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 (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 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

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Present in Australia</th>
<th>Reported in Australian marine mammals</th>
<th>Main routes of infection to humans</th>
<th>Human disease from marine mammal infections</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Influenza A viruses Calciciviruses</td>
<td>Yes</td>
<td>No</td>
<td>Respiratory Presumed faeco-oral.</td>
<td>Mild conjunctivitis Systemic disease, vesicular lesions of extremities</td>
<td>Webster et al. (1981) Smith et al. (1998)</td>
</tr>
<tr>
<td>Seal pox</td>
<td>Unknown</td>
<td>No</td>
<td>Percutaneous. Bites Respiratory</td>
<td>Cutaneous lesions</td>
<td>Clark et al. (2005)</td>
</tr>
<tr>
<td><em>Mycobacterium pinnipedii</em></td>
<td>Yes</td>
<td>Yes</td>
<td>Unknown. Percutaneous. Bites</td>
<td>Pulmonary disease</td>
<td>Thompson et al. (1993); Cousins et al. (2003)</td>
</tr>
<tr>
<td>Marine <em>Brucella</em> spp.</td>
<td>Yes</td>
<td>Yes</td>
<td>Unknown. Presumed faeco-oral, respiratory &amp; bites</td>
<td>Meningitis, osteomyelitis</td>
<td>McDonald et al. (2006); Lynch et al. (2011a)</td>
</tr>
<tr>
<td><em>Salmonella</em> spp.</td>
<td>Yes</td>
<td>Yes</td>
<td>Faeco-Oral</td>
<td>Potential for gastroenteritis, septicemia</td>
<td>Iveson et al. (2009)</td>
</tr>
<tr>
<td><em>Edwardsiella tarda</em></td>
<td>Yes</td>
<td>Yes</td>
<td>Faeco-Oral</td>
<td>Potential for gastroenteritis, septicemia</td>
<td>Iveson et al. (2009)</td>
</tr>
</tbody>
</table>
## Vibrio spp.
- **Yes**
- **No**
  - Faeco-Oral
  - Respiratory
- Potential for gastroenteritis, septicaemia
- **Tangredi and Medway (1980)**

## Campylobacter insulaenigrae
- **Yes**
- **No**
  - Faeco-Oral
- Potential for gastroenteritis, septicaemia
- **Chua et al. (2007)**

## Coxiella burnetti
- **Yes**
- **No**
  - Respiratory
- Potential systemic illness
- **Kersh et al. (2010)**

## Leptospira spp.
- **Yes**
- **No**
  - Urine contamination skin, mucous membranes
  - Renal disease
- **Smith et al. (1978)**

## Erysipelothrix rhusiopathiae
- **Yes**
- **No**
  - Uncommon. Bites
  - Cutaneous lesions, cellulitis
- **Hunt et al. (2008)**

## Mycoplasma phocicerebrale
- **Yes**
- **Yes**
  - Bites
  - Cellulitis, septic arthritis
- **Baker et al. (1998); Lynch et al. (2011b)**

## Toxoplasma gondii
- **Yes**
- **Yes**
  - Ingestion of marine mammal flesh
  - Foetal morbidity & mortality
- **Messier et al. (2009)**

## Giardia intestinalis
- **Yes**
- **No**
  - Faeco-Oral
  - Potential gastroenteritis
- **Appelbee et al. (2010)**

## Cryptosporidium spp.
- **Yes**
- **No**
  - Faeco-Oral
  - Potential gastroenteritis
- **Appelbee et al. (2010)**

## Lacazia loboi
- Unknown
- **No**
  - Uncommon. Presumed percutaneous ingestion of marine mammal flesh
  - Cutaneous lesions
- **Bermudez et al. (2009)**

## Trichenella nativa
- Unknown
- **No**
  - Ingestion of marine mammal flesh
  - Severe systemic disease
- **Kapel et al. (2003)**

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### References


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We are extremely grateful to those who had input into this fact sheet and would specifically like to thank Michael Lynch who produced this first draft.

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To provide feedback on this fact sheet

We are interested in hearing from anyone with information on this condition 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.

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. 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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