



newsletter



JANUARY 2008

Quarterly Publication

Volume 14, Issue 1

From the Director:

VDL Gains Membership in the Laboratory Response Network (LRN)

In November, the Arizona Veterinary Diagnostic Laboratory obtained membership in the Laboratory Response Network (LRN). The LRN is a network of public health and veterinary laboratories designed to improve the nation's preparedness to respond to bioterrorism emergencies through standardized rapid diagnostic methods and reporting. The VDL received funding to purchase equipment and train laboratory personnel in LRN test methods under a cooperative agreement with the Arizona Department of Health Services.

The VDL role will be to perform testing of animal specimens for zoonotic agents having the potential of being used as bioterrorism agents. These include *Bacillus anthracis*, *Francisella tularensis*, *Yersinia pestis*, botulinum toxin, *Brucella* sp., *Burkholderia mallei* and *pseudomallei*, *Coxiella burnetii* and *Coccidioides*. All are Level 3 agents and classified as select agents.

Registration with the Select Agent program is required to qualify for membership. The VDL previously accomplished select agent registration after commissioning of its Biosafety level-3 laboratory in fall 2005.

As several of these agents occur naturally in Arizona, the VDL already had experience testing for them; however, LRN membership provides access to new rapid diagnostic protocols that are not available to laboratories outside of the LRN. Three VDL technicians will be trained in LRN protocols by a "trainer" from the public health laboratory in the next few months after which the VDL LRN status will be fully operational.

More information about the LRN is available on its website: <http://www.bt.cdc.gov/lrn/>

Gregory Bradley, Director

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Featured article:

National Livestock Emergency Response Conference

The 2nd Annual National Livestock Emergency Response Conference was held at UA on December 5-7. This conference was organized by Dr. Peder Cuneo, Dr. Bob Kattnig Animal Sciences Department, and Dr. Rick Willer, State Veterinarian for Arizona. Sponsors for the conference in addition to the University of Arizona included the USDA, the Arizona Cattle Growers Association, and the Arizona Department of Agriculture. The welcome and keynote presentation was provided by Dr. Robert N. Shelton, President of the University of Arizona. Andy Groseta, President-Elect of the National Cattlemen's Beef Association spoke on the impact of animal emergencies on the United States beef industry.

The conference attracted 147 registrants from multiple states in the USA and Mexico, representing state and national animal health regulatory agencies, state public health departments, state universities, national livestock associations, the Federal Bureau of Investigation, and others. Topics presented the first day of the conference included:

Impact of Livestock Emergencies on Producers in Mexico

Agro-terrorism Response

County and Public Health Emergencies Due to Livestock Crisis

The Role of Wildlife in Livestock Emergencies

The second day of the conference moved outdoors to a ranch near Nogales, Arizona. Participants were presented with several different scenarios involving livestock losses and were asked to "walk" through how they would respond. One of the major issues presented were problems of ranch biosecurity on an international border. The final day focused on food safety emergencies and emergencies involved livestock in confined feeding operations. Veterinarians attending the conference received 22 hours of continuing education credit from the Arizona Academy of Veterinary Medicine.

This national conference evolved from the Arizona Livestock Incident Response Team (ALIRT) that was developed by Drs. Cuneo, Kattnig and Willer. The ALIRT program has been developed in Arizona to respond to the many challenges for livestock producers in Arizona. This state has very extensively managed livestock in rural areas. There are a declining number of rural veterinarians to provide diagnostic support to producers and there is a very real threat presented by unregulated immigration. The ALIRT program has trained and equipped several veterinary practitioners state-wide to act as first responders. These first responders are sent to investigate serious livestock health problems. Their training and equipment insures that all of the samples that may be needed for diagnostic services are correctly collected and transported to the Arizona Veterinary Diagnostic Laboratory. ALIRT has become a very good model demonstrating how the State of Arizona, livestock producers and the University of Arizona can work together to enhance the safety and security of livestock production in Arizona. The ALIRT program has been copied by a number of states and currently the National-Cattlemen's Beef Association is considering incorporating it into its Beef Quality Assurance Program.

