**STREPTOCOCCUS GROUP C**

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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 Potential</th>
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<td>Equine as “Strangles”; pneumonia, or reproductive disease.</td>
<td>Inhalation; ingestion; during breeding; transplacental.</td>
<td>Variable based on organ system affected.</td>
<td>Severity can range from mild to severe or fatal, depending on age, species, and immune status of the individual.</td>
<td>1st choice: Procaine penicillin and ampicillin. 2nd choice: Cephalosporins, chloramphenicol, macrolides, rifampin, and trimethoprim-sulfas.</td>
<td>Vaccination and isolation.</td>
<td>Yes, although rarely and usually in immunocompromise situations, except <em>Strep. dysgalactiae</em></td>
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<td>Swine as pneumonias.</td>
<td>Indirectly via hands and/or fomites.</td>
<td>Abscesses; pharyngitis; cellulitis; septicemias; rhinitis; ocular discharge; coughing; sneezing; draining tracts.</td>
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<tr>
<td>Ruminants as mastitis.</td>
<td>Direct contact with infectious exudates.</td>
<td>Abortions. Mastitis.</td>
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<tr>
<td>Marine mammals, birds, and salmon as septicemias.</td>
<td>Undercooked horsemeat.</td>
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**Fact Sheet compiled by:** Christie Hicks  
**Sheet completed on:** 30 April 2011; updated 7 August 2013  
**Fact Sheet Reviewed by:** Ryan Colburn; Ashley Boyle

**Susceptible animal groups:** Virtually all mammals, including humans, can be susceptible. Equine, swine, ruminants, and marine mammals are at risk and published reports included pyometra in a spotted seal. Birds and salmon also can be affected.

**Causative organism:** *Streptococcus* species classified into Lancefield Group C, which are Gram positive cocci occurring in pairs and chains.

**Zoonotic potential:** Although this is possible, it is uncommon. Possible routes of zoonosis are: consumption of infected milk, exposure to body fluids or contaminated fomites, or occupationally during care of infected individuals.

**Distribution:** Widely distributed worldwide.

**Incubation period:** *Streptococcus equi* ssp. *equi* – 3 to 14 days. The incubation period in humans can be significantly shorter.

**Clinical signs:** An abscess filled with purulent material especially about the head and neck. Fever, nasal...
discharge, pharyngitis, rhinitis, ocular discharge, coughing, sneezing, draining tracts and more rarely cellulitis and septicemia can be seen.

*Streptococcus equi* ssp. *equi* is highly infectious. Retropharyngeal and submandibular lymph node swelling and abscesses can progress to affect other organs such as the mesentery, liver, spleen, kidney, brain and less commonly the thorax and severe pyrexia can occur. Classic “Strangles” is typically limited to the head and neck regions. More advanced disease is known as metastatic strangles or “Bastard Strangles” when it moves from this area. Purpura hemorrhagica can develop secondary to Type III hypersensitivity presenting with ventral and limb edema, petechia and ecchymoses and result in renal and muscle disease. This infection has been considered a possible link in Idiopathic Hemorrhagic Vasculopathy Syndrome in black rhinos.

*Streptococcus equi* zooepidemicus causes mastitis, abortions and infertility in adults, and pneumonias in adults and foals. Purulent rhinitis and bronchitis in weanling foals. Cases of fibrinous pleuritis and pneumonia in sheep, mastitis in goats, and hemorrhagic pneumonia in dogs have been reported.

*Streptococcus dysgalactiae* is associated with arthritis, endocarditis, mastitis and/or meningitis.

