Animal Health Monitor

OCTOBER 2015

BRITISH COLUMBIA | Ministry of Agriculture

Articles of Interest:

- *Rabies in BC*
- *Looking for Avian Influenza...in Pond Scum*
- *PED Surveillance Project in BC*

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The Animal Health Centre....Who are We? by Dr. Jane Pritchard

The Animal Health Centre (AHC) in Abbotsford is the provincial veterinary diagnostic laboratory. It is an under-utilized and underappreciated resource in the province of British Columbia. Some of that may be due to location. I think that some of it is also because we have not marketed ourselves well enough for the veterinarians in the province to know what we offer.

What we offer is a very high level of veterinary service that we can stand behind; a service that the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and ISO 17025 stand behind with our accreditation. We are one of only 2 veterinary laboratories in Canada with both accreditations and one of only three with AAVLD accreditation, the others being the veterinary laboratories associated with veterinary colleges at Ste. Hyacinthe's and Guelph.

Our current staff includes:

* 2 fish pathologists
* 2 avian health pathologists
* 4 mammalian pathologists
* 1 veterinary virologist

We have recently hired graduates of Ontario Veterinary College, Atlantic Veterinary College, as well as the Western College of Veterinary Medicine and the University of Montreal, Ste. Hyacinthe.

Our laboratory scientists are also of the highest quality, something they prove over and over in the results of blind test panels that are required for accreditation. The AHC has world class level expertise in fish, poultry, mammals, marine mammals, and exotics.

We offer full necropsy services, full bacteriology, parasitology, serology, histopathology and molecular diagnostics. We also have a full virology department that includes the ability to do virus culture and also includes an electron microscope on site for visualizing virus particles.

The centre handles approximately 5,000 case submissions per year of many different species. The facility diagnoses, monitors and assists in controlling and preventing animal diseases in BC, including bovine spongiform encephalopathy (BSE), avian influenza (AI), West Nile virus (WNV) and porcine epidemic diarrhea (PED).

If you are not familiar with our services and wish to explore them, I encourage you to phone

and speak with any of our pathologists at 604-556-3003 or toll free at 1-800-661-9903.

The Animal Health Centre will also be completing the review of our fee structure in the coming months, and establishing new fees to reflect the increased delivery costs for our world-class services. The last time our fees were significantly changed was in 1999; yes, that was 16 years ago.

The new fees could allow us to bring in new services. One significant new service could be that we will be able to do a return of remains on pets under 40kg through commercial cremation services.

We are here to serve the needs of the veterinarians in British Columbia as far as the prevention and control of zoonotic and foreign animal disease, the production of safe food from livestock, poultry and fish, and insuring the welfare of all animals in the province.

We offer full necropsy services, full bacteriology, parasitology, serology, histopathology and molecular diagnostics. We also have a full virology department that includes the ability to do virus culture and also includes an electron microscope on site for visualizing virus particles.

PED Surveillance Project in BC by Dr. Nancy de With

Porcine epidemic diarrhea (PED) is a disease of swine that was first identified in the United States in May 2013 and in Canada in January 2014.

PED only affects pigs and has clinical signs that can range from mild "loose" feces to acute watery diarrhea with vomiting and dehydration, leading to death. Many animals in a herd will be affected, often reaching 100%. The mortality is generally low in older animals, but may be high in piglets (40-100%).

The PED virus is most commonly spread through fecal-oral contact with infected swine, but may also be spread by contaminated equipment and trucks, fomites, or personnel. The virus (PEDv) survives well in cold weather, at a time when cleaning of barns, equipment, and trucks can be more difficult. Several provinces have found PED virus on environmental swabs collected at various locations, including livestock transport trucks.

Biosecurity Plan for the BC Swine Industry

The governments of Canada and British Columbia announced in the spring of 2014 that they had invested over $600,000 from *Growing Forward 2*, a federal-provincial-territorial initiative, to increase surveillance and develop preventive measures to reduce the risk of PED arriving in BC, and to develop a response to contain the disease if it is found in the province.

