 2018 in cattle and May 2018 in sheep. All incidents occurred in the anthrax belt of NSW. Shortly after infection was confirmed, all susceptible stock were vaccinated, all carcasses burned and the property was subjected to movement restrictions as per the NSW Anthrax Procedure. In all events, public health units determined all potential human exposures to be low-risk and did not require prophylactic treatment.

**Brucellosis** – samples from 274 dogs were submitted for testing during 2018, a 10% decrease from 2017. Of these, 55 were serologically positive and another 6 were inconclusive. The majority of positive cases originated from the north west of NSW and had reported either contact with feral pigs or were fed raw feral pig meat. NSW DPI assists private veterinarians in assessing and managing the risks posed by *Brucella suis* infection in dogs, providing advice on infection control to prevent transmission to humans and other animals. All infections were reported to the local public health unit for human health assessment and advice.

**Equine Chlamydiosis** – was investigated on 161 occasions in horses in NSW during 2018. *Chlamydia psittaci* was detected in 6 cases. All infections were reported to the local public health unit for assessment of human contacts.

Although the zoonotic potential of psittacosis from non-avian sources is not currently well understood, the case definition in the NSW psittacosis control guideline was updated to include epidemiological links to any animal with confirmed chlamydiosis from 1 July 2018.

**Hendra virus infection** – Of 209 reports of sick or dead horses where samples were submitted for Hendra virus testing in NSW during 2018, Hendra virus infection was confirmed on one property involving an unvaccinated horse. The event occurred in the Northern NSW region in September 2018. The dead horse was buried and the property was placed into quarantine. The infection was reported to the local public health unit for assessment. One person was assessed as having low risk exposure to the infected horse and was referred to an expert panel, which advised that prophylaxis with monoclonal antibodies was not indicated. (Table 5).

**Table 5: Human assessment and treatment following exposure to horses infected with Hendra virus, NSW, 2018<sup>a</sup>**

Month	Council Area	Number of Horses	Number of Human contacts			Human Risk Assessment
			High Risk	Moderate Risk	Low/Neg Risk	
September	Tweed Shire	1	0	0	1	Horse owner: minimal direct contact with sick horse during infectious period. Assessed as 'low risk'.
<b>Total</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	

<sup>a</sup> Only lists humans deemed 'exposed'. The table does not include people who wore appropriate personal protective equipment (PPE).



# Appendices

## Appendix 1: Methods

**Human disease notifications:** Under authority of the *NSW Public Health Act 2010*, NSW Health receives notifications of communicable diseases from laboratories, doctors, and hospitals. Cases are recorded on the NSW Notifiable Conditions Information Management System (NCIMS) – a confidential, internet based system used by NSW public health units – and categorised based on the agreed [national cases definitions](#).<sup>2</sup>

This report reflects notifications of anthrax, avian and other animal influenza virus infections, brucellosis, Hendra virus infections, leptospirosis, psittacosis, Q fever, and rabies and other lyssaviruses (including ABLV), recorded in NCIMS on or shortly after 31 May 2019. Unless specified otherwise, cases were categorised by calendar year based on notification date (i.e. the date of that public health were notified of the infection).

Incidence rates were calculated using mid-year estimated resident population (ERP) projections published by the Secure Analytics for Population Health Research and Intelligence (SAPHaRI) group, NSW Ministry of Health. This includes LGA based ERPs derived from estimates published by the NSW Department of Planning and Environment (prior to 2015)<sup>3</sup> with projections from 2015 produced by using cubic spline interpolation, and Aboriginal/non-Aboriginal ERPs derived from estimates published by the Australian Bureau of Statistics.<sup>4</sup>

The degree to which notification data reflect the true incidence of disease varies between conditions, as many people with infectious disease will not be diagnosed with the disease or notified. For some conditions (e.g. Q fever), where infections maybe asymptomatic or are not diagnosed, notifications likely underestimate the true incidence of disease. Notification data are also subject to retrospective changes – data are only accurate at the time of extraction.

**Animal disease notifications:** Members of the public, veterinarians or animal owners or managers are legally obligated to notify certain suspected animal diseases under [legislation](#). This report reflects selected conditions prone to infect humans, notified to the DPI during 2018, and conveyed to public health authorities. This information is not intended to reflect overall incidence of disease in the animal population, but rather an indication of the scope of diseases upon which the DPI and NSW Health collaborate to prevent transmission to the public.

**Rabies post-exposure treatment:** Doctors contact public health units for advice on the management of potential exposures to lyssaviruses. Where indicated, public health units arrange for the ordering, urgent delivery and administration of rabies vaccine and HRIG to prevent infection – a service provided free of charge to NSW residents. These events are routinely captured in NCIMS, and records of rabies vaccine and HRIG distribution are maintained by the Immunisation Unit.

Costs estimates provided in this report were based on the total number and costs of treatments distributed and courier distribution costs. This does not take into account any salaries, consumables, consultation costs, other incidental costs borne by NSW Health or costs associated with testing bats.

