Diagnostic Update

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Anaplasma phagocytophilum infection in a PEI dog

By Heidi Bock, DVM Class of 2010 and Shelley Burton, Veterinary Clinical Pathologist

Clinicians and pathologists at the Atlantic Veterinary College (AVC) saw an intriguing case last November involving a 5 year old male castrated Husky cross dog. This dog was from Ontario but had spent the summer on Prince Edward Island (PEI). He presented on an emergency basis to the AVC with a complaint of acute lethargy and anorexia and rapid development of central nervous signs, including ataxia and facial twitches. Physical examination revealed depression and pyrexia. He had a low white blood cell count characterized by a mild neutropenia, a mild left shift, a marked lymphopenia and moderate toxic change; these findings supported acute inflammation and stress. A mild normocytic normochromic non-regenerative anemia was also present. Platelets were clumped, preventing accurate counting. A moderate increase in alkaline phosphatase (ALP) activity and a mildly elevated alanine aminotransferase (ALT) activity were the only biochemical findings. Urine collected by cystocentesis had trace bacteriuria and culture revealed heavy growth of *Klebsiella pneumoniae.*

The dog was treated for presumed sepsis and his clinical status markedly improved by the next day. The owners mentioned a bump on the dog; parting the thick hair coat over that site exposed a markedly engorged blacklegged tick! The blood smears from the day of emergency presentation were examined and neutrophils containing morulae compatible with *Anaplasma phagocytophilum* were seen (Figure 1). Treatment was initiated with doxycycline. On the 3rd day of hospitalization, the dog had a normal WBC, a normal platelet count and no visible morulae. He was discharged that day and continued to do well.

At the time of presentation, serum was negative for antibodies against *A. phagocytophilum, Ehrlichia canis* and *Borrelia burgdoferi* using a SNAP 4Dx test.[a] A tick serology panel also had negative results for antibodies against *Babesia canis, Borrelia burgdoferi, Ehrlichia canis, Anaplasma phagocytophilum* and *Rickettsia rickettsii*. The tick was sent to the National Microbiology Laboratory in Winnipeg and identified as *Ixodes scapularis.* Testing via polymerase chain reaction (PCR) revealed that the tick was positive for both *A. phagocytophilum* and *Borrelia burgdoferi*. Thirty five days later, another serum sample from the dog had a titre for *A. phagocytophilum* of 640, with values of 160 or greater considered positive. It was concluded that the dog had indeed experienced infection

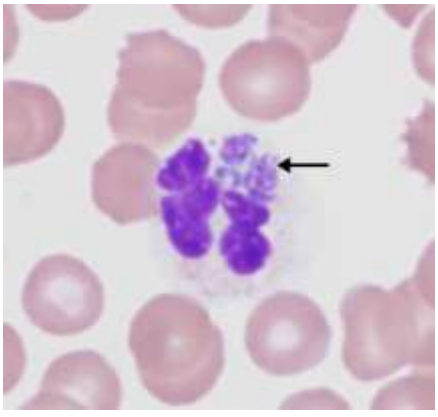

Figure 1: Blood smear showing neutrophil with morulae of *Anaplasma phagocytophilum* (arrow). Wright-Giemsa stain.

with this organism, but the negative serology results on presentation meant that clinical signs preceded an antibody response.

Canine granulocytic anaplasmosis is caused by a gram-negative tick-borne obligate intracellular bacteria, *Anaplasma phagocytophilum.* It is in the order of Rickettsiales, which underwent a major reclassification in 2001,[1] resulting in *Ehrlichia equi* being renamed as *Anaplasma phagocytophilum*. It has a worldwide distribution, including Canada.[2]

Adult ticks are the primary vectors for *A. phagocytophilum* and deer and small rodents act as primary reservoir hosts.[1] In the dog described in the present report, the reservoir host was likely a rodent because PEI does not have a deer population. The pathogenesis of *A. phagocytophilum* is distinctive because this organism survives within neutrophils and actively recruits new neutrophils to propagate itself.[3] The organisms typically appear in neutrophils in the first 1-2 weeks of acute infection, but are only present for a short time. The intracytoplasmic clusters of the bacteria are described as morulae and their presence on a blood smear allows for rapid presumptive diagnosis, as was the case in the dog presenting to the AVC.