The objectives of the project were to eliminate or reduce the impact of PED disease on the BC pork industry. These objectives were undertaken through the following eight activities:

1) Develop biosecurity and biocontainment plans for processors.

2) Support processors to implement on-site biosecurity improvements.

3) Develop and implement PED surveillance activities at the processors.

4) Develop and implement transport truck driver biosecurity protocols.

5) Develop and implement on-farm PED biosecurity measures with the 21 registered BC pork producers, including biosecurity training, on-farm audits for deviations, on-farm biosecurity improvements and PigTrace training.

6) Develop on-farm PED containment plans with each of the 21 registered BC pork producers.

7) Develop options for immediate implementation of swine transport truck washing.

8) Develop options and recommendations for a permanent livestock/poultry truck washing facility in BC.

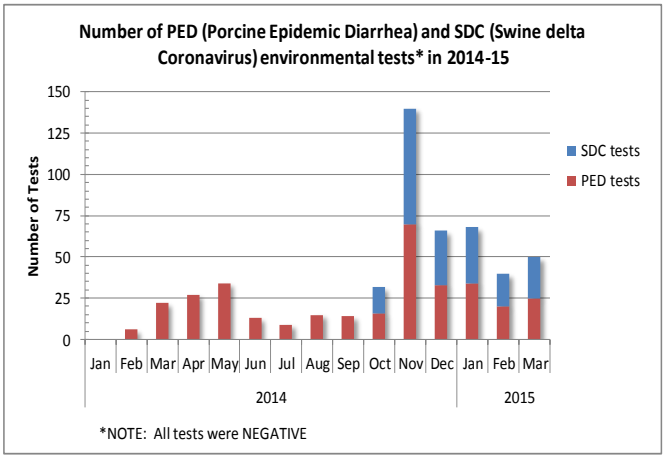
Surveillance at Processors and of Transport Trucks

The Animal Health Centre (AHC) did the testing for PEDv (PED virus) for the surveillance activities at the processors (activity 3). Environmental surveillance was conducted at the two processing sites in the Lower Mainland with swabs collected at the loading docks. Samples were collected at different frequencies depending on the time of year and risk level. Sampling commenced in February 2014 and the project was concluded in March 2015.

In addition, sampling of transport vehicles was done in October and November of 2014. This sampling was intended to be a blitz activity, targeting as many transport vehicles as possible that arrived at both abattoirs. The objective of this blitz was to provide education and awareness directly to the drivers, as well as to obtain samples to test for the virus.

A total of 352 samples were tested at the AHC, with 273 samples tested in 2014 and 79 tests in 2015. All samples tested negative.

In addition, beginning in September 2014, the environmental samples were also tested for swine delta coronavirus (SDC). A total of 203 samples were tested at the AHC, with 124 tests in 2014 and 79 in 2015. All samples tested negative.



The AHC uses a RT-PCR (reverse transcription polymerase chain reaction) test for use on swine that are suspected to have PED. Diagnosis of porcine epidemic diarrhea can be made on feces or intestines from acutely affected pigs. For further information on sample submission, please contact the Animal Health Centre at 604-556-3003.

This disease does not affect people, and is not a food safety concern.

Looking for Avian Influenza....in Pond Scum? By Dr. Michelle Coombe and Dr. Chelsea Himsworth

From December 2014 to January 2015 there was an outbreak of highly-pathogenic Avian Influenza (AI) in the Fraser Valley. This outbreak involved 11 commercial poultry production farms and two non-regulated (backyard) farms. Approximately 240,000 birds died or were culled as a result of the outbreak.

The outbreak strain was identified as a highly-pathogenic avian influenza (HPAI) H5N2 virus, and sequencing revealed that this virus appeared to be the result of re-assortment between a North American AI virus and highly pathogenic Eurasian H5N8 virus. This virus is remarkable due to its ability to cause immediate high mortality in domestic poultry, since it is the first time a Eurasian HPAI H5 lineage virus has caused an outbreak in poultry in North America, and because this particular reassortment has not been observed anywhere before. Although H5N2 is not believed to be zoonotic, other Eurasian strains of avian influenza are responsible for significant human morbidity and mortality, therefore the arrival of a Eurasian H5 virus in North America has potential public health implications.