If you have further questions regarding ALIRT contact:

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Or visit the ALIRT web site

<http://ag.arizona.edu/ans/alirt/index.html>

DIAGNOSTIC UPDATE:

BOVINE

A cross-bred steer had severe bronchopneumonia accompanied by fibrinous pleuritis, pericarditis and peritonitis. Suppurative lesions are identified in numerous organs. Heavy populations of *Pasteurella multocida* were isolated from multiple tissues. *Pasteurella multocida* is usually associated with more chronic forms of bovine pneumonia but in this case, the acute septicemic form was identified. The isolates were sensitive to nearly all antibiotics. This is frequently true with bovine *Pasteurella multocida* isolates. However response to antibiotic therapy frequently does not reflect the apparent sensitivity of the organism to the various antibiotics.

Several Holstein bull calves were received from a calf raiser. The calves were less than one week of age and had variable degrees of diarrhea apparent. The most consistent finding in these animals was **abomasitis** with distention. The abomasums frequently contained large amounts of fluid that was sometimes foul smelling as well as gas. No pathogens were identified in most of these animals and the animals tested negative for BVD. The cause of this problem is not clearly defined but some publications have discussed the likelihood of highly fermentable milk replacer products causing an excessively rapid ferment in the abomasum. Feeding practices can also be involved and the role of poor colostrum intake is an unanswered question. Two episodes of this condition have occurred in calves being raised in hutches with apparent contribution by inclement weather.

EQUINE

Uremic gastrointestinal infarctions with copious gastrointestinal hemorrhages were found during the necropsy of a 10-year-old thoroughbred gelding. The uremia was precipitated by a chronic generalized glomerulonephritis with extensive interstitial fibrosis (end-stage kidneys).

A three-year-old gelding had signs of central nervous system disorder. There were no significant gross or microscopic lesions in any of the tissues including the brain. However PCR tests for western equine encephalitis (WEE) were positive. **Western equine encephalitis** is occasionally seen in this area and lesions are not always readily present in the portions of brain that can be examined histologically. Eastern equine encephalitis has not been reported in this area.

A seven-month-old quarterhorse fetus had an unusually long and severely **twisted umbilical cord**. The likelihood of the twisted umbilical cord being a factor in the fetal death is supported by the presence of extensive amounts of edema and congestion in some areas of the twisted cord. This condition has been reported as an occasional cause of fetal death.

Infection with **West Nile virus** was the diagnosis in a seven-year-old, quarterhorse with a history of increasing ataxia, weakness and dullness. There were perivascular lymphocytic infiltrates in the brain and some neuronal degeneration. Lesions as is typical of west Nile infections were more pronounced in the lower brain stem and anterior spinal cord. Our laboratory identified 14 horses that had either serologic or post mortem evidence of infection with **west Nile virus**.

DIAGNOSTIC UPDATE:

EXOTICS

A *Bordetella bronchiseptica* pneumonia and scurvy (periarticular and muscular hemorrhages in the hind legs) were diagnosed in the necropsy of a juvenile pet guinea pig. Three had died in the household. In addition, there were lesions of acute muscular degeneration and necrosis suggestive of nutritional myodystrophy. The owner declined to investigate the selenium-vitamin E status in the animal.

Articular gout was diagnosed in an adult chuckwalla (*Sauromalus varius*) from a zoo collection. Several of the distal limb joints were mildly swollen. Deposits of a white, soft material were present within and around intervertebral articulations and limb joints. Microscopically there was a urate nephrosis with radiating crystalline urates (tophi) in renal tubules and interstitium, and urate deposits in periarticular tissues and spleen.

A guinea pig was presented with a history of breathing problems. The apparent cause of the animal's death was extensive **chronic interstitial nephritis** with tubular change. No cause for the lesions was determined.

A six-year-old tiger was submitted for necropsy after it had collapsed in its cage and died. The mitral valve was found to have a focal area of thickening and discoloration. The lungs were very heavy, and large amounts of clear, watery fluid flowed from them. Histologically, the lesion in the heart was consistent with a previous area of hemorrhage. The lungs contained "heart failure" cells in the air spaces indicating a chronic left heart insufficiency and pulmonary edema as the cause of death.

Two related two-year-old African hedgehogs had pulmonary edema and hepatic central vein fibrosis consistent with chronic heart failure. Cardiomyopathy is frequently reported in African hedgehogs, and was first reported in the following article:

Raymond, J. T. and M. M. Garner (2000).
"Cardiomyopathy in captive African hedgehogs (*Atelerix albiventris*)."
J Vet Diagn Invest 12 (5): 468-472.