Dogs with clinical disease have vague signs of illness, including fever, lethargy, anorexia and generalized muscle pain. Less often, central nervous system disease such as ataxia, seizure activity and stupor are seen.[2] The most common hematologic finding is mild to severe thrombocytopenia, which is seen in over 80% of acutely affected dogs.[3] Other findings include mild anemia, lymphopenia and neutropenia. The mechanism of these hematological findings is unknown and they may vary with the phase of the disease. Common serum biochemical abnormalities include hypoalbuminemia and mildly elevated ALP and ALT activities. The effect of the *A. phagocytophilum* on neutrophil function can result in secondary infections and autoimmune reactions.

Dogs with anaplasmosis may not have neutrophils containing morulae to aid in diagnosis. Diagnostic techniques such as SNAP 4Dx testing, serologic testing and PCR testing (of both patient blood and the tick) can be employed.[2] Dogs may have positive results on the spot SNAP 4Dx as early as 8 days after inoculation. In serologic testing, antibody titres may develop as soon as 2-5 days after morulae appear in circulating neutrophils, but seroreactivity may also not develop for 7 to 21 days post infection. This fact was illustrated in the dog seen at the AVC, where antibodies were not initially detected but were found on a convalescent sample 35 days later. The most sensitive method for detecting *A. phagocytophilum* is via PCR testing of the blood of an infected animal or of a removed tick. In the dog described in the present report, the tick was positive using PCR for this organism.

Doxycycline is the most effective antimicrobial agent for treatment in dogs. There is currently no vaccine for protection or immunoglobulin product for post exposure prophylaxis. Application of monthly ascaricidal products and careful inspection of the animal is the most realistic way to prevent tick borne infections in endemic areas.

This report illustrates the importance of being aware of tick borne diseases in Atlantic Canada. Clinical signs can be vague in infected dogs and can change quickly. Initial diagnostic tests may be negative. Using blood smear evaluation, SNAP 4Dx spot testing, serology and PCR together improves diagnostic ability. If you have any questions about testing for *Anaplasma phagocytophilum* in one of your patients or wish us to fax or e-mail you a good review article on this topic (Carrade 2009), please do not hesitate to contact us.

[a]IDEXX Laboratories

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1. Day M, Shaw S, eds. *Arthropod-borne Infectious Diseases of the-Dog and Cat*. Lippincott Williams and Wilkins, Philadelphia, PA. 2005: 152.
2. Cockwill K, Taylor S, Snead E, et al. Granulocytic anaplasmosis in three dogs from Saskatoon, Saskatchewan. *Can Vet J.* 2008;50: 835-840.
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Quality Assurance Program at Diagnostic Services

By C. Anne Muckle, Veterinary Bacteriologist and Dennis Olexson, Diagnostic Services Manager

Diagnostic Services at the Atlantic Veterinary College has received 3 year project funding from the 2009 Atlantic Innovation Fund (AIF). The project is based on technology innovation, quality assurance accreditation and expansion of the Veterinary Laboratory Association - Quality Assurance Program (VLA-QAP).

The VLA-QAP is a collaborative program established in 1997 on behalf of the Veterinary Laboratory Association in conjunction with Genzyme Diagnostics PEI Inc. and Diagnostic Services at the Atlantic Veterinary College (AVC), University of Prince Edward Island. Presently, the VLA-QAP markets eight laboratory modules to over 300 veterinary diagnostic laboratories worldwide. The program provides an impartial objective verification of laboratory tests to subscriber laboratories. Relevant animal specific samples are sent out quarterly to these laboratories; they analyze the samples and refer their sample test results back to Diagnostic Services for statistical evaluation. The sub-

scriber laboratories receive confidential comprehensive reports of their test results illustrating how they fit within the range of results of their peers. The reports verify that in-house laboratory practices remain accurate, precise and reproducible within the veterinary laboratory community.

