

Animal Health Monitor

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Articles of Interest:

- ⇒ **AHC's New Lab Testing Package for Cattle Scours**
- ⇒ **Highlights from the Annual BC Zoonoses Symposium**

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Responding to the Risk of Rabies in Pets in BC—Why Euthanasia Should be the Last Choice by Dr. Jane Pritchard

Rabies is a very serious zoonotic disease that should never be taken lightly. In BC, our risks are much lower than other provinces in Canada. My hope is that by sharing what the actual risks for a pet to be positive for rabies in BC with you in this article, that euthanasia will not become a routine response to a pet that may have been exposed to rabies.

In BC, we are very fortunate to not have the raccoon or fox variant of rabies—the types that are most frequently contacted by domestic felines and canines in other parts of the country. Raccoons have invaded most urban and rural areas and interactions between ourselves, our pets and them can be quite common. Knowing that they are not carrying rabies in BC is reassuring. The risk of rabies in humans in BC is almost exclusively from travel-related exposure, and from exposure to BC bats, which can carry the bat variant of rabies. The risk of being exposed through any other animal is extremely low.

Every year we find bats positive for rabies through the provincial testing programs. (10/97 bats tested in 2015, 18/148 tested in 2016 and 11/116 tested up to the end of September in 2017 were positive). Bats tested are generally ones that have displayed unusual activity such as being active during the day, or that have bitten or scratched a human during handling. We also test bats that are found dead, but have been 'played with' by a pet.

The last rabies positive animal that was not a bat was a cat in 2007 and 4 skunks in 2004. These positive cases all had bat variant rabies. The most recent case of a human death from rabies was in 2003 when a 60 year old male died of bat variant rabies.

There are very effective vaccines for both humans and for our pets and livestock to

protect against rabies. For humans, the vaccine can be effective for years without boosting, and for our pets and livestock, many vaccines are effective for three years without boosting. If a pet is vaccinated for rabies, and the vaccinations are current, it is not going to develop or transmit rabies.

If a pet is not vaccinated or the vaccination is not current, there are still very effective and safe processes to prevent the pet from developing rabies. There are also very effective post exposure prophylaxis treatments available for humans exposed to rabies virus, but they must be administered before clinical signs develop.

The very first thought in response to discovering a pet may have been exposed to the rabies virus should be calling your local public health unit <http://www.immunizebc.ca/finder>, the BCCDC Rabies Information website (www.bccdc.ca/rabies), including the BC Rabies Guidance for Veterinarians document, or speak with Dr. Erin Fraser, the BCCDC Public Health Veterinarian, at 778-677-7790.

Bats can be tested for rabies within days, and updating a pet's rabies vaccination within 7 days of a possible exposure is the safest thing to do. Home quarantine is a simple arrangement without excess demands or costs. Euthanizing a pet for possible rabies exposure is an extraordinary step that in almost all cases is completely unnecessary in BC, and should be the last consideration. Pets which have recently bitten a person should not be euthanized without consulting the local public health authority because the euthanasia could jeopardize the human health risk assessment.



AHC's New Lab Testing Package for Cattle Scours

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Diarrhea (scours) is the most significant cause of morbidity and mortality in neonatal calves worldwide¹. It is associated with considerable production losses and is reported to have long-term negative effects on growth, milk output and reproductive function^{2,3}. Calves are particularly susceptible to diarrhea in the first few weeks of life, with the most common causes being enterotoxigenic and enteropathogenic *Escherichia coli* (ETEC and EPEC, respectively), *Salmonella spp.*, *Cryptosporidium parvum*, rotavirus and coronavirus⁴.