SMALL RUMINANTS

Three unrelated cases of **Rumen acidosis/grain overload** in small ruminants were diagnosed during this reporting period. A three-month old Suffolk lamb, and a one-year-old male Nigerian dwarf goat were fed

excessive amounts of grain (corn, wheat). A five year old Alpine goat was found dead after escaping the pen and eating sheep grain. All three animals had the rumen distended by watery fluid, gas, and excessive amounts of grain. The pH of the rumen fluid was 4.7, 5.0 and 4.5 respectively.

We received a five-month-old, alpaca with a history of chronic diarrhea and more recent sudden onset of fever. Necropsy findings included congested lungs and a liver that was grossly swollen and mottled with petechial hemorrhages. Histopathology identified numerous hepatocytes with degeneration including many cells that contained large magenta colored intranuclear inclusion bodies. These lesions are typical of **adenovirus** infections that have been previously reported in alpacas. Tests for herpesvirus and BVD were negative. There have been recent reports of infections in young alpacas with both herpesvirus and adenovirus.

Heavy parasitosis by *Haemonchus contortus* was the cause of death of several ewes in a herd in southern Arizona. The affected animals were anemic, cachectic with serous atrophy of fat, had edema of the sub-mandibular tissues (bottle jaw) and thorax, hydropericardium and ascites. Very large numbers of the worms were present in the abomasum. *H. contortus* (barber pole worm) can be of greatest concern for sheep and goats during warm, humid weather, particularly if there are nutritional deficiencies or if the stocking rate is high. Deworming can be ineffective if animals are kept in heavily infested environments under continuous massive re-exposure, or if tactical treatment plans are not followed.

AVIAN

Septicemic salmonellosis by a group B *Salmonella* caused heavy acute mortality in a group of parakeets recently shipped for commercial distribution. Gross lesions consisted of hepatosplenomegaly. Numerous bacterial rods (many intracellular) could be seen in giemsa stained impression smears of liver and spleen. Histologic lesions included multifocal hepatic necrosis, lymphoid necrosis, vascular thrombosis, and clumps of bacterial rods within capillaries in lungs, liver and spleen.

A twenty-year-old male, double yellow-headed Amazon parrot died following a fall from its perch. A lump had been previously detected in the pelvic area. At necropsy the bird had hemorrhage in the subcutis of the left medial thigh and left side of the abdomen consistent with the fall. The liver

DIAGNOSTIC UPDATE:

was large, hard and pale with rounded borders. On cut surface there were pale brown nodules. Histologically, the liver was consistent with **hepatic cirrhosis**. Cirrhosis is an end-stage change and the cause is usually no longer apparent. However, liver cirrhosis in seed eating birds is often attributed to mycotoxin contaminated seeds resulting in chronic liver injury.

A quail breeder was losing approximately 10 birds per day from his flock of 3,000 birds. A single bird was presented for necropsy. There was multifocal caseous necrosis of the liver and large caseonecrotic cores in the ceca, lesions consistent with *Histomonas* infection. Microscopically the bird also had large numbers of spherical microorganisms consistent with *Cryptosporidium* colonizing the apical cytoplasm of epithelial cells lining intestinal villi. The mortality was attributed to the dual infection.

An Eclectus parrot of unknown age was submitted with a history of seizures. There was caseous exudate in the thoracic and abdominal air sacs. Consolidated areas in the lung contained vessels with thrombi and numerous fungal hyphae. *Aspergillus spp.* was isolated from air sac.

A large kidney mass in a 35-year-old macaw was diagnosed as a renal adenocarcinoma. Death of the bird was attributed to compression of the adjacent liver and intestinal tract in conjunction with probable respiratory compromise due to the size of the mass within the coelomic cavity.

Several three- to five-week-old chickens were found to have degeneration of the white matter and (in the oldest bird) Purkinje cells of the cerebellum. The lesions were suggestive of Vitamin E deficiency. Testing of the liver for Vitamin E at Michigan State University confirmed low concentration of this essential nutrient in the livers of these birds.

An older female chicken from a backyard flock was diagnosed with severe atrophy of the pectoral muscle and a swelling on the right leg. A mass around the tibiotarsus was found microscopically to be a fibrosarcoma. The mass had metastasized to the heart, kidney, ovary, pancreas, and mesentery. Fibrosarcomas in chickens can be caused by the Avian sarcoma virus (a type of retrovirus). PCR testing of this chicken for the virus was negative.

