Wildlife Health Australia

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Wildlife Health Australia (WHA)[7] is the peak body for wildlife health in Australia. WHA was established as the Australian Wildlife Health Network (AWHN) in 2002, an Australian Government initiative to coordinate wildlife health surveillance information across Australia, to support Australia's animal health industries, human health, biodiversity, trade and tourism. WHA collates information from multiple sources into a national database — the Wildlife Health Information System (eWHIS)[8] — including submissions by WHA subscribers, state and territory WHA coordinators, researchers, and zoo and sentinel clinic veterinarians. In January–March 2015, 245 wildlife disease investigations were reported into eWHIS (Table 1). This report details some of the disease and mortality events in free-living wildlife recorded in eWHIS this quarter. WHA thanks all those who submitted information for this report.

Wild bird mortality events — Newcastle disease and avian influenza exclusion

WHA received 96 reports of wild bird mortality or morbidity from around Australia in January–March 2015. A breakdown of the bird orders is presented in Table 2. Reports and samples from sick and dead birds are received from members of the public, private practitioners, universities, zoo wildlife clinics and wildlife sanctuaries. Avian influenza (AI) was excluded by polymerase chain reaction (PCR) testing for influenza A in 25 of the events as part of Australia's general (sick and dead bird) AI surveillance program. AI exclusion testing was not warranted in the remaining 70 events, based on clinical signs, history, prevailing environmental conditions or other diagnoses. In addition, avian paramyxovirus was excluded in 18 events by PCR testing specific for Newcastle disease (ND) virus and/or pigeon paramyxovirus 1 (PPMV-1).

Avian influenza surveillance

Australia's National Avian Influenza Wild Bird (NAIWB) Surveillance Program comprises two sampling components: pathogen-specific, risk-based surveillance by sampling of apparently healthy, live and hunter-killed wild birds; and general surveillance by investigating significant unexplained morbidity and mortality events in wild birds, including captive and wild birds within zoo grounds (with a focus on exclusion testing for AI virus subtypes H5 and H7). Samples from sick or dead birds are discussed above. Sources for targeted wild bird surveillance data include state and territory government laboratories, universities and samples collected through the Northern Australia Quarantine Strategy.

During the quarter, targeted surveillance of healthy, live wild birds occurred at sites in New South Wales, Queensland, South Australia, Tasmania, Victoria and Western Australia. Cloacal, oropharyngeal and/or faecal environmental swabs were collected from 2649 waterbirds and waders. No highly pathogenic AI viruses were identified. A number of positive swabs to low pathogenicity AI are undergoing further testing.

Table 1 Number of disease investigations reported into eWHIS, January–March 2015[a]

Bats[b]	Birds	Marsupials	Feral animals	Snakes and lizards	Monotremes	Marine turtles
121	96	19	4	2	1	1

a Disease investigations may involve a single animal or multiple animals (e.g. mass mortality event).

b The majority of bat disease investigations are single bats submitted for Australian bat lyssavirus testing.

Table 2 Wild bird disease investigations reported into eWHIS, January–March 2015

Bird order	Common name for bird order[9]	Events reported[a]
Anseriformes	Magpie goose, ducks, geese and swans	11
Caprimulgiformes	Frogmouth, nightjars, owlet-nightjars, swifts	2
Charadriiformes	Shorebirds	1
Columbiformes	Doves and pigeons	1
Falconiformes	Falcons	1
Gruiformes	Rails, gallinules, coots and cranes	2
Passeriformes	Passerines or perching birds	14
Pelecaniformes	Pelicans, ibis and herons	5
Psittaciformes	Parrots and cockatoos	59
Sphenisciformes	Penguins	1
Strigiformes	Typical owl and barn owls	1

a Disease investigations may involve a single or multiple bird orders (e.g. mass mortality event).

7 http://www.wildlifehealthaustralia.org.au/Home.aspx

8 http://www.wildlifehealthaustralia.com.au/ProgramsProjects/eWHISWildlifeHealthInformationSystem.aspx

9 Common names adapted from del Hoyo and Collar (2014) *HBW and BirdLife International Illustrated Checklist of the Birds of the World.* Volume 1—Non-passerines. Lynx Editions, Barcelona, Spain (courtesy of the Australian Department of the Environment).