It is currently suspected that the virus originated in wild waterfowl for the reason that waterfowl are known to be one of the reservoirs for almost all strains of influenza A, and because waterfowl migration is the most plausible mechanism by which a Eurasian AI strain could arrive in North America. Additionally, in the 2014/2015 AI outbreak, there were at least six independent incursions (i.e., infected farms that could not be epidemiologically linked to any other infected farms), which has led epidemiologists to suspect that the AI virus was introduced onto these farms by wild waterfowl.

Thus far, waterfowl surveillance (both in Canada and elsewhere in the world) has been centered on dead birds, with occasional live bird testing. However, these methods have a number of significant limitations stemming from the practical and financial impediments to collecting a representative sample of wild waterfowl. Indeed, it is now thought that these limitations were the primary reason that the 2014/2015 H5N2 virus was not detected before it caused a major outbreak in poultry. This surveillance failure highlighted the need for better tools to predict and prevent AI incursions and outbreaks, and one of the tools could be sampling of wetland sediments (a.k.a. pond scum).

Given that AI is shed in bird feces, sampling wetland sediments where feces accumulate may be a more efficient and effective way of detecting AI in waterfowl populations. Specifically, since each sediment sample contains contributions from a number of different individuals and species, sediment sampling is much more efficient than sampling individual birds. Additionally, since most AI viruses cause no disease in waterfowl, wetland sediments, which contain feces from healthy birds, are more representative of the general waterfowl population compared to dead bird samples (which are heavily biased by species, location, and cause of death). Finally, wetland sediment samples are simple and straightforward to collect and do not require capture or handling of wild birds, which has important animal welfare and wildlife health implications. Indeed, sediment sampling is starting to be used to study AI in a research capacity in the United States. However, this methodology remains poorly developed and has never before been used to respond to an AI outbreak or as part of a systematic AI surveillance program.

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The BC Ministry of Agriculture, the BC Node of the Canadian Wildlife Health Cooperative, and the BC Centre for Disease Control (BCCDC) are currently working together to determine if genomic analysis of wetlands sediments (i.e., looking for virus genetic material in pond scum) could be an effective tool to understand the 2014/2015 HPAI H5N2 outbreak and for future AI surveillance. The first part of the project involved a comprehensive waterfowl ecology study to identify key wetlands within the outbreak area where infected wild birds are likely to congregate. Sediment samples were then collected from these wetlands and sent to the BCCDC in order to extract viral genetic material, which has since been sent to two separate laboratories for full genetic sequencing. Once this analysis is complete, advanced computer software (used by the bioinformaticians at the BCCDC) will be used to piece together millions of genetic sequences to determine the presence and characteristics of the AI viruses in each sample. Our hope is that, in the future, this methodology could be used to screen for AI when migratory waterfowl return to the Fraser Valley each fall. This will provide producers and health officials with information regarding the AI risk for each season so that appropriate preventative strategies can be put into place to avoid virus transmission to poultry or humans.

Financial support for this project is being provided by the BC Ministry of Agriculture, the Canadian Food Inspection Agency, Genome BC/Genome Canada, *Growing Forward 2*, a federal-provincial-territorial initiative, and the Sustainable Poultry Farming Group.

Rabies in BC by Dr. Michelle Coombe and Dr. Chelsea Himsworth

Photo Credit: Juliet Craig

Case History

An adult female Big Brown Bat (*Eptesicus fuscus*) was found dead in the BC Interior by a member of the public. The bat was reported to the Community Bat Program of British Columbia (CBPBC) who, in turn, reported the event to the BC Wildlife Health Program of the Ministry of Forests, Lands and Natural Resource Operations (FLNRO). FLNRO then arranged for the bat to be submitted to the veterinary diagnostic laboratory at the Animal Health Centre, BC Ministry of Agriculture in order to determine the cause of death.