FELINE

Intestinal lymphoma with intestinal perforation was the necropsy finding in a 6-year-old feline after a couple of days

of fever and respiratory depression. There was a perforation of the wall of the duodenum surrounded by a 2 cm x 2 cm area of thickening of the omentum containing hair and intestinal content. Histologically, there was a diffuse transmural infiltration by lymphoblasts with a high mitotic index. Similar infiltrations were found in other intestinal sections, omentum, kidneys, bladder and liver.

Pulmonary coccidioidomycosis was diagnosed in a 7-year-old domestic shorthair feline with recently observed progressive personality changes and was euthanized after it was found in distress and rapidly deteriorating condition unresponsive to treatment. The necropsy findings were confined to a large, nonencapsulated mediastinal/right apical pulmonary abscess with sticky, yellow mucopurulent content draining into the tracheal bifurcation and right principal bronchus. There were no lesions of coccidioidomycosis outside the lungs. Coccidioidomycosis is less frequently reported in cats than in dogs. Disseminated and respiratory infections are the most common forms in both species, but the common respiratory signs observed in the dog (harsh, unproductive cough) are rarely reported in cats. There was no mention of clinical respiratory disease in the history submitted in the present case.

A five-year-old, castrated male domestic shorthair was presented for a neuter and blood work. It went home after surgery. The owner called two days later to report that the cat was vomiting and did not know if the cat was eating. The cat died the following day. At necropsy there was marked distention of the urinary bladder with approximately 90 cc of red-tinged urine. The wall of the bladder was diffusely red/grey. The mucosa was dark red and studded with slightly adherent 0.1 to 0.3 cm diameter, rough uroliths. A small urolith was obstructing the pelvic urethra. The cause of death was attributed to uremia resulting from **urinary obstruction/urolithiasis**.

A four-year-old domestic shorthair was presented for not feeling well, a left head tilt, difficulty standing and a drooping left eyelid. The left ear was infected. Treatment with Clavamox, itraconazole and metronidazole was begun. The cat did not improve and Baytril and cyproheptadine was added to the regimen. Two days later the cat was recumbent and had nystagmus. It died two days later. At necropsy there was **suppurative otitis media and an abscess of the** left brainstem and left cerebellar hemisphere. Bacterial rods were seen within the abscess but cultures were

Diagnostic Update:

were negative for bacterial growth.

A four-month-old Persian feline died suddenly after a several week history of vomiting. At necropsy, there was massive dilation of the esophagus from the heart base to the oropharynx with the lumen packed with undigested food. The **megaesophagus** was the result of a marked constriction of the esophagus at the heart base by the ligamentum arteriosum connecting to a **persistent right aortic arch**.

CANINE

An *E. coli* **septicemia** was diagnosed in a 4-day-old Great Dane puppy found dead without showing prior signs of disease. None of the litter mates were affected. The stomach was full of milk. Histologic lesions were compatible with an acute septicemia, and large numbers of hemolytic *E. coli* were isolated from all the viscera. Neonatal *E. coli* infections in dogs are usually sporadic resulting from exposure to maternal fecal or urogenital flora. They are not likely to affect many members of the litter when the environment is clean and there is no exposure to recently introduced animals.

Four shepherd mix dogs were confiscated from a property due to welfare concerns. One, a six-week-old puppy died at the scene. The others were euthanized. All were heavily infested with ticks. All dogs had non-suppurative meningoencephalitis and plasmacytosis of lymph nodes. *Ehrlichia canis* PCR was positive on all four dogs using pooled lung, liver and spleen tissues. An adult male dog had one adult **heartworm** in the left pulmonary artery.

A six-month-old beagle/pit bull mix died three days following ovariohysterectomy. The dog was vomiting since surgery. Necropsy findings included severe hemorrhagic enteritis with microscopic lesions consistent with canine **parvovirus** enteritis.

We received a four-year-old, castrated male west highland white terrier dog with a history of coughing and labored breathing. Some dental extractions had been performed earlier on this adopted animal. There was severe **pyothorax** with a large amount of cloudy grey to tan somewhat viscous fluid in both sides of the thorax. There was also heavy fibrinous pleuritis and portions of the lungs were collapsed. Heavy population of *Bordetella bronchiseptica* were isolated from lung and thoracic exudate. The source of the infection is not determined. The amount of thoracic

exudate in animals with pyothorax is also quite impressive with respect to the frequent, rather late onset of significant clinical signs.