Australian bat lyssavirus

Reports to WHA for the January–March quarter included 121 bats tested for Australian bat lyssavirus (ABLV) from Australian Capital Territory, New South Wales, Northern Territory, Queensland, South Australia, Victoria and Western Australia.

Bat submissions were made for a variety of reasons:

- 39 cases involved contact or suspected contact with the potential for ABLV transmission to humans; of these
  - 6 cases were associated with trauma (e.g. fence or netting entanglement)
  - 3 cases involved contact with a pet dog or cat
  - 3 bats displayed other clinical signs
  - 1 bat was found dead
  - the remainder had no further history reported
- 45 cases involved contact with a pet dog (37 bats) or cat (8 bats)
- 10 cases were associated with trauma (e.g. barbed wire or netting entanglement)
- 8 bats displayed neurological signs, including abnormal behaviour, dullness, tremors, twitching, neck ventroflexion, seizures, paralysis, wing paresis and inability to hang
- 7 bats displayed other clinical signs (e.g. respiratory signs, diarrhoea, weakness, dehydration, moribund)
- 1 bat was found dead
- 11 bats had no further history reported at this time.

During the quarter, five flying foxes were confirmed positive for ABLV by PCR testing for pteropid ABLV ribonucleic acid (RNA); of these, four black flying foxes (*Pteropus alecto*) were from south-east and central Queensland and one little red flying fox was from Darwin, Northern Territory. This is only the third time that an ABLV-positive bat has been detected in the Northern Territory; the first case was in 1997 and the second was in September 2014 (AHSQ Vol. 19, Issue 3). The current case is discussed further in the Northern Territory report.

The five ABLV-positive flying foxes presented with the following signs:

- neurological signs or aggressive behaviour (two bats)
- found on the ground with respiratory distress and froth from the mouth
- sudden death
- found dead and decomposed; submitted for testing due to possible exposure to two pet dogs.

Necropsy and histopathology findings of these flying foxes included mild to severe nonsuppurative meningoencephalitis (inflammation of the brain and meninges), neuronal necrosis, Negri bodies and necrosuppurative haemorrhagic lymphadenitis (lymph node inflammation) in the neck. Potentially dangerous human contact was reported in three cases and an experienced public health official provided appropriate counselling and information.

More information on ABLV testing of bats in Australia is available in ABLV Bat Stats.[10]

Antibiotic resistant Staphylococcus *infection in a koala*

A koala (*Phascolarctos cinereus*) presented to Australia Zoo Wildlife Hospital in South East Queensland with bilateral conjunctivitis due to *Chlamydia* infection in December 2014. Whilst in care over a 3-month period, the koala developed oxalate nephrosis and was euthanased due to renal failure. Bacterial culture of samples from the koala's prostate, liver, heart and spleen revealed a coagulase negative *Staphylococcus* sp., which was found to be resistant to all antibiotics in the sensitivity test. Other cases of antimicrobial resistance (AMR) in wildlife have been reported to WHA (Table 3).

Table 3 Cases of antimicrobial resistance in wildlife reported to Wildlife Health Australia

Year	Species	Sample cultured	Bacteria	Resistance
2015	Koala (*Phascolarctos cinereus*)	Prostate, liver, heart and spleen	*Staphylococcus* sp.	Resistant to all antibiotics tested
2014	Eastern grey kangaroo (*Macropus giganteus giganteus*), hand-raised joey	Faecal sample	*Klebsiella* sp.	Resistant to all antibiotics tested except gentamicin, amikacin and neomycin
2014	Bar-shouldered dove (*Geopelia humeralis*)	Crop sample	*Enterobacter* sp.	Resistant to all antibiotics tested
2013	Koala (*Phascolarctos cinereus*)	Blood sample	*Klebsiella* sp.	Resistant to all antibiotics tested
2013	Tawny frogmouth (*Podargus strigoides*)	Ocular swab (conjunctivitis)	*Klebsiella* sp.	Resistant to all antibiotics tested
2012	Koala (*Phascolarctos cinereus*)	Abdominal fluid	*Enterobacter gergoviae*	Resistant to all antibiotics tested

