## Mycobacteriosis (piscine)

<table>
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<th>Animal Group(s) Affected</th>
<th>Transmission</th>
<th>Clinical Signs</th>
<th>Severity</th>
<th>Treatment</th>
<th>Prevention and Control</th>
<th>Zoonotic</th>
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<td>Fish</td>
<td>Ingestion is probably the major route of infection in fishes; other species, direct contact with infected individuals or contaminated objects. Bacteria may be found in aquatic biofilm.</td>
<td>Fishes: hyperemia, pale to dark coloration, morbidity, mortality; granuloma or ulcers of the skin and subcutaneous tissues.</td>
<td>Mild to severe in fishes, causing a wide range of gross and microscopic lesions</td>
<td>Fishes: generally not attempted due to systemic nature of disease at diagnosis, poor response to treatment and zoonotic potential; long-term antimicrobial therapy with appropriate compounds can be tried.</td>
<td>Proper hygiene, disinfection, biosecurity, quarantine, protective apparel. Manage environment to reduce stressors on fish.</td>
<td>Yes</td>
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<td>Mammal (includes humans)</td>
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<td>Reptile</td>
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<td>Amphibian</td>
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**Fact Sheet compiled by:** Gregory A. Lewbart and Melanie L. Church  
**Sheet completed on:** 16 March 2011; updated 20 August 2012  
**Fact Sheet Reviewed by:** Stephen A. Smith, Leigh A. Clayton  
**Susceptible animal groups:** Fishes, mammals (including humans), reptiles, amphibians  
**Causative organism:** *Mycobacterium* spp. with approximately more than 120 species recognized in the genus *Mycobacterium*. Common isolates include: *M. marinum*, *M. chelonae*, *M. neoaurum*, *M. fortuitum* and *M. haemophilum*. The organisms are Gram-positive and acid-fast staining.  
**Zoonotic potential:** Yes; moderate  
**Distribution:** Global and most commonly associated with aquatic environments. The optimal temperature range is 24-28°C (76-82°F). The bacteria can survive for up to 2 years in the environment.  
**Incubation period:** Varied, weeks to months in fishes; 2 days to 6 weeks in humans.  
**Clinical signs:** Fishes: Chronic progressive infection is most typically reported and may include skin hemorrhage, ulcerations and granulomas and/or white nodules on viscera; hyperemia of fins; exophthalmos, corneal ulcer, granulomatous endophthalmitis; lethargy, anorexia, weight loss, abdominal edema, cutaneous edema, reduced pigmentation, loss of scales. Acute mortalities may occur with more virulent strains and animals
may lack substantial gross changes such as granulomas. Animals may be infected without evidence of disease.

Humans: Usually causes a chronic infection that is limited to the extremities, such as fingers and hands. A localized skin nodule or granula may ulcerate and start to exude a serosanguinous or purulent discharge. Depending on immunological status of infected individual, nodular cutaneous lesions can progress to tenosynovitis, arthritis, and osteomyelitis.

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<th>Post mortem, gross, or histologic findings:</th>
<th>Gross changes presented in clinical signs. Microscopically, acid-fast organisms are frequently detected in tissues and within granulomas but not all acid-fast organisms are <em>Mycobacteria</em> species. Acid-fast bacilli may be detected in both granulomatous and non-granulomatous tissues. Staining intensity can vary.</th>
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**Diagnosis:** History; signalment; clinical signs; gross lesions; acid-fast staining of tissue touch impressions; histopathology with granulomatous inflammation and acid-fast staining; microbial culture; PCR and DNA sequencing.

**Material required for laboratory analysis:** Tissue samples for touch impressions, culture, histopathology, and in some cases PCR.

**Relevant diagnostic laboratories:** Many. National Veterinary Services Diagnostic Laboratory (Ames, Iowa) for culture and sensitivity.

**Treatment:** Treatment often considered unrewarding for eliminating infection in individual fish or fish populations. Long-term antibiotic including rifampin, erythromycin, streptomycin, as examples, may be considered. Surgical excision and long term antibiotics are usually recommended in humans.

**Prevention and control:** The disease can be difficult to eradicate. Wear gloves when cleaning aquariums or handling fish. Hands should be washed thoroughly afterwards with 70% isopropyl alcohol and a bactericidal soap. In exhibit settings, may manage certain populations as positive, particularly if animals presenting infrequently with chronic disease in older individuals (consistent with opportunistic infection). Reducing environmental stressors may help reduce clinical disease.

**Suggested disinfectant for housing facilities:** Ethanol or methanol (70%).

**Notification:** None required by law.

**Measures required under the Animal Disease Surveillance Plan:** None.

**Measures required for introducing animals to infected animal:** Introductions to infected animals should be avoided.

**Conditions for restoring disease-free status after an outbreak:** Depopulate, disinfect the environment, and then monitor and test sentinel animals.

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References: