

# Zoonoses and Australian marine mammals

## Fact sheet

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### Introduction

It is recognised that some pathogens resident in wildlife species pose a risk to human health. Likelihood of transfer of disease from wildlife to humans varies with the specific pathogen and host species but also, over space and time. Factors such as changes in human activities and enterprises may increase the likelihood of interaction with wildlife pathogens. In addition, over-arching factors such as short and long-term climate fluctuations can influence pathogen prevalence in wildlife and therefore likelihood of human infection. It is important to review and list potential zoonotic diseases carried by wildlife species so that public health agencies can define at-risk groups in the community and formulate risk management strategies aimed at preventing pathogen transfer.

Table 1 lists most potential zoonotic pathogens known to be associated with marine mammals, their distribution, routes of infection and the main clinical disease observed in infected humans.

### Natural hosts

Potential zoonotic pathogens from marine mammals may represent spill-over or spill-back infection. For example, cetaceans and pinnipeds are the natural hosts of marine *Brucella* strains that can cause severe disease in humans (Sohn et al. 2003; McDonald et al. 2006). Similarly, seals are the natural host for *Mycoplasma phocicerebrale*, the reported cause of 'seal finger' in humans, a painful condition characterised by severe subcutaneous tissue inflammation with, in some cases, joint involvement (Baker et al. 1998). In contrast, *Giardia intestinalis* in seals from Canadian waters were genetically characterised as pathogenic human strains and it is probable that seals became infected by inadequate treatment of human sewerage discharge (Appelbee et al. 2010).

Marine mammals may act as reservoirs of zoonotic infection originating in other wildlife or domestic species. For example, the natural hosts of influenza A viruses are wild, aquatic birds. However, virus originating in these natural hosts can infect a wide range of domestic and wild avian and mammalian species and produce disease. An H7N7 subtype isolated from seals showed potential to cause conjunctivitis in humans but did not spread from person to person (Webster et al. 1981).

**Table 1:** Distribution, routes of infection and clinical signs in humans of infections associated with marine mammals

| Pathogen                            | Present Australia | Reported Australian marine mammals | Main routes of infection to humans                 | Human disease from marine mammal infections        | References                                    |
|-------------------------------------|-------------------|------------------------------------|--|--|---|
| Influenza A viruses                 | Yes               | No                                 | Respiratory  | Mild conjunctivitis                                | Webster et al. (1981)                         |
| Caliciviruses                       | Yes               | No                                 | Presumed faecal-oral                               | Systemic disease, vesicular lesions of extremities | Smith et al. (1998)                           |
| Seal pox                            | Unknown           | No                                 | Percutaneous, bites                                | Cutaneous lesions                                  | Clark et al. (2005)                           |
| <i>Mycobacterium pinnipedii</i>     | Yes               | Yes                                | Respiratory  | Pulmonary disease                                  | Thompson et al. (1993); Cousins et al. (2003) |
| <i>Mycobacterium marinum</i>        | Yes               | No                                 | Uncommon. Percutaneous, bites                      | Cutaneous lesions                                  | Flowers (1970)                                |
| Marine <i>Brucella</i> spp.         | Yes               | Yes                                | Unknown. Presumed faecal-oral, respiratory & bites | Meningitis, osteomyelitis                          | McDonald et al. (2006); Lynch et al. (2011a)  |
| <i>Salmonella</i> spp.              | Yes               | Yes                                | Faecal-oral  | Potential for gastroenteritis, septicaemia         | Iveson et al. (2009)                          |
| <i>Edwardsiella tarda</i>           | Yes               | Yes                                | Faecal-oral  | Potential for gastroenteritis, septicaemia         | Iveson et al. (2009)                          |
| <i>Vibrio</i> spp.                  | Yes               | Yes <sup>1</sup>                   | Faecal-oral, respiratory                           | Potential for gastroenteritis, septicaemia         | Tangredi and Medway (1980)                    |
| <i>Campylobacter insulaenigrae</i>  | Yes               | No                                 | Faecal-oral  | Potential for gastroenteritis, septicaemia         | Chua et al. (2007)                            |
| <i>Coxiella burnetii</i>            | Yes               | No                                 | Respiratory  | Potential systemic illness                         | Kersh et al. (2010)                           |
| <i>Leptospira</i> spp.              | Yes               | No                                 | Urine contamination skin, mucous membranes         | Renal disease                                      | Smith et al. (1978)                           |
| <i>Erysipelothrix rhusiopathiae</i> | Yes               | Yes                                | Uncommon; bites                                    | Cutaneous lesions, cellulitis                      | Hunt et al. (2008); Ladds (2009)              |
| <i>Mycoplasma phocicerebrale</i>    | Yes               | Yes                                | Bites  | Cellulitis, septic arthritis                       | Baker et al. (1998); Lynch et al. (2011b)     |
| <i>Toxoplasma gondii</i>            | Yes               | Yes                                | Ingestion of marine mammal flesh                   | Foetal morbidity & mortality                       | Messier et al. (2009)                         |