Given that the different causes of calf diarrhea can be difficult to impossible to differentiate clinically, laboratory testing of fecal samples is a cornerstone in achieving an etiologic diagnosis. With this in mind, the Animal Health Centre (AHC) introduced a calf diarrhea testing package with the goal of helping veterinarians to increase the efficiency and efficacy with which they manage cases of calf diarrhea for calves ≤ 2 weeks of age. This package includes aerobic culture and PCR-based toxin testing for ETEC, EPEC, *Salmonella spp.* culture, direct smear for detection of *C. parvum*, rotavirus PCR, and coronavirus PCR.

A small scale analysis was conducted on the data collected during the first 8 months (November 2016 to June 2017; n = 39 cases) with the goals of studying the prevalence of common scours-causing pathogens across age groups and operation type (i.e., beef vs. dairy), measuring rates of co-infection (i.e., infection with two or more different pathogens), and identifying overall rates of antibiotic resistance for *E. coli* isolates. The prevalence of each pathogen, as well as the prevalence of co-infection, was compared among age categories and operation types using Fisher's exact test⁵. Pair-wise comparisons were used to detect relationships between specific pathogens involved in cases of co-infection. 4/39 cases had insufficient sample volumes with incomplete testing (*E. coli* toxin typing not performed) and as such were excluded from some analyses.

One or more pathogens were detected in 28/35 (80.0%) cases. *E. coli* was isolated in all of these cases, 14/35 (40.0%) of which were pathogenic (3/14 (21.4%) ETEC and 12/14 (85.7%) EPEC). Rotavirus was identified in 16/39 (41.0%)

cases, followed by *Cryptosporidium* in 13/39 (33.3%) cases and coronavirus in 7/39 (17.9%) cases. No *Salmonella spp.* was isolated. Co-infection was identified in 14/28 (50.0%) cases.

Among the different age groups, rotavirus was most common in calves < 1 week of age, rotavirus and pathogenic *E. coli* were most common in calves at 1 - 2 weeks, and *Cryptosporidium* was most common at > 2 weeks (see figure 1.B). Pathogenic *E. coli* and *Cryptosporidium*, and rotavirus, were most common in beef and dairy calves, respectively (see figure 1.A).