As part of this AIF funding, the Diagnostic Services project team proposes to further expand the VLA-QAP services, marketability and scope by working over the next three years to:

1. Create three new modules, based on demands of the veterinary laboratory industry, for mammalian cytology, shellfish and fin-fish histopathology.
2. Deliver histology and cytopathology modules and share data by web-based delivery with virtual microscopy.
3. Obtain ISO/IEC 17025 quality assurance accreditation status as a proficiency testing provider to meet the expectations of the subscriber laboratories.

With the support of our industry partners, the Atlantic Veterinary College, the University of Prince Edward Island and the Atlantic Innovation Fund, a project team of key collaborators (Dr. Anne Muckle, Mr. Dennis Olexson, Dr. David Sims, Mr. Mark Leggott, Dr. Barb Horney and Dr. Dave Groman) will work towards moving this proposal to completion.

An Unusual Skin Lesion in a Cat

By Elizabeth O'Neil, Clinical Pathology Resident, Rachelle Gagnon, Referring Veterinarian and Barbara Horney and Shelley Burton, Veterinary Clinical Pathologists

A 7-year-old neutered male domestic long-haired cat was examined because of swelling and a draining lesion of the right forepaw. Initial therapy included cleaning of the wound and antibiotic administration, but symptoms did not improve over one week. A fine needle aspirate was performed and submitted for cytologic evaluation to the Diagnostic Services Laboratory at the Atlantic Veterinary College. Over three days while awaiting culture results, the ulcerated lesion increased to 2 cm in diameter (Figure 1).

Microscopic examination of the Wright-Giemsa stained smears showed high numbers of both nucleated cells and erythrocytes and low numbers of platelets. Moderate numbers of extracellular bacteria (approximately equal numbers of chaining cocci and short rods) were noted. A 300 differential nucleated cell count revealed 49% neutrophils and 48% macrophages, with the remaining 3% composed of approximately equal numbers of small lymphocytes, eosinophils and plasma cells. Approximately 35% of the macrophages had basophilic coccoid to rod shaped bacteria within the cytoplasm (Figure 2). The cytological diagnosis was neutrophilic and histiocytic inflammation with intracellular bacteria.

Figure 1: Ulcerated skin lesion on the cat's right forepaw (arrow).

Primary causes of neutrophilic and histiocytic inflammation include foreign bodies, chronic bacterial infections, fungal infections or neoplasia. *Mycobacteria* and *Rhodococcus* species were strongly considered as phagocytized bacteria are observed in both macrophages and neutrophils. The presence of basophilic intracellular bacteria predominantly within macrophages made *Mycobacterium* an unlikely agent in this case and supported *Rhodococcus equi* (*R. equi*) as the agent. There are increasing numbers of case reports world wide of *R. equi* infections in cats with similar cutaneous lesions and cytologic appearances to the case reported here. Bacterial culture and sensitivity was strongly advised due to the variability of antibiotic resistance of this organism in cats. In this case, the bacteriology staff was advised that *R. equi* was the agent of interest and they were able to identify its characteristic appearance as a single colony in a light growth of mixed flora. It is recognized that *R. equi* routinely may be missed due to mis-identification as a contaminant. Because these organisms are intracellular, culture may be more successful if submitted biopsy tissue is macerated, which releases organisms from cells. Based on the sensitivity results, therapy was switched to clavulanic acid and doxycycline for 6 weeks. The swelling began to decrease after one week and was gone after 2 weeks. The ulcerated lesion gradually regressed and was healed completely after 3 weeks.

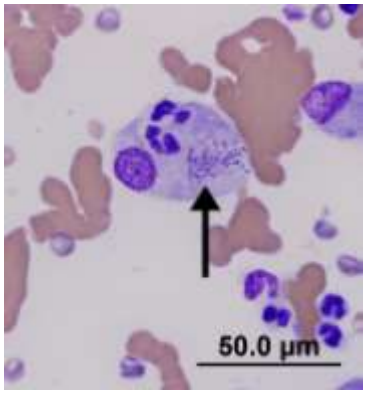

Figure 2: Wright-Giemsa stained smear of feline blood sample. Note bacteria in the macrophage in center field (arrow).

