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### ***What is the current thinking on Leptospirosis ?***

Leptospirosis has been a concern for veterinarians and dogs for several years. In the past, leptospiral disease in dogs was caused primarily by 2 serovars - *L. canicola* and *L. icterohemorrhagica*, with rare cases caused by *L. pomona*. Vaccination against two of these strains was available, but a small number of adverse vaccine reactions were observed (urticaria, allergic-type responses), especially in smaller breeds. This led many veterinarians to cease administering leptospirosis vaccines.

Over the last few years, leptospirosis has re-emerged as a cause of acute renal failure. However, the serovars associated with these cases have not traditionally been seen in dogs: *L. kirschneri* ser. *grippotyphosa*, *L. bratislava*, *L. autumnalis* and *L. pomona*.<sup>1-3</sup>

There appears to be an increased incidence of cases in late summer and fall as well as a positive correlation with high levels of rainfall.<sup>4,5</sup>

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### ***What is the current thinking on Leptospira vaccination?***

#### **What serovars are included in the new vaccines?**

Traditional leptospira vaccines (bacterins) have included coverage against *L. canicola* or *L. icterohemorrhagica*. The emerging serovars (*grippotyphosa*, *bratislava*, *pomona*, and *autumnalis*) were not included in these vaccines. Recently, Wyeth-Fort Dodge released new Leptospira vaccines (either as stand-alone, or in combination with the viral vaccines), that contain bacterins against *L. canicola*, *L. icterohemorrhagica*, *L. grippotyphosa* and *L. pomona*. [Pfizer now also has an approved 4-serovar vaccine]

Vaccination against one Leptospira serovar is not cross-protective against the other serovars. Therefore, dogs vaccinated against *L. canicola* and *L. icterohemorrhagica* are still susceptible to infection by *L. grippotyphosa* or *L. pomona*. Additionally, vaccinated dogs are susceptible to serovars not contained in even the newer vaccines.

#### **How long is the duration of immunity with Leptospira vaccines?**

This is difficult to determine. Some unpublished data suggests that titers persist for <12 months (often <6 months), and that some dogs fail to seroconvert despite vaccination. One year challenge studies have been performed by Fort Dodge for *L. canicola* and *L. icterohemorrhagica*, but not the newer strains (or at least data are not available for these studies, if they have been performed). One year challenge studies have also been performed by Pfizer, but data are not readily available for evaluation.

#### **What is the recommended vaccination schedule for dogs?**

Dogs should receive at least 2 initial vaccinations with the new bacterin, regardless of previous leptospira vaccination history. Two doses should be administered at least 2 weeks, preferably 3 weeks apart. Some data suggest that dogs require 3 doses of bacterin to develop antibody titers. Yearly vaccination is recommended, although 6-monthly vaccination may be warranted in some cases if the risk of exposure is exceptionally high.

#### **How can I minimize adverse vaccine reactions?**

Some dogs given leptospira bacterins develop adverse clinical reactions. Few statistics exist, but some suggest that adverse events occur in less than 1% of vaccinates. The occurrence of these adverse reactions led many practitioners to abandon routine Leptospira vaccination. With re-emergence of leptospirosis, and more vaccinations being administered, the issue of adverse vaccine responses will increase. Anecdotally, small breed dogs and puppies appear to be at the greatest risk for developing adverse vaccine reactions with Leptospira bacterin. Therefore it is best to avoid giving the vaccine to puppies younger than 9 weeks.

Some practitioners advocate pre-treating dogs receiving Leptospira vaccines with antihistamines and glucocorticoids (see message board link). This appears to ameliorate the adverse reactions in most cases. However, given the low incidence of adverse reactions, we do not recommend routine pre-treatment with antihistamines or glucocorticoids. This strategy should be reserved for cases previously demonstrating hypersensitivity reactions, or high-risk cases.

## Which dogs are at risk?

Many practitioners are concerned about unnecessary vaccination, and prefer to vaccinate only those dogs considered "at risk". Determining which dogs are at risk is difficult. There are at least 3 studies of risk factors for leptospirosis.<sup>1,6,7</sup> These studies suggested that *L. grippityphosa* had previously affected dogs in rural environments (working and herding dogs), but now affects dogs in urban and peri-urban environments. Middle-aged male dogs are at greatest risk. Virtually all infected dogs in these retrospective studies were unvaccinated. However, because the vaccine is relatively new, it is difficult to determine whether the vaccine is truly protective, because there is anecdotal evidence of infection in vaccinated dogs.

There is also evidence that geographic locations have different prevalence of disease.

Thus, it is difficult to determine which dogs should receive *Leptospira* vaccine in any particular region. If the incidence of leptospirosis in your area is high, vaccination is probably warranted.

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## What about *L. bratislava* or *L. autumnalis*?

Whether these 2 serovars cause disease is still questionable. The Animal Health Diagnostic Laboratory at Cornell University does not routinely measure antibody titers against these 2 serovars, because they claim that "...Given the lack of sufficient clinical evidence to support testing for *L. bratislava* and *L. autumnalis*, the AHDL is not recommending routine testing for them..." This is based on the fact that neither serovar has been cultured from any clinical case of leptospirosis. However, serological data suggests that at least *L. autumnalis* and *L. bratislava* may cause disease.<sup>2,3</sup> The Cornell AHDL argues that high titers with these serovars are cross-reactive with other serovars - a hypothesis that is supported by the fact that in nearly all cases, patients display seropositivity against multiple serovars.

Regardless of whether these serovars are pathogenic in dogs, treatment of patients with leptospirosis is the same irrespective of serovar.

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## How do I interpret *Leptospira* titers?

In general, there are five rules regarding lepto titers:

1. the highest serovar is considered to be the infective serovar.
2. there is a lot of cross-reactivity between serovars, so positive titers can be seen to multiple serovars (hence, rule #1).
3. differences of less than 4-fold are not significantly different from one another.
4. lepto vaccines can cause positive titers to multiple serovars.
5. titer means antibodies--and thus exposure--and not necessarily disease.

Additionally, as with any infectious serology, changing titers (increasing in acute disease) help determine the accuracy of the diagnosis.

Vaccination titers are generally relatively low (1:100 to 1:400), compared to active infection.

Some studies at Cornell University have shown that Western Blot analysis can discriminate between vaccinal antibodies and antibodies generated in response to natural infection. However, these data are not published.

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## Do cats get lepto?

No. Cats do not appear to become infected, even when experimentally inoculated.

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## How do I disinfect contaminated areas or bedding?

Iodine-based or bleach-based disinfectants effectively kill *Leptospira*. 3-10% (1:30-1:10) bleach solutions are effective as soaks for bedding and for washing kennels. Dessication and sunlight also kill the *Leptospira*.