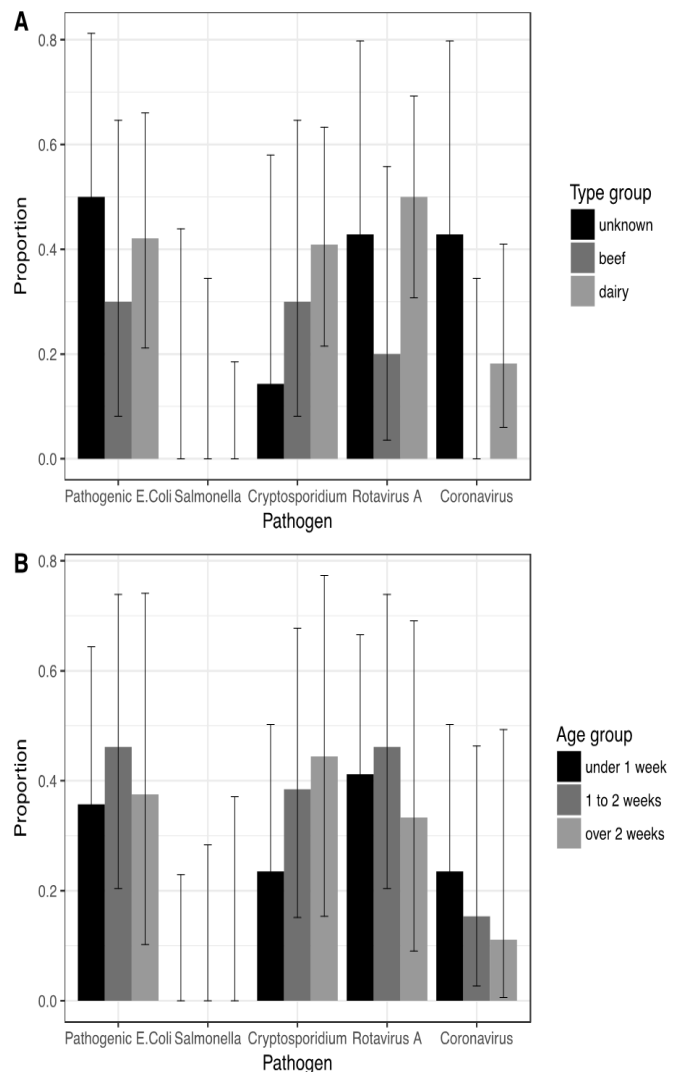


Figure 1. Pathogen prevalence by (A) type group and (B) age group

AHC's New Lab Testing Package for Cattle Scours Cont'd

There was no significant association between pathogen prevalence and age category; however, it is of note that no ETEC was identified in calves > 2 weeks (figure 2). Neither age category nor type of operation was found to be significantly associated with the prevalence of co-infection and there was no significant association found between specific pathogens involved in co-infections.

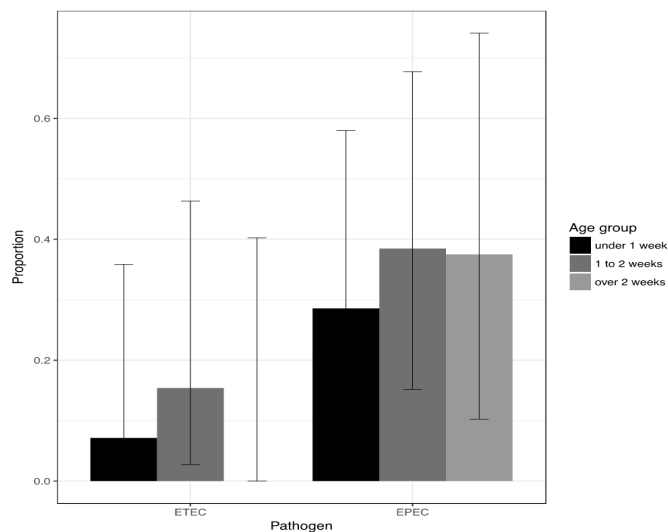


Figure 2. Prevalence of enterotoxigenic and enteropathogenic *E. coli* by age group

Of the generic *E. coli* isolated from the 39 samples, resistance against tetracycline was most common (35/39, 90%), followed by neomycin (32/39, 82%), sulphamethoxazole/trimethoprim (28/39, 72%), florfenicol (27/39, 69%) and ampicillin-sulbactam (27/39, 69%), ceftiofur (13/39, 33%), gentamicin (12/39, 31%), and enrofloxacin (10/39, 26%). Three of 39 cases (7.7%) were resistant to all 8 antibiotics and 3/39 cases (7.7%) were sensitive to all 8 antibiotics.

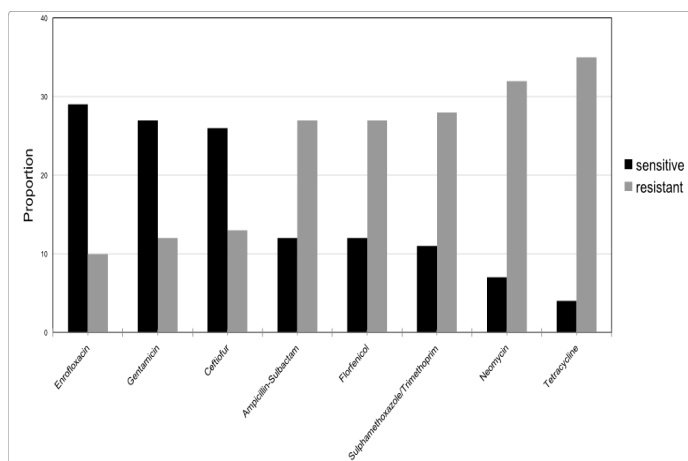


Figure 3. Prevalence of Antibiotic Resistance

The results of this preliminary study highlighted the diagnostic challenges with regard to calf scours, particularly the frequency of co-infection and the lack of clear associations between specific pathogens and either age, operation type, or co-infection, in contrast with what is typically reported in the literature.