Diagnosis

- On post mortem examination, the bat was in good nutritional condition with no external signs of trauma.
- On microscopic examination of the brain, there was classic rabies virus aggregates called Negri bodies within neurons. Confirmatory testing for rabies using immunohistochemistry (IHC) was positive.

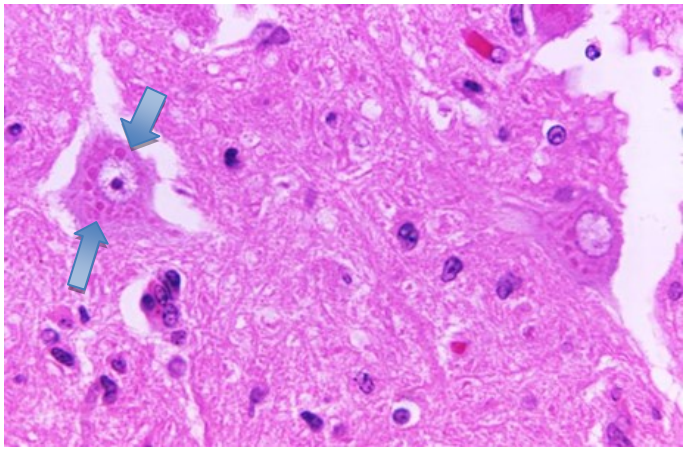

Photo Credit: CDC/Dr. Daniel P. Perl

One of the classic microscopic signs of rabies is the dark pink-staining clumps of viral protein called Negri bodies (arrows) visible inside certain brain cells.

Cause of Death—Rabies

Rabies virus infects the central nervous system (brain and spinal cord) causing neurological disease and death. It can affect any mammal, including humans, and is almost always fatal once symptoms occur. There can be a prolonged time period (weeks to months) between infection and the developing of clinical signs, which can include changes in behaviour such as aggression, listlessness, or stupor. Rabies should always be suspected in wild mammals acting abnormally, but fortunately it is a very rare disease in mammals other than bats in BC.

Bat Rabies in BC

The only wildlife species in BC that naturally carry rabies (called a reservoir) are bats. They carry their own unique strain of the virus. Elsewhere in North America and in other areas of the world, other wild mammals such as skunks, raccoons, foxes and even dogs can carry different strains and are considered reservoirs.

The bat species with the highest prevalence of rabies in Canada is the Big Brown Bat. While most bat species carry their own species-specific variant of rabies viruses, the Big Brown Bat can carry several different variants. The prevalence of rabies in Canadian bats submitted for testing is between 4 and 10%. However, as rabid bats are more likely to be captured/collected compared to non-rabid animals, the actual prevalence in the general bat population is likely much closer to 1% or even lower.

The Canadian Wildlife Health Cooperative BC Node is responsible for rabies surveillance in bats in BC. Samples tested at the Animal Health Centre exclude those with known human or domestic animal contact, which are sent for testing at the Canadian Food Inspection Agency.