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<th>Post mortem, gross, or histologic findings:</th>
<th>Abscesses tend to be fluid filled with <em>Streptococcus equi</em> ssp. <em>equi</em>. Empyema with or without chondroids may be found in the guttural pouches. Metastasis is most common to the mesenteric lymph nodes. <em>Streptococcus equi</em> zooepidemicus is associated with consolidation and adhesions of the lungs with debris in the airways. Reproductive disease is associated with placentitis especially around the cervical star. <em>Streptococcus dysgalactiae</em> causes endocarditis with yellow or white vegetations of varying sizes, fibrous and multifocal abscesses of tissues and hypertrophy of synovial villi.</th>
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<td>Diagnosis:</td>
<td>On hemogram, anemia, neutrophilic leukocytosis, and hyperfibrinogenemia are present while chemistry panel remained unremarkable. Polymerase chain reaction is the most sensitive and efficient. Growth of the organism on cow or sheep blood agar at 37°C in 3 – 5% CO2 or using the CAMP phenomenon. Ultrasound, endoscopy (particularly of the guttural pouches) and/or radiographs may be helpful to determine the extent of the abscesses and infection.</td>
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<td>Material required for laboratory analysis:</td>
<td>Aspirates from unopened abscesses collected in a sterile manner and/or milk collected under sterile conditions can be cultured. Aspirates, nasopharyngeal and guttural pouch washes can be submitted for <em>Streptococcus equi</em> equi PCR and culture.</td>
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<td>Relevant diagnostic laboratories:</td>
<td>Any laboratory that performs cultures and sensitivities on a routine basis can complete testing for this organism. <em>Streptococcus equi</em> equi PCR can be found at many major commercial and veterinary diagnostic laboratories.</td>
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<td>Treatment:</td>
<td>Antibiotics that are found to be effective against <em>Streptococcus</em> Group C on culture, for example: penicillins, cephalosporins, macrolides, chloramphenicol, rifampin and trimethoprim-sulfonamides have proven to be effective, but their use is controversial in <em>Streptococcus equi</em> equi unless given in the early stages of disease because many clinicians feel that treatment at later stages only prolongs the course of disease. Antibiotic use should depend on the severity of disease and can help limit shedding. Antibiotic use may prevent development of natural immunity and re-infection is possible. Procaine penicillin is the antibiotic of choice. Encouraging assessable lymph nodes and abscesses to drain via warm compresses, aspiration, lancing and/or draining may help to speed up the recovery process. Administer NSAIDS to help decrease fever and provide analgesia.</td>
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| Prevention and control: | *Streptococcus equi* equi: Vaccination intramuscularly is with products that do not induce mucosal immunity. An intranasal product with a live attenuated strain of *Streptococcus equi* ssp. *equi* is available and used commonly. Vaccination of any kind is not recommended for exposed horses at a facility with an ongoing outbreak. Injection site reactions are possible. It is important to monitor temperatures and
isolate febrile animals as minimal to no shedding occurs within the first 48 hours. Isolate the infected individuals as recovered individuals can still shed the bacteria for months. Examination of gullet pouches can identify carriers. Prophylactic treatment of exposed animals may be considered. *Streptococcus equi* zoopneumonia: foals should be appropriately vaccinated for respiratory viruses to help prevent secondary bacterial infections. Limit crowding when housing foals.

**Suggested disinfectant for housing facilities:** Clean with detergents and then disinfect either with, chlorhexidine gluconate or glutaraldehyde.

**Notification:** Not federally reportable but *Streptococcus equi* equi is reportable in some states.

**Measures required under the Animal Disease Surveillance Plan:** Currently none.

**Measures required for introducing animals to infected animal:** *Streptococcus equi* ssp. *equi* can live outside the host for several weeks and can be shed for at least 4 weeks, so all facilities should not accept any new individuals for at least 1 month after an outbreak has resolved. Specifically for *S. equi* ssp. *equi*, all new animals should observe a 21 day quarantine period with three negative nasopharyngeal wash PCRs or one guttural pouch wash PCR obtained before entry into the group.

**Conditions for restoring disease-free status after an outbreak:** Careful monitoring of those that are infected for a resolution of clinical signs and all blood parameters returning to normal. Following clinical resolution, three negative nasopharyngeal PCRs separated by 4 to 7 days should be performed before recovered individuals are allowed back into the group with a minimum of 1 month of isolation. It should be noted that some individuals can become prolonged shedders for months with the source being within the guttural pouch therefore, PCR of the guttural pouch may prove beneficial.

**Experts who may be consulted:** Any laboratory that routinely tests for this bacterium, as well as large animal internists and equine veterinarians.

**References:**

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