These accepted pathogen-age associations may therefore not be as consistent as previously thought. These results also underlines the value of using a comprehensive and consistent screening technique in cases of calfhood scours, and that this package offers a reliable tool for veterinarians seeking to more easily and reliably achieve a diagnosis, and for epidemiologists seeking to track and understand the causes of calf scours.

- 1) Uhde FL, Kaufmann T, Sager H et al. Prevalence of four enteropathogens in the faeces of young diarrhoeic dairy calves in Switzerland. *Vet Rec* 2008;163:362-366.
- 2) De la Fuente R, Garcia A, Ruiz-Santa-Quiteria JA et al. Proportional morbidity rates of enteropathogens among diarrhetic dairy calves in central Spain. *Prev Vet Med* 1998;36:145-152.
- 3) Waltner-Toews D, SW Martin, and AH Meek. The effect of early calfhood health status on survivorship and age at first calving. *Can J Vet Res* 1986;50:314-317.
- 4) Frank NA, Kaneene JB. Management risk factors associated with calf diarrhea in Michigan dairy herds. *J Dairy Sci* 1993;76:1313-1323.
- 5) R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. Available from: <https://www.R-project.org/>.
- 6) Gelberg, HB. Alimentary System and the Peritoneum, Omentum, Mesentery, and Peritoneal Cavity. In: Zachary JF, eds. *Pathologic Basis of Veterinary Disease*. 6th ed. St Louis, Missouri: Elsevier. 2017:324-412.

16th Annual BC Zoonoses Symposium by Dr. Brian Radke

The 16th Annual BC Zoonoses Symposium was held November 15, 2017 in Langley, BC at the Langley Golf Centre in BC's Fraser Valley. This collaborative, interdisciplinary symposium provides an opportunity for professionals from across BC to gather, network and learn about disease issues affecting animals and humans. The symposium is a partnership of the BC Ministry of Agriculture, the BC Centre for Disease Control and the Ministry of Forests, Lands, Natural Resource Operations and Rural Development. The two Ministries and the BCCDC Foundation for Population and Public Health were gracious sponsors of the symposium.

The symposia consist of short presentations on a wide variety of One Health topics. The symposium included information on marine mammal zoonoses, citizen science, leptospirosis in wild rats, West Nile Virus in horses, a One Health approach to street-affected populations and their pets, and a human case of tick paralysis. A case study on norovirus in oysters was well-received as a way to stay awake following the free lunch.

For the third year, the webinar option was offered for those unable to attend in person. The webinar was again well received with between 65 and 80 participants for each presentation. Half of the webinar participants were from BC, along with participants from 5 other provinces and Washington state. One hundred and ten people attended in person, maintaining the symposia's history of strong attendance. The audience included public health inspectors, public health physicians, public health researchers, laboratory staff, students and veterinarians. Most of the veterinarians are engaged in public practice and a goal is to increase attendance by private practitioners and animal health technicians. There typically is no registration fee for the symposia, but registration is required for planning purposes, including webinar attendance. Historically, the symposia have been held in November in the lower mainland. It is expected the webinar option will be offered for the 17th Symposium in 2018. Details of the 17th Annual BC Zoonoses Symposium will be included in a future edition of the Animal Health Monitor. The agenda and webinar broadcasts of the presentations from the 16th Symposium are available at <http://www.bccdc.ca/health-professionals/education-development/zoonotic-symposiums-zoonoses>. (Agendas and presentations from the two previous symposia are also available at that website.)