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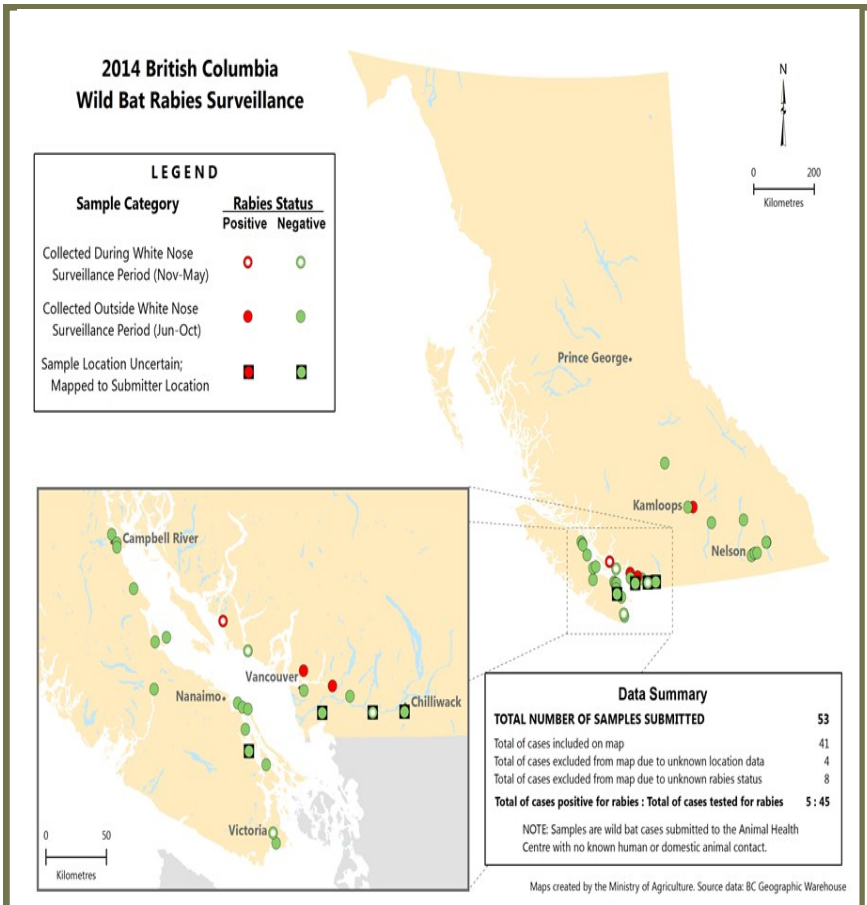
Cont'd: Rabies in BC



This map shows the location of bats submitted for rabies surveillance in 2014. A total of 45 bats were tested by the Animal Health Centre for rabies, of which 5 were positive.

Detecting and Preventing Rabies in BC

Consult your veterinarian to protect your domestic animals from rabies infection. Vaccination of pets is the best way to reduce the risk of rabies in humans and in our furry family members.

Public participation is as essential component of any rabies surveillance program, so we need your help in developing and maintaining an understanding of bat rabies in BC. If you find a dead bat:

* See the BC Wildlife Health website for more information, at www.gov.bc.ca/wildlifehealth

* **Follow the instructions on the webpage** and if needed, contact the BC Wildlife Veterinarian (250-751-3234 or cell at 250 361-7619) or the Wildlife Health Biologist (250-751-3219) for submission instructions.

* If there has been human exposure to a bat – contact your physician and/or local public health office.

* If there has been domestic animal/pet exposure to a bat – contact the BCCDC Public Health Veterinarian (604-707-2400) and your veterinarian.

Photo Credit: BC Ministry of Agriculture

Despite for the potential for rabies, bats play a vital role in our provincial ecosystems. For fascinating information on bats and bat conservation programs in BC, connect with the Community Bat Programs of BC at http://www.bcbats.ca

For more information on Rabies see the BCCDC website at http://www.bccdc.ca/dis-cond/a-z/_r/Rabies/default.htm

References

* BC Centre for Disease Control. 2015. Communicable Disease Control, Chapter I – Management of Specific Diseases Rabies

