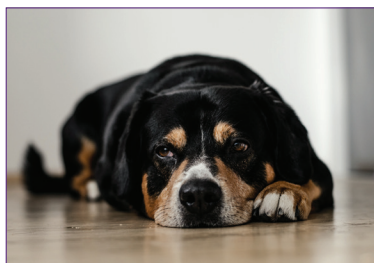


## Canine Heartworm Antigen Tests:

*Does a negative test mean a dog does not have heartworm and does a positive test mean the dog is infected with heartworms?*

By Dr. Michael W. Dryden



Canine Heartworm Disease (CHD) caused by *Dirofilaria immitis* continues to be a commonly diagnosed parasitic disease in the United States. It is now considered at least regionally endemic in

all states, except Alaska, with over 250,000 dogs being diagnosed annually.

Given the large number of dogs being infected annually and the known medical risks of infection (6 – 13” long worms in the pulmonary arteries and right heart), routine annual screening is commonly conducted in practices. Additionally, dogs presenting to the clinic with symptoms indicative of CHD (cough, exercise intolerance, rapid breathing, ascites, cyanotic mucous membranes, ataxia, heart murmur, tachycardia, etc..) must have the presumptive diagnosis confirmed by appropriate diagnostics.

For at least two decades the most commonly used diagnostic tests have been antigen tests. All currently available antigen tests (ELISA, Immunochromatographic and Hemagglutination) are designed to detect heartworm antigen circulating in the blood. While the specific antigens that are being targeted are proprietary, it is reported that all antigen tests detect a protein produced by mature female worms (likely a uterine antigen) and currently there are no USDA

licensed serologic tests that can detect male *D. immitis*.

While currently available antigen tests are highly sensitive and highly specific, there

are limitations that must be taken into consideration before telling a dog owner that their dog is or is not infected with *D. immitis*.

1. Circulating heartworm antigen appears in the blood as early as five months post-infection in a small percentage of dogs, but most dogs are not antigen positive until seven months post-infection. Yes, contrary to popular belief, a dog infected six months previously can be negative on an antigen test.
2. A low worm burden can markedly affect a test's sensitivity. These tests will detect dogs infected with one – two female worms only 60 – 70 percent of the time. Such dogs, while often asymptomatic, can either have negative tests, positive tests or inconsistently positive tests.
3. Recent studies have documented that antigen tests may not test positive in up to 7% of dogs due to the occurrence of “antigen-antibody complexes” that

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*Accredited by the American Association of Veterinary Laboratory Diagnosticians*

**TO SET UP AN ACCOUNT GO TO:**  
[www.ksvdl.org/accounting-and-billing/](http://www.ksvdl.org/accounting-and-billing/)

### Canine Heartworm (continued)

are formed in the dog's blood. These complexes bind the circulating antigen so that it is "unavailable" to react on the antigen tests. These dogs will only test positive after specific heat or acid treatment is applied to the dog's serum sample to dissociate the immune complexes, neither of which can be accomplished in a veterinary practice.

4. False positives, while uncommon can also occur a) in well-type tests due to inadequate washing, b) due to residual circulating antigen post-adulticide treatment, and c) cross reaction with *Spirocerca lupi* or other unknown antigens. While the esophageal nematode *S. lupi* is most commonly encountered in the Southern states, such as Louisiana, this author has recently consulted on cases in Kansas, Nebraska and Missouri, one of which was positive on an antigen test.

Now even with the abovementioned limitations, parasitologists are not recommending that practices stop using these tests for clinical diagnosis or routine screening. They are the best diagnostic tests available. **What is being recommended is that veterinarians learn to appreciate the limitations of the tests and augment their diagnostic procedures.**

For routine annual screening we need to be conducting an antigen test and also go "old school" and look for circulating microfilariae (Knott's test, filter test, or even a direct smear) in the blood.

For dogs with clinical signs indicative of CHD, conduct not only an antigen test, but also a test to recover microfilariae, chest radiographs and a CBC. If both the antigen and microfilariae tests are negative (remember 20+% of dogs with CHD do not have circulating microfilariae - occult infections) in a dog with clinical signs of CHD, consider submitting 1.5 to 2ml of serum to a diagnostic service that will conduct heat (KSVDL and others) or acid (IDEXX) immune complex dissolution.

Remember that the American Heartworm Society (<https://www.heartwormsociety.org/>) does not recommend testing a dog with an antigen test until at least six months post-treatment due to residual circulating antigen.

It is recommended that in antigen-positive, microfilariae-negative asymptomatic dogs, adulticide therapy should not be instituted until the antigen result is verified on a different manufacturer's antigen test.

Finally, if the heartworm antigen test is negative this does not always mean the dog is not infected with *D. immitis*. What the test is telling us is that there is not enough circulating antigen to be detected, which could be because the dog is truly negative, only male worms present, low female worm burden, immature (prepatent) infection, test error or immune complexes binding the antigen.

