



Australian Marine Mammals and Zoonoses FACT SHEET

Introductory statement

It is well 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, spatially and temporally. 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, therefore, 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.

Aetiology

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 (McDonald *et al.* 2006; Sohn *et al.* 2003). 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 also 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).

Prevention and management of human infection

Groups at most risk of acquiring zoonotic infections from marine mammals are those that have close contact 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. As a minimum standard hands should be washed with chlorhexidine gluconate or an equivalent disinfectant after handling any marine mammal. Gloves should be employed when handling faeces, urine, blood or body discharges. 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.

Members of at-risk groups need to 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.

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

Pathogen	Present in Australia	Reported in 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 <i>et al.</i> 1981)
Caliciviruses	Yes	No	Presumed faeco-oral.	Systemic disease, vesicular lesions of extremities	(Smith <i>et al.</i> 1998)
Seal pox	Unknown	No	Percutaneous. Bites	Cutaneous lesions	(Clark <i>et al.</i> 2005)
<i>Mycobacterium pinnipedii</i>	Yes	Yes	Respiratory	Pulmonary disease	(Cousins <i>et al.</i> 2003; Thompson <i>et al.</i> 1993)
<i>Mycobacterium marinum</i>	Yes	No	Uncommon. Percutaneous. Bites	Cutaneous lesions	(Flowers 1970)
Marine <i>Brucella</i> spp.	Yes	Yes	Unknown. Presumed faeco-oral, respiratory & bites	Meningitis, osteomyelitis	(Lynch <i>et al.</i> 2011a; McDonald <i>et al.</i> 2006)
<i>Salmonella</i> spp.	Yes	Yes	Faeco-Oral	Potential for gastroenteritis, septicaemia	(Iveson <i>et al.</i> 2009)
<i>Edwardsiella tarda</i>	Yes	Yes	Faeco-Oral	Potential for gastroenteritis, septicaemia	(Iveson <i>et al.</i> 2009)
<i>Vibrio</i> spp.	Yes	No	Faeco-Oral. Respiratory	Potential for gastroenteritis, septicaemia	(Tangredi and Medway 1980)
<i>Campylobacter insulaenigrae</i>	Yes	No	Faeco-Oral	Potential for gastroenteritis,	(Chua <i>et al.</i> 2007)

				septicaemia	
<i>Coxiella burnetii</i>	Yes	No	Respiratory	Potential systemic illness	(Kersh <i>et al.</i> 2010)
<i>Leptospira</i> spp.	Yes	No	Urine contamination skin, mucous membranes	Renal disease	(Smith <i>et al.</i> 1978)
<i>Erysipelothrix rhusiopathiae</i>	Yes	No	Uncommon. Bites	Cutaneous lesions, cellulitis	(Hunt <i>et al.</i> 2008)
<i>Mycoplasma phocicerebrale</i>	Yes	Yes	Bites	Cellulitis, septic arthritis	(Baker <i>et al.</i> 1998; Lynch <i>et al.</i> 2011b)
<i>Toxoplasma gondii</i>	Yes	Yes	Ingestion of marine mammal flesh	Foetal morbidity & mortality	(Messier <i>et al.</i> 2009)
<i>Giardia intestinalis</i>	Yes	No	Faeco-Oral	Potential gastroenteritis	(Appelbee <i>et al.</i> 2010)
<i>Cryptosporidium</i> spp.	Yes	No	Faeco-Oral	Potential gastroenteritis	(Appelbee <i>et al.</i> 2010)
<i>Lacazia loboi</i>	Unknown	No	Uncommon. Presumed percutaneous	Cutaneous lesions	(Bermudez <i>et al.</i> 2009)
<i>Trichenella nativa</i>	Unknown	No	Ingestion of marine mammal flesh	Severe systemic disease	(Kapel <i>et al.</i> 2003)

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To provide feedback on this fact sheet

The Australian Wildlife Health Network would be very grateful for any feedback on this fact sheet. Please provide detailed comments or suggestions to rwoods@zoo.nsw.gov.au. (A Word version is available to make Track Changes if it is easier – contact us at rwoods@zoo.nsw.gov.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. We are especially keen to hear from PhD students who might be able to contribute, or are working in the area.

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