* BC Centre for Disease Control. 2015. BCCDC Rabies Guidance for Veterinarians

* De Serres et al. 2008. *Clinical Infectious Diseases*. 46(9): 1329-1337

* Klug et al. 2011. *Journal of Wildlife Diseases*. 47(1): 64-77

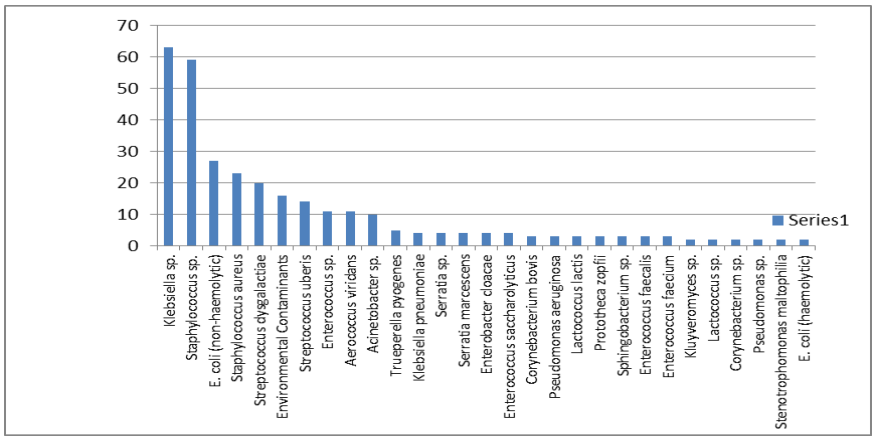
* Nadin-Davis et al. 2012. *The Open Zoology Journal*. 5(Suppl 1-M5): 27-37

* Merck Veterinary Manual, online at http://www.merckvetmanual.com/mvm/nervous_system/rabies/overview_of_rabies.html, Accessed October 2015

* The Centre for Disease Control website at http://www.cdc.gov/rabies/diagnosis/index.html, Accessed July 2015

Milk Culture Results by Dr. Jane Pritchard

January 1-September 30, 2015 – Results of milk cultures sorted by frequency of isolation.



* The following isolates were single occurrences during the period of January 1-September 30, 2015, and not included in the chart above: Arcanobacterium sp., Brevundimonas sp., Candida albicans, Candida sp., Citrobacter freundii, Citrobacter sp., Empedobacter brevis, Helcococcus ovis, Klebsiella oxytoca, Leuconostoc sp., Lysinibacillus sp., Mannheimia varigena, Proteus sp., Raoultella terrigena, Rheinheimera sp., Rothia sp., Serratia liquefaciens, Streptococcus bovis, and Streptococcus sp.

Between January 1 and September 30, 2015, 477 milk samples (133 submissions) were received for culture and sensitivity at the Plant and Animal Health Centre. Out of the 477 samples submitted, no bacteria was isolated in 179 samples.

Resistance by Isolate										
	amp	kf	ob	e	xnl	p10	pyr	sxt	tet	# of isolates tested
Klebsiella sp.	68%	13%	68%	68%	5%	68%	68%	2%	11%	63
Staphylococcus sp.	12%	0%	7%	8%	2%	12%	15%	2%	7%	59
E. coli (non-haemolytic)	59%	52%	78%	74%	4%	78%	78%	4%	26%	27
Staphylococcus aureus	4%	0%	0%	0%	0%	4%	9%	0%	0%	23
Streptococcus dysgalactiae	0%	0%	0%	0%	0%	0%	20%	20%	50%	20

amp – ampicillin	ob – cloxacillin	xnl – excenel	pyr – pirlimycin	sxt – sulfamethoxazole/trimethoprim
kf – cephalothin	e – erythromycin	p10 – penicillin	tet – tetracycline	

AGRI Staff Profiles

Dr. Chelsea Himsworth, Leader, Veterinary Science and Diagnostics

A long time Pony Clubber and three-day eventer, Chelsea Himsworth grew up riding horses in the Fraser Valley before moving to Saskatchewan to attend the Western College of Veterinary Medicine. After graduating in 2007, she went on to pursue a Masters of Veterinary Science and Senior Residency in Anatomic Pathology and Wildlife Health. Chelsea passed the board exam and became a Diplomate of the American College of Veterinary Pathologists in 2010, before moving back to Vancouver to start a PhD in Population and Public Health at the University of British Columbia. Her research was focused on the ecology of rodent associated zoonotic pathogens in urban settings. During her PhD, Chelsea also started working for the Animal Health Centre as a diagnostic pathologist, and continued on in that role after her degree was complete. In July 2015, Chelsea took up a new position within the AHC, Leader of Veterinary Science and Diagnostics. In that role, Chelsea still does diagnostic work, but also works with the Director, Jane Pritchard, to manage the laboratory. Chelsea is also the Director of the BC Node of the Canadian Wildlife Health Cooperative (http://www.cwhc-rcsf.ca/) and a Partner Faculty in the School of Population and Public Health at the University of British Columbia. Chelsea is passionate about contributing to animal health on a local, national and international level, whether that be diagnosing cause of death in animals submitted to the lab, helping to develop and manage national wildlife health surveillance strategies, or teaching fledgling pathologists in Sri Lanka. When she is not in her coveralls, you will probably find her in her gum boots enjoying her Abbotsford farm with her husband and daughter.