### **Trichomoniasis Testing Tips**

As a friendly reminder, please mark on the submission form if the Trich pouches have been incubated before shipment and also indicate if you would like the samples pooled.

This information will help shorten the test result turnaround time which KSVDL takes very seriously.

*Thank you*

### **KSVDL Diagnostic Medicine Internship**

- Extensive training in Clinical Pathology methods and interpretations
- Scheduled rotations through other KSVDL laboratories for familiarization with testing procedures and training in test-result interpretations

For more information, visit:  
[ksvdl.org/about/internship-program.html](https://www.ksvdl.org/about/internship-program.html)

## KSVDL to Sponsor and Provide Continuing Education for 2017 KVMA Convention

The Kansas Veterinary Medical Association will launch the 2017 KVMA Convention February 3-5, held at the Hilton Garden Inn Manhattan – a series of sessions, taught by nationally recognized speakers, will cover both small animal and food animal medicine. Designed to keep veterinary professionals up-to-date on cutting-edge science and strategies, the convention will focus on providing the best care in animal health and welfare.

“The KVMA is pleased to provide a convention for members and guests packed with a diversity of speakers and topics that are of high value to today’s veterinarians,” said Dr. Gregg Hanzlicek, Committee chair. “Our committee put in extra efforts to ensure



we are covering some of the most current topics to help our members and attendees stay in-tuned to current issues in animal health.”

The three-day event kicks off February 3

at 11:30 am. A first-ever highlight will be the KVMA Poster Session and Career Fair designed to connect veterinarians in the field with future professionals. The Poster Session will feature an exhibition of veterinary medical research by students, faculty and industry partners, as well as invited presentations from selected speakers.

### Don't miss it!

## CAREER FAIR

There will be a **FREE** career fair on the evening of February 4th for practitioners who are looking for associates desiring to talk to veterinarians and senior students looking for associate positions.

### Among the convention's hot presentations:

- Small Animal Dermatology: Demodicosis, Dermatitis and Otitis Externa
- Immunology: Maximizing Herd Health
- Ophthalmology: Ocular Diseases, Surgery and More
- Cow-calf and Feedlot Lameness
- Neurology
- Bovine Vaccinology and Immunology
- Small Animal Behavior
- Food Animal Trace Mineral Deficiencies, Urea and Monensin Toxicities and More

Speaker Tad Coles, DVM, is providing the luncheon address on Saturday, February 4, with his focus on personal wellbeing and creating your own resilience. Dr. Coles is a passion fatigue coach, wellbeing consultant, and impairment and prevention specialist. His mission is to decrease the impact of compassion fatigue, burnout and substance use disorder in healthcare professionals.

“Veterinarians from around the state will converge on Manhattan for more than the outstanding continuing education,” said Dr. Aaron White, KVMA President. “It’s also about relaxing with life-long friends, networking with colleagues, and taking home tips and tricks to make our practice the best it can be.”

To learn more about the 2017 KVMA Convention, visit [www.ksvma.org](http://www.ksvma.org) or contact the KVMA office at 785-234-0461. The convention is sponsored in part by Kansas State Veterinary Diagnostic Laboratory, Hill’s Pet Nutrition, ThermoFischer and Zoetis.

## POSTER SESSION

Five minute KSU-CVM student poster presentations with reviews. For poster submissions contact Megan Kilgore.

## Timely Test Offerings

### **Bovine Abortion Tissue PCR Panel**

KSVDL is now offering a panel that includes testing for five Leptospira serovars (L. canicola, L. grippityphosa, L. hardjo, L. icterohaemorrhagiae, L. pomona), IBR, BVD type 1 and 2, and Neospora caninum in fetal tissue.

**Specimens to submit:** 1 gm fresh tissues that include: liver, kidney, skeletal muscle, spleen, lung, placenta

**Days tested:** M-F

**Estimated turnaround:** 1-2 days

### **Bovine Abortion Serology Panel**

This serology panel includes testing for Infectious Bovine Rhinotracheitis (IBR), Bovine Viral Diarrhea (BVD 1 and 2), Lepto (includes all five serovars), Neospora caninum, Brucella abortus

**Specimens:** 2-3 ml serum (red top) or preservative tube

**Days tested:** M-F

**Estimated turnaround:** 4-7 days

### **Bovine Neonatal Enteric Diarrhea PCR Panels**

- For all three panels either 5 gms of feces or 1 gm fresh intestine can be submitted in a sterile container.
- This PCR is completed Monday through Friday and expected turnaround time is 1-2 days.
- The results are reported out as Positive, Negative, Suspect, with Ct values.

#### 1. **Bovine Neonatal Enteric Diarrhea PCR Full Panel**

**This PCR detects:**

Viral pathogens:

Coronavirus

Rotavirus (group A)

Bacterial & Protozoal pathogens:

E. coli K99

Salmonella sp.

Cryptosporidia sp.