Rhodococcus equi cutaneous infection is an emerging disease in cats. This organism is an aerobic, gram-positive, pleomorphic coccobaccillus. It is most commonly associated with bronchial and gastrointestinal lesions in young foals, and increasingly is reported in immunosuppressed human patients with human immunodeficiency virus. Immune status should be considered

if *R. equi* is suspected. However, similar to the present case, all cats tested in reported cases were negative for feline leukemia virus and feline immunodeficiency virus, including one that died due to the infection. In most of the reported cases, lesions occurred as draining ulcerated lesions on a limb but similar lesions on the neck area are also reported. Systemic infection appears infrequent. Cats with lymph node or systemic involvement had poorer outcomes in reported cases, but most treated cats survived.

This case emphasizes the importance of cytological evaluation of skin lesions in cats, especially in those cases where the lesion is not responding to empirical antibiotic therapy within a short time frame. The finding of rod to coccoid shaped bacteria within macrophages that stain basophilic with Wright-Giemsa should heighten suspicion of *R. equi* infection. In these cases, culture of macerated tissue and informing bacteriology laboratory staff of the suspicion of an *R. equi* infection should optimize successful culture and identification.

Products and Protocols for Adrenocorticotropic Hormone Stimulation Testing in Dogs and Cats

By Noel Clancey, Veterinary Clinical Pathologist

The goal in adrenocorticotropic hormone (ACTH) stimulation testing is to maximally stimulate the adrenal glands. The time of peak cortisol concentration following ACTH administration depends on product formulation and route of administration. Gel forms of ACTH are not consistently available and have not been consistent in bioactivity. Synthetic ACTH has been more readily available and provides consistent bioactivity, so is recommended. Non-depot synthetic ACTH (cosyntropin), given by either the intravascular (IV) or intramuscular (IM) routes, produces the same degree of adrenal stimulation in healthy dogs. As irritation can occur with IM injection, the IV route is often preferred. However, IM administration may be easier in small or aggressive dogs and in dogs with poor venous access.

A cost benefit of non-depot synthetic ACTH is that a lower dose of 5 μg/kg to a maximum of 250 μg/dog can be used, with the remaining reconstituted portion stored frozen for future use. Frozen cosyntropin is reportedly stable for up to 6 months; freezing in well-sealed plastic syringes is recommended.

The ACTH stimulation test will identify approximately 85% of dogs with pituitary dependent hyperadrenocorticism (PDH) and approximately 60% of dogs with adrenocortical tumors. Therefore, it is a good screening test if the results are positive, but spontaneous hyperadrenocorticism should not be ruled out based on a negative test result. Although specificity of the ACTH stimulation test for the diagnosis of canine hyperadrenocorticism is generally high (64-86%), exaggerated cortisol responses to ACTH stimulation are frequently seen in stressed dogs. Responses are generally mild to moderate in degree but can occasionally be marked and in the range consistent with spontaneous hyperadrenocorticism. This makes clinical judgment critical.

ACTH stimulation test results from dogs with PDH are not distinguishable from those from dogs with adrenocortical tumors. Thus, the test is used only as a screening test. Benefits of the ACTH stimulation test include the short time required to perform it and the provision of baseline and therapeutic monitoring data. As well, it is the only screening test which distinguishes iatrogenic hyperadrenocorticism (due to chronic corticosteroid treatment) from spontaneous hyperadrenocorticism.

The ACTH stimulation test is the most reliable test for the diagnosis of canine hypoadrenocorticism. The limitation of the ACTH stimulation test is that it does not distinguish between naturally occurring primary hypoadrenocorticism, secondary insufficiency due to pituitary failure, secondary insufficiency due to chronic exogenous corticosteroid administration or primary adrenocortical destruction due to therapy for hyperadrenocorticism. Here, historical information is very important.

In cats, synthetic ACTH stimulates the adrenal cortex more consistently and to a greater degree than does ACTH gel, so is the preparation of choice. The IV route is generally preferred because it gives a more marked and prolonged elevation in cortisol compared to IM administration.