<sup>1</sup> One report in eWHIS

| Pathogen                    | Present Australia | Reported Australian marine mammals | Main routes of infection to humans | Human disease from marine mammal infections | References   |
|-----------------------------|-------------------|------------------------------------|------------------------------------|---|--|
| <i>Giardia intestinalis</i> | Yes               | Yes                                | Faecal-oral                        | Potential gastroenteritis                   | Appelbee et al. (2010); Delpont et al. (2014)      |
| <i>Cryptosporidium</i> spp. | Yes               | No                                 | Faecal-oral                        | Potential gastroenteritis                   | Appelbee et al. (2010); Delpont et al. (2014)      |
| <i>Lacazia loboi</i>        | Unknown           | Yes <sup>2</sup>                   | Uncommon, presumed percutaneous    | Cutaneous lesions                           | Bermudez et al. (2009); Palmer and Peterson (2014) |
| <i>Trichenella nativa</i>   | Unknown           | No                                 | Ingestion of marine mammal flesh   | Severe systemic disease                     | Kapel et al. (2003)                                |

## Prevention and management of human infection

Groups most at risk of acquiring zoonotic infections from marine mammals are those that have close and/or prolonged contact with infected animals. Such groups include staff working in facilities holding captive marine mammals, particularly those that accept wild individuals for treatment and rehabilitation. Other groups potentially at risk are research scientists, wildlife officers and members of the public and wildlife carer groups who assist at marine mammal stranding events.

Prevention of infection should be discussed with the local public health authority. Adoption of appropriate personal protection measures matched to the type of exposure is recommended. At a minimum, hands should be washed (with chlorhexidine gluconate or an equivalent disinfectant) and thoroughly dried after handling any marine mammal. Disposable gloves should be employed when handling faeces, urine, blood or body discharges. Disposable gloves, protective clothing and mask should be employed when conducting post mortem examinations on marine mammals. Equipment should be washed and chemically sterilised following use. For more information on appropriate biosecurity practices see the “National Wildlife Biosecurity Guidelines”

[www.wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/National\\_Wildlife\\_Biosecurity\\_Guidelines.PDF](http://www.wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/National_Wildlife_Biosecurity_Guidelines.PDF) (Wildlife Health Australia 2018).

Members of at-risk groups should be advised on the risks of zoonotic disease and, in the event of illness, encouraged to discuss this issue with their medical practitioner. Bites and infected abrasions are common injuries in people working with marine mammals (Hunt et al. 2008). Awareness of potential microbial agents that may be involved in such wounds is important to guide appropriate therapy.

<sup>2</sup> Several suspect cases reported in Australian dolphins; no molecular confirmation

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## To provide feedback on this fact sheet

We are interested in hearing from anyone with information on these conditions in Australia, including laboratory reports, historical datasets or survey results that could be added to the National Wildlife Health Information System. Negative data are also valuable. If you can help, please contact us at [admin@wildlifehealthaustralia.com.au](mailto:admin@wildlifehealthaustralia.com.au).

Wildlife Health Australia would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to [admin@wildlifehealthaustralia.com.au](mailto:admin@wildlifehealthaustralia.com.au). We would also like to hear from you if

you have a particular area of expertise and would like to produce a fact sheet (or sheets) for the network (or update current sheets). A small amount of funding is available to facilitate this.

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