Contagious Ecthyma in Bighorn Sheep by Dr. Glenna McGregor

In early February 2017 a conservation officer in southeastern British Columbia came across an adult female bighorn sheep (*Ovis canadensis*). She appeared lethargic and ill. Not wanting to disturb her unnecessarily, the conservation officer left, and returned over 4 hours later to find her bedded in the same position – not normal behaviour for a bighorn sheep. As the conservation officer approached, the animal took a few slow steps, but seemed lethargic and dull and he noticed that the lips and nose appeared quite unusual. They were extremely large and crusty (see image below). The conservation officer euthanized the animal and performed a post-mortem examination in the field noting that the animal was emaciated with no indications of trauma. The head was sent to the Animal Health Centre for further investigation of the mouth lesions.



*Bighorn with crusting of the nose and mouth due to infection with *Ovine Parapoxvirus**

Based on the characteristic gross and microscopic lesions, a positive PCR for ovine Parapoxvirus and the visualization of Parapoxvirus particles on electron microscopy, the animal was diagnosed with Contagious Ecthyma, more commonly known as “orf” or “sore mouth”. Contagious Ecthyma is a common disease of domestic sheep and goats caused by ovine Parapoxvirus. It has been reported sporadically in bighorn sheep in BC and Alberta since the 1950s. It typically affects lambs, but can also affect adults, as in this case. It is spread by direct contact or fomites (materials that may carry infectious disease). In bighorn sheep, regular use of salt blocks may lead to increased rates of transmission. Most infected animals will recover in 3-6 weeks, but it can affect food intake. In this case, it seems likely that the severe mouth lesions would have negatively affected feed intake and at least contributed to the poor body condition. However, because a full necropsy wasn't performed in this case, we don't know if this was the sole cause of the emaciation and ill-health of this animal or if other concurrent factors also contributed.

New Additions to Fish Pathology by Dr. Heindrich N. Snyman

I would like to give a big welcome to 3 new staff who joined our growing team of fish pathologists at the Animal Health Centre.

Dr. Doran Kirkbright (Dory) is a boards eligible veterinary pathologist and will be joining us for a one-year auxiliary position as fish pathologist until September 3, 2018.



Dory is from South Hampton, New York, at the end of Long Island. After an internship at Mote Marine Laboratory's Dolphin and Whale Rehabilitation Hospital, she attended Cornell

University's College of Veterinary Medicine and pursued aquatic animal medicine with courses at Woods Hole Marine Institute, and externships at Shedd Aquarium and Olympia Fish Health Center (US Fish & Wildlife Services). Dory completed her Anatomic Pathology residency and Doctor of Veterinary Science (DVSc) at the Ontario Veterinary College in Guelph. Her DVSc research in Dr. John Lumsden's laboratory was focused on epitheliocystis in lake and rainbow trout.

In her time away from the microscope, she enjoys socializing, outdoor activities and fitness, and exploring her new city of Abbotsford.

Dr. Michael Pawlik is a Veterinary Pathologist from Nanaimo. Michael will be joining us for a one year auxiliary



position as fish pathologist until September 3, 2018.

For the last twelve years, Michael has been away from home, pursuing his career.

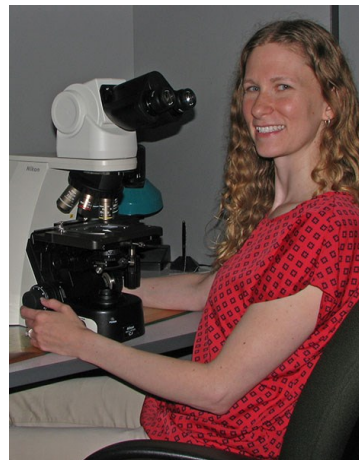
He completed a Bachelor of Science at the University of Calgary where he majored in Zoology. He then spent seven

years at the Western College of Veterinary Medicine where he completed his DVM and a Master in Veterinary Science as an Anatomic Pathologist. One of the requirements of the residency program was to write a research paper. Owing to his love for the Pacific Coast (and in a desperate attempt to escape the prairies), Michael chose to do a study on the health status of Sea Otters in British Columbia under the supervision of, our very own, Dr. Stephen Raverty. After completing his senior residency, Michael spent a year at the Bronx Zoo in New York where he continued his training as a fellow in wildlife with the Wildlife Conservation Society.