Feline hyperadrenocorticism is an infrequently documented endocrinopathy with less than 100 cases reported worldwide. Because of the low occurrence of this disease, evaluation of the ACTH stimulation test in diagnosing it is not complete. Currently, it is used because it is fast and relatively inexpensive. Abnormal results are considered specific for hyperadrenocorticism and it is the only test used in long-term monitoring for treated patients. However, it lacks sensitivity, with as many as ~65 % of cats with confirmed hyperadrenocorticism having normal ACTH-stimulated cortisol concentrations. This high percentage of false-negative results makes the ACTH stimulation test a poor screening test for feline hyperadrenocorticism. Similar to its use in dogs, the ACTH stimulation test is the "gold standard" for diagnosing feline hypoadrenocorticism, and the testing protocol is identical to that used when testing for hyperadrenocorticism.

Regardless of species, failure of ACTH administration (product not given, outdated or improperly stored) also needs to be considered with low post-ACTH stimulated cortisol concentrations, especially if the results are not consistent with the clinical findings.

Table 1: ACTH stimulation testing protocols for dogs and cats.

PRODUCT	Synthetic ACTH Cortrosyn® (cosyntropin)	Synthetic ACTH Synacthen Depot® (cosyntropin-zinc	ACTH Gel Bexco® (corticotropin, USP)
CANINE			
FORMULATION	0.25 mg/vial reconstituted with 1 ml sterile saline (0.25 mg = 250 µg = 25 U)	1 mg/vial, 1 ml bottle	40 U/ml, 5 ml bottle
DOSE	250 µg (1 vial)/dog regardless of BW* or 5 µg/kg to a maximum of 250 µg/dog	BW <15 kg give 0.25 mg/dog BW >15 kg give 0.5 mg/dog	2.2 U/kg of BW
ADMINISTRATION ROUTE	Intravenously (preferred) or Intramuscularly	Intramuscularly	Intramuscularly
COLLECTION	Pre and 1 hour post	Pre and 2 hours post	Pre and 2 hours post
FELINE			
FORMULATION	0.25 mg/vial reconstituted with 1 ml sterile saline (0.25 mg = 250 µg = 25 U)	No established protocol	40 U/ml, 5 ml bottle
DOSE	125 µg (½ vial)/cat regardless of BW		2.2 U/kg of BW
ADMINISTRATION ROUTE	Intravenously		Intramuscularly
COLLECTION TIMES	Pre & 60 minutes post are most important (30 and/or 90 minutes post may help with patient variation)		Pre, 1 & 2 hours post

*BW= body weight

Sample collection, handling and submission:

- Collection should be into red-topped tubes. Blood should be allowed to fully clot before centrifugation to decrease fibrin strands in the supernatant. Following centrifugation, serum should be removed and transferred to a new red-topped tube as soon as possible.
- At least 0.5 ml of serum is required for each cortisol measurement.
- Samples with high bilirubin concentrations may falsely increase the cortisol concentration and should be avoided. Although there is likely minimal risk of interference, hemolyzed and lipemic samples should also be avoided if possible.
- Refrigerate serum as soon as possible; do not store at room temperature. If transport to the laboratory is delayed more than 24 hours after collection, freeze the serum and ship it in a frozen state.
- Clearly label sample tubes with the name of the patient, owner and sampling time (baseline, 1 hour post-ACTH, etc).
- Provide the type of ACTH product used, dose per kilogram, administration route and times of collection.
- Provision of a history is always appreciated and helps avoid misinterpretations by the duty clinical pathologist.

Raccoon Roundworm Infection in a Dog

By Gary Conboy, Veterinary Parasitologist, Nicole Murphy, Veterinary Parasitology Technologist, Tonya Stewart, Community Practice Veterinarian and Amanda Taylor, Veterinary Intern