The existence of AMR in a range of wildlife species is well documented overseas and in a limited number of published cases in Australia. Studies found 'a low but widespread prevalence of anti-microbial resistance' in an analysis of 946 strains of Enterobacteriaceae isolates from wild Australian mammals from 1993 to 1997.[11] Both free-ranging and zoo collection wallabies surveyed in South Australia were found to be a significant reservoir of antibiotic resistance in a number of Staphylococcus species, with resistance to β-lactam antimicrobials in around one-third of all isolates.[12]

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10 www.wildlifehealthaustralia.com.au/ProgramsProjects/BatHealthFocusGroup.aspx

11 Sherley M et al (2000). Variations in antibiotic resistance profile in Enterobacteriaceae isolated from wild Australian mammals. *Environmental Microbiology* 2, 620–631. doi: 10.1046/j.1462-2920.2000.00145.x

12 Chen MM et al (2014) Nasal colonization of Staphylococcus spp among captive and free-ranging wallabies in South Australia. *Journal of Veterinary Science & Medical Diagnosis* 3:2 doi: 10.4172/2325-9590.1000136

Photo: Dreamstime

While the role of wildlife and the environment in the development and transmission of AMR is poorly understood, we know that wildlife populations have the potential to act as reservoirs for AMR and emerging resistant pathogens.[13] The impact of AMR environmental contamination from treatment of livestock and in aquaculture should also be considered.[14,15] These factors could become more significant as wildlife, livestock and people are brought into closer contact through changes in land use and climate change.

Sarcoptic mange in a koala

In February 2015, a koala (*Phascolarctos cinereus*) from the Adelaide Hills, South Australia, presented with marked crusting and fissuring of the skin, especially around the muzzle and forearms. Skin scrapes revealed mites consistent with *Sarcoptes* spp. The koala was euthanased due to poor prognosis. Another 14 cases of sarcoptic mange have been reported in koalas from the Adelaide Hills region in the past 12 months.

Sarcoptic mange has been reported in free-ranging koalas but is uncommon. It has been reported in koalas from Phillip Island in Victoria,[16] Ulupna Island in northern Victoria[17] and the Macarthur region in NSW (David Phalen, pers comm). Infection with *Sarcoptes scabiei* has been selected for monitoring by the World Organisation for Animal Health (OIE) Working Group on Wildlife Diseases.[18]

13 Radhouani H et al (2014) Potential impact of antimicrobial resistance in wildlife, environment, and human health. *Frontiers in Microbiology*, 5(23) doi: 10.3389/fmicb.2014.00023

14 Barton M and Ndi OL (2012) Can we feel it in our waters? Antimicrobials in aquaculture. *Medical Journal of Australia*, 197(9), 487-488. doi: 10.5694/mja12.11484.

15 Wellington EM et al (2013) The role of the natural environment in the emergence of antibiotic resistance in Gram-negative bacteria. *The Lancet infectious diseases*, 13(2), 155-165. DOI: http://dx.doi.org/10.1016/S1473-3099(12)70317-1.

16 Obendorf DL (1983) Causes of mortality and morbidity of wild koalas, *Phascolarctos cinereus* (Goldfuss), in Victoria, Australia. *Journal of Wildlife Diseases* 19, 123–131

17 Vaz P et al (2011). Detection of a novel gammaherpesvirus in koalas (*Phascolarctos cinereus*). *Journal of Wildlife Diseases* 47(3), 787–791

18 www.oie.int/wahis_2/public/wahidwild.php; World Organisation for Animal Health (OIE) (2012) *Report of the meeting of the OIE Working Group on Wildlife Diseases*, Paris, 12–15 November 2012. www.oie.int/fileadmin/Home/eng/Internationa_Standard_Setting/docs/pdf/WGWildlife/A_WGW_Nov2012.pdf