Now that he's had his fill of monkeys and okapis, he's excited to be back home and ready to start a new adventure in fish pathology.

Dr. Laura Baseler is a fish pathologist who has joined us as a post-doctoral scholar in fish pathology until June 29, 2018.

Laura is a board certified veterinary anatomic pathologist that



completed a Ph.D. in a dual program between Purdue University and the National Institutes of Health (in Hamilton, Montana). After which she spent two years as an Assistant Professor providing diagnostic and experimental pathology support for laboratory animal researchers at the University of Texas MD Anderson Cancer Center in

Houston, TX. Laura is a native of Iowa. She earned three degrees from Iowa State University (B.S., M.S., and D.V.M.). Laura just got married in May in Minnesota. After her initial 3-month training period in Abbotsford, she will spend two weeks every two months working remotely from her permanent home in Chanhassen, Minnesota. At the Animal Health Center she will be based in the student carrels (home of the multi-headed microscope) through August, and then will move to room 122 for the rest of her time here.

Laura enjoys hiking, hockey, and bicycle riding.

Open House at the Animal Health Centre

By: Blake Bilmer

The Animal Health Centre was proud to host our first open house on November 21, 2017 to welcome over 30 clients and members of the industries we serve. It was a fantastic opportunity for clients and staff to become more familiar with the work that we do at the Animal Health Centre.

Digging through the depths of their offices, many of our pathologists curated an interesting collection of bones and specimens to show guests throughout the evening. Amongst the many species of bones and samples were the skulls of a wild boar and a black bear. Some tables held more obscure items such as the wing of an eagle that had been singed from electrocution.

Our Front Office and Post Mortem Room staff set up a series of interactive presentations to help navigate the resources on our website and how to best package samples for shipment.



The level of enthusiasm at the event was equally as contagious for our staff as it was for our guests. Presentations were a welcomed surprise for guests who were given behind the scenes access to view slide samples in our microscope room. During the tours of our laboratory by pathologists and section heads, guests were walked through the level of complexity involved in the testing we do in each lab - Serology, Virology, Molecular Diagnostics, Bacteriology, Histology and the Post Mortem Room. Displays organized by lab staff drew the interest of many on the tours and prompted a number of interesting questions.

Pathologists organized well structured and informative talks featuring interesting cases on Skunks, Avian Species and Bears which drew the attention of many of the guests interested in participating in the diagnostic thought process.

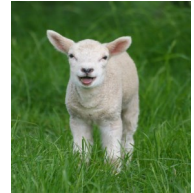
Participants commonly described the event as a fun and informative evening that they would like to see again in the future. Based on the response from both staff and guests, it is safe to say that events like this might make more appearances in the future.



Calendar of Events

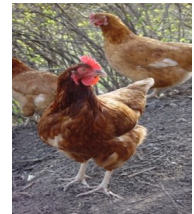
“KEEPING YOUR SHEEP & GOATS HEALTHY WORKSHOPS”

Sessions will focus on basic nutrition, biosecurity, and disease and parasite management related to small flock sheep and goat production. Planned locations include: Vancouver Island and the North Okanagan. For more information contact: Glenna.McGregor@gov.bc.ca or Lori.Vickers@gov.bc.ca



“SMALL FLOCK POULTRY WORKSHOPS”

Sessions will focus on health, disease detection and biosecurity related to small lot poultry production. Planned locations include: Abbotsford (Dec 2/17) and Powell River (Jan 2018). For more information, contact Clayton.Botkin@gov.bc.ca or Victoria.Bowes@gov.bc.ca



Past editions of the Animal Health Monitor can be found on our website:

<http://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/animal-health/animal-health-centre/newsletter>

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