A fecal sample from a 9-month old female mixed breed dog was submitted for flotation examination. The dog had passed a large cream colored cylindrical shaped worm, presumably a nematode, the day previously. Numerous elliptical to subspherical parasite eggs were detected on zinc sulfate centrifugal flotation examination. The eggs were about 73 x 58 microns in size with a thick shell wall and contained a large, dark single-celled embryo. They were identified as *Baylisascaris procyonis*, the raccoon roundworm (Figure 1). The dog was placed on 50 mg/kg oral fenbendazole given once a day for 7 days. All feces passed by the dog for the first 5 days of the treatment period was collected and examined grossly for the presence of adult worms. Centrifugal fecal flotation examinations were conducted daily for the first 7 days of treatment and then weekly for 3 weeks. Fecal flotation examinations were negative by the 5th day of treatment and remained negative on all subsequent samples. The diagnosis was confirmed by the recovery of a total of 17 adult *B. procyonis* from feces passed by the dog during the treatment period.

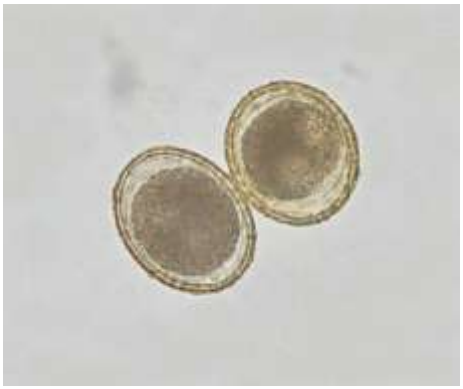

Figure 1: Raccoon roundworm (*Baylisascaris procyonis*) eggs.

Baylisascaris procyonis, the raccoon roundworm, is the cause of cerebrospinal nematodosis in rabbits, rodents, birds and various other animals, including humans. Human exposure is through the ingestion of larvated eggs; infection can lead to ocular disease or severe central nervous system disease which can result in death. In addition to raccoons, patent *B. procyonis* infections also occur in dogs. At present, *B. procyonis* infection in dogs is considered rare. However, diagnoses may be missed due to the close similarity in morphology between *B. procyonis* and *Toxocara canis* eggs. The eggs of *T. canis* are larger and the shell wall surface has a distinctive "golf-ball" pitting (Figures 2 and 3). The eggs of *B. procyonis* are smaller and may have a brown color of variable intensity. The shell wall surface of *B. procyonis* eggs lack the regular appearing "golf-ball" pitting.

Figure 2: Canine roundworm (*Toxocara canis*) egg.

Prior to the above case, patent *B.procyonis* infections have been diagnosed by fecal flotation in samples submitted to AVC Diagnostic Services in 4 dogs on PEI since April 2005. Each case was confirmed by recovery of adult worms passed in the feces.

Figure 3: Distinctive "golf-ball" pitting appearance to shell wall surface of *T. canis*.

Dogs ranged in age from 1.5 to 4 years (mean = 2.6 years). All dogs were treated with fenbendazole (50 mg/kg for 5-7 days). A necropsy survey has found *B. procyonis* infection in 17/242 (7%) of the raccoons on PEI. A fecal flotation survey of samples from dogs at the PEI Humane Society (2005-2007) detected *B. procyonis* eggs in 2/555 (0.4%) samples. Infections were also confirmed by the recovery of adult worms passed in the feces. Although a prevalence of 0.4% is low, it does indicate that patent infection does occur and that every effort should be made to detect patent *B. procyonis* infection when it occurs in dogs. Veterinarians need to be aware of the possibility of *B. procyonis* infection for the accurate diagnosis, treatment and prevention of environmental contamination by dogs with the eggs of this dangerous zoonotic pathogen.

Update on Canine Leptospirosis in Atlantic Canada

By Cora Gilroy, Veterinary Clinical Pathologist, Allan MacKenzie and Ellen McMahon, Clinical Pathology Technologists

Leptospirosis is an important worldwide bacterial zoonotic disease with continued increased awareness by practitioners in the Atlantic Canadian region in recent years. Serum titres positive for leptospirosis can be due to exposure, vaccination or clinical disease.

The number of submissions to the Atlantic Veterinary College (AVC) Diagnostic Services to test for leptospirosis titres peaked in 2005 (Table 1).

Table 1: Serological results for all canine *Leptospira* serovars submitted to the AVC Diagnostic Services.