#### 2. **Bovine Neonatal Enteric Diarrhea PCR Viral Panel**

**This PCR detects:**

Viral pathogens:

Coronavirus

Rotavirus (group A)

#### 3. **Bovine Neonatal Enteric Diarrhea PCR Bacterial:Protozoal Panel**

**This PCR detects:**

Bacterial and Protozoal pathogens:

E. coli K99

Salmonella sp.

Cryptosporidia sp.

For more information contact KSVDL Client Care at 866-512-5650 or [clientcare@vet.k-state.edu](mailto:clientcare@vet.k-state.edu).

## KSVDL Personnel Activities

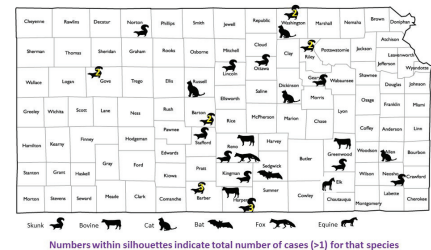
- Dr. Bill Fortney will be representing the KSVDL at the Missouri VMA meeting January 19-22 in Columbia, Missouri.
- Dr. Mike Moore will be attending EquiFest™ of Kansas: 20<sup>th</sup> Anniversary Celebration with a group of KSU-CVM students and faculty on February 24-26 in Topeka KS.
- Dr. Gregg Hanzlicek will be presenting to dairy producers in Seneca and Whiteside, KS on appropriate vaccine use and vaccine protocol designs.
- Dr. Jamie Henningson's case report about over supplementation of trace minerals in cattle was published in the January edition of Bovine Veterinarian.
- Dr. Bill Fortney will be representing the KSVDL at the Nebraska VMA meeting January 26-28 in Lincoln, NE.
- Dr. Brian Lubbers presented to the Southeast District of the Kansas Veterinary Medical Association in Cherryvale, KS on the Veterinary Feed Directive.
- Dr. Gregg Hanzlicek will present to Kansas cow-calf producers in McPherson, KS, through K-State Research and Extension, on the topic of Anaplasmosis management.
- Dr. Mike Moore will be representing the KSVDL at the Oklahoma VMA meeting January 26-28 in Norman, OK.
- Dr. Gregg Hanzlicek presented in Smith Center, KS to cow-calf producers, through K-State Research and Extension, on colostrum management and scour prevention.

## Diagnostic Disease Trends Maps for Kansas

*Updated weekly at [www.ksvdl.org](http://www.ksvdl.org)!*

Disease trend maps include:

- Anaplasmosis
- Canine Brucellosis
- Canine Leptospirosis
- John's
- Rabies
- Rocky Mountain Spotted Fever
- Trichomoniasis
- Tularemia



## KSVDL on YouTube

We have posted new videos on the KSVDL YouTube® channel covering the following topics:

- Tissues for Bovine Abortion Diagnosis  
<https://www.youtube.com/watch?v=xlqHjIQ3Sps>
- Deep Pharyngeal Swab from Live Cattle  
<https://www.youtube.com/watch?v=WB3luk1nQjY>
- Fecal Egg Count Reduction Test  
<https://www.youtube.com/watch?v=SBYuKfBvX8&t=1s>



**Subscribe to the KSVDL  
YouTube® channel:**

[www.youtube.com/c/  
KansasStateVeterinaryDiagnosticLaboratory1](http://www.youtube.com/c/KansasStateVeterinaryDiagnosticLaboratory1)

## Developing and Delivering Accurate, Innovative Diagnostic Services

*The mission of the Kansas State Veterinary Diagnostic Laboratory (KSVDL) is to develop and deliver accurate, innovative, and timely diagnostic and consultative services to the veterinary and animal health community while providing support for teaching, training and research programs.*

**1800 Denison Avenue  
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**Phone: 785.532.5650  
Toll Free: 866.512.5650**

### Continuing Education

[www.vet.k-state.edu/education/continuing/](http://www.vet.k-state.edu/education/continuing/)

**February 3-5, 2017**

**KVMA/KSVDL Continuing Education  
Conference**

Manhattan, Kansas  
[www.ksvma.org](http://www.ksvma.org)

**February 4-8, 2017**

**NAVC Conference**

Orlando, Florida  
[https://register.navc.com/conference/2017/  
registration\\_form.cfm](https://register.navc.com/conference/2017/registration_form.cfm)

**March 26, 2017**

**34<sup>th</sup> Annual Frank W. Jordan Seminar:  
Shelter Medicine**

Frick Auditorium, K-State College of  
Veterinary Medicine  
Contact: [vmce@vet.k-state.edu](mailto:vmce@vet.k-state.edu)

For more information, call the Continuing Education Office  
at 785-532-4528.

### Test Results and Schedules

**Laboratory results available  
online, all the time!**

**Holiday Schedule:**

**Memorial Day:** Closed: Monday, May 29<sup>th</sup>

To receive this newsletter by email,  
contact: [ksvdloutreach@vet.k-state.edu](mailto:ksvdloutreach@vet.k-state.edu).

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