A twelve year-old, beagle had a **transitional cell carcinoma** in the bladder that was quite extensive. There were numerous secondary tumor nodules in the lungs. Anaplastic cells were also identified in some vessels in the lung and some of the larger nodules were observed to have necrotic areas. This dog also had osteoproliferative lesions identified in the long bones. This is considered to be a situation where **hypertrophic pulmonary osteoarthropathy** is secondary to multiple pulmonary lesions.

We received a three year-old, female husky with a history of two days illness. The animal was in overall good body condition, but the body and both horns of the uterus were grossly enlarged to a diameter of 5-6 cm. They were filled with thin brown odoriferous purulent appearing fluid. The diagnosis was **pyometra**. The only bacteria identified in the uterus were Alpha hemolytic *Streptococcus* spp. which may or may not have been the initiator of the pyometra. Several recent cases of pyometra in bitches have been impressive in that the lesion is very severe with respect to the rather short duration of clinically identifiable illness that is sometimes reported.

A three-week-old French bulldog puppy was reported to be second puppy in the litter to die. The ventral portion of both lungs was observed to be dark red and firm. Heavy populations of *Staphylococcus aureus* and group G *Streptococcus* spp. were isolated from lung and other tissues including brain. **Septicemia** was supported by focal necrotic hepatitis, interstitial pneumonia and meningitis. A suspicion of failure to establish good immunologic health in these young animals cannot be confirmed at necropsy.

A biopsy of a mass on the penis from a six-year-old German shepherd dog with a previous history of transmissible venereal tumor (TVT) was submitted for evaluation. No typical TVT cells were found; however within the dermal connective tissue, numerous microfilariae were found. The mass at the time of biopsy was attributed to the inflammatory response to the nematode worms in the tissue.

Cardiomyopathy was the diagnosis in a ten year-old, German shepherd that had a history of lethargy and being "dazed". The animal had terminal dyspnea. There was clear fluid in body cavities with some fibrin present. The heart profile was rounded with a markedly dilated left ventricle.

Diagnostic Update:

Histologically there were diffuse foci of myocardial degeneration with replacement by supporting cells and some scattered mononuclear inflammatory cells.

WILDLIFE

Parvovirus infection was the cause of death in two juvenile coyotes from a Tucson area wildlife rehabilitation center. Both animals exhibited lesions characteristic of parvovirus enteritis. Parvovirus enteritis was also diagnosed in a 3-months-old raccoon from the Tucson area, received from another wildlife rehabilitator. The infection was confirmed by PCR, but the protocol followed does not allow differentiation of canine and raccoon strains.

A severe **spiruroid gastric infestation** was diagnosed in a juvenile golden eagle found moribund in Yavapai County.

Two large **poxvirus** nodular lesions, with severe hyperplasia of the epidermis and numerous viral inclusions, were observed in an emaciated mockingbird found in a Scottsdale backyard. One lesion was in the face, closing the eye and interfering with food ingestion; the second one was in a wing, very likely affecting flight.

While cleaning a quail, a hunter noticed numerous white spots in the pectoral muscle. The bird was submitted for necropsy, and numerous *Sarcocystis* spp. were found in the muscle cells microscopically. In addition to the sarcocysts, multiple nematode worms surrounded by fibrous tissue were detected in the pectoral muscle. The worms were morphologically consistent with the spirurid family of nematodes.

A white-faced whistling duck was diagnosed at necropsy with an ovarian carcinoma that had metastasized throughout the coelomic cavity.

A juvenile Harris hawk was found to have a large esophageal mass during necropsy. Microscopic evaluation revealed

large numbers of protozoal parasites consistent with *Trichomonas* spp. This condition is called “frounce” in raptors, and is often caused by consumption of infected prey (typically pigeons) by the bird. In an unrelated case, a pigeon was found to have large numbers of *Trichomonas* organisms in its liver; this is an unusual but not unreported site for trichomoniasis.

Arizona Veterinary Diagnostic Laboratory

Access to the AzVDL: Take Tucson Interstate 10 to the Miracle Mile exit #255. Travel approximately 1/4 mile on the south bound frontage road between Miracle Mile and Grant Rd. Turn west onto the farm at the signed entrance.

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Diagnostic Services offered at AzVDL:

Pathology: gross necropsy, histopathology, cytology, immunohistochemistry or other diagnostic tools used to determine the cause of disease

Microbiology: the use of microbiological techniques to identify bacteria, viruses, parasites, and other infectious agents, and their relationships to animal diseases

Serology: analysis of serum to monitor animals' prior exposure to diseases

Molecular Diagnostics: PCR testing for common diseases of companion animals

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