Year	Number of samples	Positive n (%)	Suspicious n (%)	Negative n (%)
2001	52	13 (25)	3 (6)	36 (69)
2002	48	20 (42)	14 (29)	14 (29)
2003	30	0 (0)	10 (33)	20 (67)
2004	60	17 (28)	19 (32)	24 (40)
2005	106	8 (8)	30 (28)	68 (64)
2006*	64	8 (13)	1 (2)	55 (85)
2007	51	18 (35)	--	33 (65)
2008	63	17 (27)	--	46 (73)
2009	57	12 (21)	--	45 (79)
2010§	14	4 (29)	--	10 (71)

*Beginning in mid 2006, samples were submitted to a different external laboratory with only positive or negative results reported. §Until May 1st.

Table 2: Percent positive and suspicious cases for individual provinces.

Year	Province*	Positive† n (%)	Suspicious† n (%)
2004	NB	13 (22)	14 (23)
	NS	4 (7)	4 (7)
	PEI	0 (0)	1 (2)
2005	NB	4 (4)	15 (14)
	NFLD	1 (1)	1 (1)
	NS	3 (3)	13 (12)
	PEI	0 (0)	1 (1)
2006	NB	4 (6)	0 (0)
	NS	4 (6)	1 (2)
2007	NB	5 (10)	--
	NS	13 (25)	--
2008	NB	6 (10)	--
	NS	9 (14)	--
	PEI	2 (3)	--
2009	NB	7 (12)	--
	NS	4 (7)	--
	PEI	1 (2)	--
2010§	NB	2 (14)	--
	NS	2 (14)	--

*NB = New Brunswick, NFLD = Newfoundland, NS = Nova Scotia, PEI = Prince Edward Island. †Calculated based on the total number of submissions from all provinces per year. §Until May 1st.

The ongoing testing for *Leptospira* serovars demonstrates the importance that is placed on this bacterial disease. Over the previous 9 years, a mean of 22% positive results from all submitted samples has been seen (Table 1).

The highest percentage of positive and suspicious test results have been from New Brunswick (2004, 2005 and 2009) and Nova Scotia (2006, 2007 and 2008) over the past 7 years (Table 2). So far in 2010, there has been an equal percentage of positive cases from New Brunswick and Nova Scotia. Provinces not listed for a particular year did not have any suspicious or seropositive cases.

Since 2007, *L. grippotyphosa* has been the most frequent seropositive serovar (Table 3). The *autumnalis* and *bratislava* serovars are not included in the current vaccines available against leptospirosis. Multiple positive titres are typically interpreted as being increased due to cross-reactivity, but unfortunately the highest titre cannot always be used to confidently identify the infecting serovar.

Table 3: Percent suspicious and seropositive cases to various *Leptospira spp.* serovars.

Serovar	2004 %	2005 %	2006 *%	2007 %	2008 %	2009 %
L. autumnalis	75	45	11	0	0	8
L. bratislava	44	34	56	61	47	25
L. grippotyphosa	53	50	44	94	65	83
L. pomona	22	8	33	78	59	25
L.icterohaemorrhagiae	25	11	22	22	59	33
L. canicola	17	29	11	11	6	0
L. hardjo	--	--	--	0	12	0

*Beginning in mid 2006, samples were submitted to a different external laboratory with only positive or negative results reported.

While there is a seasonal trend for leptospirosis, with the highest frequency of cases noted in late summer and fall, it is important to note that positive titres to *Leptosira* serovars have been reported throughout most months of the year from 2008 – 2009 (Figure 1).

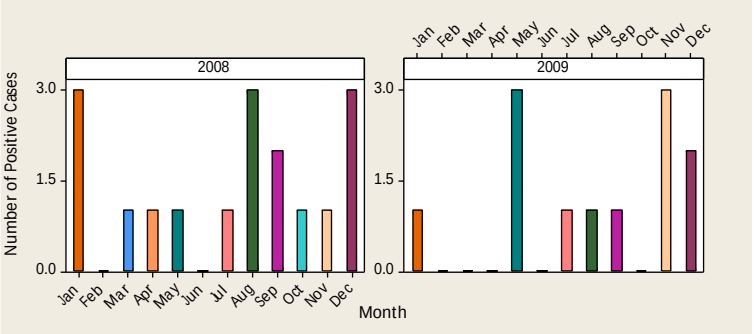

Figure 1: Frequency of positive leptospirosis cases by month.