One of Chelsea's roles as Vet Leader is to ensure that we at the AHC are giving the best possible service to our clients. So, if you have any questions or concerns (or would just like to chat), please contact Chelsea at Chelsea.Himsworth@gov.bc.ca or call her at 604-556-3150.

Dr. Eric Parent, Poultry Health Pathologist

Eric joined the Ministry of Agriculture as a poultry health pathologist in September 2015.

He grew up in a small rural township 30 minutes south of Quebec City, where he was initiated early in his life to agriculture as his parents owned a swine, broiler chicken, turkey and beef farm.

His interest towards agriculture and medicine led him to join the Faculty of Veterinary Medicine of the University of Montreal in 2008, where he obtained a Doctorate in Veterinary Medicine in 2013. Then, he pursued during 2 years a Master's degree in veterinary medicine at the same school. He focused his research on antibiotic free broiler chickens production in order to reduce the amount of antibiotics used in poultry medicine, and therefore decreasing the risk of bacterial resistance to antibiotics.

He also transferred his knowledge to poultry producers by monitoring antibiotic free chicken flocks as a private veterinarian.

After his Master's degree, Eric decided to move to the beautiful region of the Fraser Valley to provide diagnostic and extension services to poultry producers of British Columbia, by working as a poultry health pathologist at the Animal Health Center in Abbotsford.

He is strongly devoted to poultry health, and his role through his new position at the Ministry of Agriculture greatly satisfies his interests.

While Eric is not working, you can find him discovering his new home by exploring the beautiful Province of British Columbia.

He plans to increase his mountain bike skills by ascending and descending the numerous mountain bike trails in the surrounding area. But when the snow shows up in the mountains, he will trade his pedals for skis, as the Rockies offer dream conditions for a skier originating from Quebec.

Feel free to contact Eric to talk about poultry health. He can be reached by email at Eric.Parent@gov.bc.ca or by phone at 604 556–3037.

AGRI Staff Profiles Cont'd

Dr. Glenna McGregor, Veterinary Pathologist

Dr. Glenna McGregor graduated from the Western College of Veterinary Medicine in Saskatoon, Saskatchewan in 2010.

Following vet school graduation, she spent two adventure-filled years practicing at a very busy mixed-animal practice in rural Ontario, treating everything from a hedgehog with an embarrassing exercise-wheel injury, to bison with copper deficiency, and everything else in between.

She then decided she wanted to try to improve animal health from a little higher upstream – by trying to better understand the origin and development of disease and other determinants of animal health.

In September, 2015 she completed a Masters of Veterinary Science and Senior Residency in anatomic pathology with a specialization in wildlife health, also at the Western College of Veterinary Medicine.

Glenna joined the Animal Health Center as a diagnostic pathologist in October 2015. She is looking forward to working with the clients of the Animal Health Center to improve the health of BC's animals on a local and provincial level.

As a prairie-girl and newcomer to British Columbia, Glenna is excited to explore all of the hiking, skiing and climbing around the beautiful Fraser Valley.

Glenna can be contacted by email at Glenna.McGregor@gov.bc.ca or by phone at 604 556-3124.

BRITISH COLUMBIA Ministry of Agriculture

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http://www.agf.gov.bc.ca/ahc/AHMonitor/index.html

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