## Appendix 2: Zoonoses notifiable to NSW human and/or animal health authorities

Disease	Status in NSW	Human health notification	Animal health notification
Anaplasmosis	sporadic		✓
Anthrax	sporadic	✓	✓
Arboviral infections	varies by virus	✓	some
Babesiosis	sporadic		✓
Borna disease	exotic		✓
Brucellosis - <i>Brucella suis</i>	sporadic	✓	✓
Brucellosis - NEC	exotic	✓	✓
Camelpox	exotic		✓
Campylobacteriosis	endemic	*	
Crimean-Congo haemorrhagic fever	exotic	✓	✓
Cryptosporidiosis	endemic	✓	
Cysticercosis – porcine, bovine	exotic/sporadic		✓
Encephalitides (tick-borne)	exotic		✓
<i>Escherichia coli</i> - STEC and HUS	endemic	✓	
Getah virus infection	exotic		✓
Giardiasis	endemic	✓	
Glanders	exotic		✓
Hendra virus infection except in pteropid bats	sporadic	✓	✓
Hepatitis E	sporadic	✓	
Influenza - highly pathogenic avian influenza	exotic	✓	✓
Influenza - swine/equine influenza	exotic	✓	✓
Leishmaniasis	exotic		✓
Leptospirosis	endemic	✓	
Listeriosis	endemic	✓	
Louping ill	exotic		✓
Lyssavirus - ABLV	endemic	✓	✓
Lyssavirus - Rabies	exotic	✓	✓
Menangle virus infection	sporadic		✓
Nairobi sheep disease	exotic		✓
Newcastle disease	exotic		✓
Nipah virus infection	exotic	✓	✓
Pigeon paramyxovirus	sporadic		✓
Plague	exotic	✓	
Psittacosis (Ornithosis) / Chlamydiosis in birds	endemic	✓	✓
Q Fever	endemic	✓	
Rift Valley fever	exotic	✓	✓
Salmonellosis - NEC	endemic	✓	
Salmonellosis - <i>Salmonella</i> Enteritidis	sporadic	✓	✓
SARS CoV	exotic	✓	
Transmissible spongiform encephalopathy	exotic	✓	✓
Trichinellosis	exotic		✓
Trypanosomiasis / Chagas' disease	exotic		✓
Tuberculosis - Bovine ( <i>Mycobacterium bovis</i> )	exotic		✓
Tuberculosis - other mammal or avian	sporadic	✓	✓
Tularaemia	Exotic/sporadic	✓	✓
Turkey rhinotracheitis (avian metapneumovirus)	exotic		✓
Vesicular stomatitis virus	exotic		✓
Viral haemorrhagic fever, human – NEC	exotic	✓	
Warble-fly myiasis	exotic		✓
Wesselsbron disease	exotic		✓

NEC: Not elsewhere classified. \* *Campylobacter* notifications commenced in NSW on 7 April 2018

Table correct as at 24 May 2018

## Appendix 3: Additional sources of information

See NSW Health's [Infectious Diseases website](#) for further information for the general public and health professionals on all human health conditions presented in this report, as well as other notifiable conditions. This includes NSW-specific data and information, factsheets and control guidelines on:

- [Anthrax](#)
- [Avian influenza](#)
- [Brucellosis](#)
- [Hendra virus](#)

- [Leptospirosis](#)
- [Psittacosis](#)
- [Q fever](#)
- [Rabies and ABLV](#)
- [Tularemia](#).

See the DPI's [Animal health and diseases](#) and [Animal Biosecurity Zoonoses](#) websites for further information for general public, veterinarians and animal health authorities about zoonoses in animals.

## Appendix 4: List of acronyms

AAHL	Australian Animal Health Laboratory
ABLV	Australian Bat Lyssavirus
ACT	Australian Capital Territory
CDNA	Communicable Diseases Network Australia
DPI	Department of Primary Industries
EMAI	Elizabeth Macarthur Agriculture Institute
ERP	Estimated resident population
HRIG	Human rabies immunoglobulin
LGA	Local Government Area
LHD	Local Health District
LLS	Local Land Services
NCIMS	Notifiable Conditions Information Management System
NEC	Not elsewhere classified
NSW	New South Wales
NQFMP	National Q Fever Management Program
PCR	Polymerase chain reaction
PPE	Personal protective equipment
SAPHaRI	Secure Analytics for Population Health Research and Intelligence
Yr	Year

## Contributors and acknowledgements

This report was developed by staff of the Enteric and Zoonotic Diseases Unit and the Immunisation Unit, Communicable Diseases Branch, Health Protection NSW in collaboration with the NSW Department of Primary Industries.

Protecting the health of the community is a collaborative effort, involving public health units, clinicians, laboratory scientists, affected communities, and other government and community-based organisations. We sincerely thank all those involved for the role they played in NSW in 2018.

## References

- 1 World Health Organization. Health Topics: Zoonoses. [updated: 2016; cited: 28 Apr 2016]. Available from: [http://www.who.int/zoonoses/control\\_neglected\\_zoonoses/en/](http://www.who.int/zoonoses/control_neglected_zoonoses/en/)
- 2 Communicable Diseases Network Australia (CDNA). Australian national notifiable diseases and case definitions. [updated: 15 Apr 2016; cited: 5 May 2016]. Available from: <http://www.health.gov.au/casedefinitions>
- 3 NSW Planning and Environment. NSW population, household and dwelling projections. [updated: 17 September 2018 cited: 18 February 2019]. Available from: <http://www.planning.nsw.gov.au/Research-and-Demography/Demography/Population-Projections>
- 4 Australian Bureau of Statistics. 3238.0 - Estimates and Projections, Aboriginal and Torres Strait Islander Australians, 2001 to 2026 [updated: 17 Dec 2015; cited: 5 May 2016]. Available from: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3238.0Main+Features12001%20to%202026?OpenDocument>