Leptospirosis continues to be an important disease for veterinary patients in the Atlantic provinces. Appropriate testing is important for both patients and for epidemiological monitoring of this important zoonotic disease.

References:

1. Alton GD, Berke O, Reid-Smith R, Ojkic D, Prescott J. Increase in seroprevalence of canine leptospirosis and its risk factors, Ontario 1998-2006. *Can J Vet Res.* 2009;73:167-175.

2. Greene C, Sykes J, Brown C, Hartmann K. Leptospirosis. In: Greene C, ed. *Infectious Diseases of the Dog and Cat.* 3nd ed. Saunders Elsevier, St. Louis MO. 2006:402-417.

Laboratory News

By Shelley Burton, Veterinary Clinical Pathologist

Here are some recent happenings in Diagnostic Services:

- We redesigned our Diagnostic Update newsletter and you are looking at the new version. We hope you like it!
- We welcomed our summer veterinary students, including Sadie Griffin, Lauren Bernstein and Stephanie Hayward, who will be helping the bacteriology, parasitology and post-mortem laboratories.
- Dr. Barbara Horney provided a continuing education session on bovine clinical pathology to the Atlantic Bovine Practitioners Association in Moncton.
- Ms. Ramona Taylor, who works in histology and who was featured in a recent newsletter, learned that her singing quartet qualified to compete at an international competition in Saint John this coming November!
- We extended congratulations to two of our anatomic pathologists who were honored with teaching awards. Dr. Paul Hanna received The Vetoquinol Clinical Teaching Award. He is recognized by peers and students as a skilled pathologist and dedicated educator. Dr. Alfonso Lopez received The UPEI Hessian Award of Merit in Teaching. Dr. Lopez continues to excel in teaching at the local, national and international levels, including the development of web-based courses.
- Dr. Sandra McConkey, Dr. Shelley Burton and Ms. Ellen McMahon provided 2 wet laboratories on urinalysis at the Atlantic Provinces Veterinary Conference in Halifax on Saturday, April 24th. Interest was high and these enjoyable sessions were sold out. Watch for our participation in future conferences!

Staff Focus

Dr. Shannon Martinson

By Andrea Bourque, Veterinary Anatomic Pathologist and Cora Gilroy, Veterinary Clinical Pathologist

Clients of Diagnostic Services will recognize the name of one of our newer anatomic pathologists, Dr. Shannon Martinson, on biopsy and post-mortem reports. Originally from Mactaquac, New Brunswick, Dr. Martinson graduated with a Bachelor of Science from the University of New Brunswick in 1999. She moved to Prince Edward Island to attend the Atlantic Veterinary College and received her Doctor of Veterinary Medicine in 2004, graduating #1 in the class for academic achievement. She then began her 3 year combined Master of Veterinary Science and Residency in anatomic pathology. Shannon passed her certifying examination from the American College of Veterinary Pathology in 2008 to become a boarded Diplomate.

Shannon has been integral to improvements in our biopsy services over the previous 3 years. She has an avid interest in surgical pathology and is currently collaborating with Dr. Etienne Côté investigating a newly reported cardiomyopathy affecting Toy Manchester Terriers. Shannon is an approachable, very knowledgeable pathologist who genuinely enjoys her work. In her spare time, she enjoys the outdoors with her husband Scott, her stepson Chase, and their dogs, Hershey and Diesel. Her other interests include cycling, photography, acrylic painting and drawing using a variety of mediums. She has recently taken up dirt biking and we insist she wears a helmet!

Reader Feedback: The *Diagnostic Update* group invites comments or suggestions for future topics in the newsletter. Please submit your comments to *Dr. Cora Gilroy* (cgilroy@upei.ca), Diagnostic Services, Atlantic Veterinary College, UPEI, Charlottetown, PE, C1A 4P3 and they will be forwarded appropriately.