Leptospirosis occurs in most species of animals where it causes blood infection (septicemia), kidney infections, hemolytic anemia, mastitis and abortion. It is responsible for economic losses due to abortions, mastitis and decreased milk production.

Etiology and Pathogenesis

Leptospirae are motile gram-negative bacteria. There are seven pathogenic species of Leptospira, of which five have been reported in cattle. Within these seven pathogenic species, about 200 pathogenic serovars have been identified worldwide. The unique antigens that the organism presents on its surface identify specific serovars. The pathogenesis of the disease depends very much on the serovar as well as the species of animal. A serovar behaves differently in its maintenance host species than it does in the incidental host species.

A maintenance host acts as a reservoir. It is highly susceptible to infection but not to clinical disease. Instead, the organism causes chronic disease and economic losses due to impaired reproductive performance. It persists in the kidney, in the genital tract and is a source of infection for other animals within the species. It is characterized by low antibody titers, despite long term infection, making it difficult to diagnose and to mount appropriate immune responses to vaccination.

An incidental host has low susceptibility to the infection but tends to succumb to acute disease. It has a short kidney phase and produces high antibody titers in response to infection. Transmission among host species is sporadic and it tends to be transmitted to other species rather than its own.

An important feature of Leptospira pomona is the intavascular hemolysis and the kidney inflammation that it causes. On the other hand, Leptospira hardjo cause either but instead produces septicemia, mastitis and/or abortion in cattle.

After L. pomona enters the host via lesions in the mucous membranes or the skin, the organism multiplies rapidly in the liver. Leptospires then migrate to the peripheral blood and on to other tissues such as kidneys, reproductive tract, eyes and the central nervous system. In the acute phase, antibodies develop and the infection is cleared from most organs with the exception of the kidneys and/or the reproductive tract. In this chronic phase, antibody production is limited, the organism persists in the kidneys and reproductive tract, from which the organism can be shed. During this period, the animal is a non-clinical carrier of infection within the herd.

Clinical Signs

L. pomona in cattle causes septicemia, kidney infection, abortion in cows and fatal hemolytic anemia in calves. Serovar L. hardjo in the cow causes atypical mastitis, a drop in milk production and possibly infertility.

Diagnosis

Positive diagnosis may be difficult in individual animals since the disease is variable, the organism is transient in some tissues and it dies rapidly in transit to diagnostic laboratories. Acute and convalescent sera using micro-agglutination technique (MAT) will detect cases of acute disease.

Epidemiology

Leptospira pomona and hardjo are common in Australia, New Zealand and North America, with L. hardjo isolates more common in the United Kingdom.

With Leptospira hardjo, cattle are considered to be the principle reservoir for infection. It is an important cause of bovine abortion and is also the most common infection in humans. Leptospira
Canicola infection has been recovered in cattle while L. icterohaemorrhagiae and L. grippotyphosa are rare in cattle.

The reservoir of infection is usually an infected animal, which sheds leptospires and contaminates pastures, drinking water and feed by infected urine, aborted fetuses and infected uterine discharges. An infected bull can transmit the organism to breeding females through the semen. Infected wildlife, including rodents are strongly suspected as having a role in the spreading of disease in livestock.

Since the shedding of leptospires in the urine (leptospiruria) continues long after clinical recovery—urine is the chief source of contamination. The organism survives best between 44°F and 96°F (7°C–36°C) and at a pH between 6–8. Environmental moisture is the critical factor governing the organism's ability to persist in bedding and soil; and it can survive for long periods of time in stagnant water.

Leptospirosis is an occupational hazard for livestock producers, especially those personnel who milk cows, veterinarians, and butchers who become infected via urine or uterine contents.

### Treatment

The drug of choice in the treatment of acute leptospirosis in cattle is streptomycin daily for 3 days. A single injection of dihydrostreptomycin is effective in eliminating the carrier-state in L. pomona but is ineffective for L. hardjo. Other antibiotics that may be effective are tetracyclines, erythromycin, and ampicillin.

### Prevention and Control

The most effective means of controlling the disease are through improving hygiene and through vaccination. Reducing moist environments by ensuring dry bedding, draining low areas in pens or pastures or simply removing the animals from those infected areas in wet seasons can significantly decrease the transmission of organism. The control of rodents can also be an important factor for reintroduction, once the herd had been cleaned up of infection.

With advances in serological methods of diagnosis, elimination of carriers with pharmaceutics and vaccines, eradication efforts from individual herds is reasonable. Since the risk of re-infection is high, control through management and vaccination is generally more prudent.

Annual vaccination for leptospirosis can be an effective control measure in conjunction with other management practices. Most vaccines are multivalent bacterins, containing up to five serotypes, as protection is serotype specific with no or little cross reactivity. However, vaccination has not been completely protective against experimental infection and some animals still shed the organism. In some cases a vaccination program combined with antibiotic treatment has been used in infected herds with success.

### Merial bovine vaccines against bovine Leptospirosis

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<tr>
<th>Product</th>
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<tr>
<td>J·VAC® L5</td>
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### References
