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Animal Health Perspectives

Antimicrobial Stewardship
A One Health Perspective

By: Dr. Betty Althouse, Chief Veterinary Officer, Saskatchewan Ministry of Agriculture

With federal regulatory changes regarding increased oversight of the use of medically important antimicrobials in animals now in place, what are next steps to improving antimicrobial stewardship?

The Federal Action Plan on Antimicrobial Resistance and Use in Canada, released in March 2015, outlined goals to strengthen surveillance systems to monitor AMR and AMU, promote responsible antimicrobial use in humans and animals, strengthen the regulatory framework and support more research into antimicrobial resistance and alternative treatments.

The Pan-Canadian Framework on AMR and AMU, released in September 2017, was developed jointly with federal and provincial governments and other key partners in animal health and human health. Four priority pillars were identified: surveillance, both for antimicrobial use and antimicrobial resistance; infection prevention and control; stewardship; and research and innovation. A Pan-Canadian action plan is currently under development to implement the Framework. The action plan will lay out timelines, deliverables and outcomes, and will be completed this year.

The Western Canadian One Health Antimicrobial Stewardship Conference in Regina January 23-24, 2019 explored antimicrobial stewardship through a One Health lens. Over 120 medical health professionals, representing both human and animal health were in attendance.

Plenary session speakers set things up covering issues such as One Health, and how and why antimicrobials are currently being used in agriculture, and human medicine. This moved on to antimicrobial selection strategies in human and veterinary medicine, antimicrobial resistance prevention programs in hospitals, ways to measure, monitor and provide feedback on antimicrobial prescribing practices, and ways that stewardship can be improved, looking at evidence-based stewardship.

Developing practice or hospital protocols for drug selection, based on current research, and laboratory-based resistance patterns was stressed. Ideas on duration of therapy are changing. Shorter duration may be appropriate for some infections. On-going continuing education on antimicrobial resistance is essential, and the Saskatchewan Veterinary Medical Association requires continuing education specific to AMR. Modules on AMR and stewardship have been created by SVMA members as a helpful resource. These provide great ideas and tips that can be practically incorporated into practice.

Infection prevention and control programs are widely implemented in hospitals now due to the rise in antimicrobial resistant infections. What are veterinary clinics doing to promote infection prevention? Biosecurity protocols on farms, cleaning and disinfection procedures and vaccination strategies all come to mind. But, how many vet clinics have developed written infection prevention and control plans? Do clinic staff fully understand cleaning and disinfection procedures, and correct selection and use of disinfectants? Are infectious patients prescreened and put into isolation areas? There are some good resources available for veterinary clinics from the American Animal Hospital Association, and can be accessed at https://www.aaha.org/guidelines/icpb_guidelines/default.aspx

Separate breakout sessions allowed the veterinary attendees to look more closely at some current issues. There was discussion around the effects of the new regulatory realties. There was still some concern and confusion with establishing a veterinary-client-patient relationship (VCPR). The requirements of a VCPR have not changed, and are set by provincial veterinary regulatory bodies. A VCPR is needed to dispense any prescription drug product. With federal changes adding all medically important antimicrobials to the Prescription Drug List, a VCPR is now needed to disperse any medically important antimicrobial. But, the definition of a VCPR has not changed. The information needed to previously dispense (sell) prescription products now applies to all medically important antimicrobials; this will be a big change for some producers and increase record-keeping for veterinarians.

There were good discussions on CVMA prudent use guidelines, updated drug selection charts, in-feed prescribing, dispensing of antimicrobials for incorporation into feeds mixed in on-farm mills, and alternatives to antimicrobials. Other topics that were discussed included: on-farm food safety programs and the requirements for record-keeping, recorded withdrawal times for all drug treatments and herd health programs focusing on disease prevention though better health and nutrition.

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On the human side, viral prescription pads and delayed prescriptions are becoming more widely used. This could be applied to veterinary medicine, for example, pets with diarrhea. There are treatments such as fluid therapy, and dietary restrictions that are helpful. Why not prescribe these, and explain why antibiotics are probably not needed? Choosing Wisely Canada-Antibiotics has great resources: https://choosingwiselycanada.org/campaign/antibiotics/

Antimicrobials used appropriately are essential for animal health and welfare and can enhance public health. However, improper use, poor drug selection and unnecessary use can lead to antimicrobial resistance and jeopardize both human and animal health. Better stewardship in a One Health context will preserve these important drugs for future use for all.

2018 Testing Results for Equine West Nile Virus Infections at PDS

By: Dale Godson (Veterinary Microbiologist) and Melissa Koehnlein (Laboratory Technologist), PDS

With summer approaching one begins to think about barbecues, camping trips, and consequently, mosquitoes. That means it's also time to think about vaccination for West Nile virus (WNV) in horses. Last year we saw a much increased prevalence of WNV infections, with over 80 cases in horses (Fig. 1), reminding us to always be prepared for this disease.

Detection of IgM antibodies to WNV (indicating a recent infection) in a horse with neurologic signs is considered diagnostic for West Nile virus disease. Thus, a serum sample collected soon after the onset of clinical signs is the appropriate sample. Include a nasal swab for EHV-1 PCR testing if herpesvirus myeloencephalopathy is on your differential diagnosis list. Summary statistics for the WNV IgM test are found below, showing that over half of the submissions were positive in all 3 provinces (Table 1). There were two additional cases of equine WNV infection diagnosed at necropsy.

Last year, the first equine WNV case was detected near the end of July (sample collected July 20), which is a bit earlier than usual. Submissions quickly increased over August with the peak frequency of positive samples occurring at the end of the month. On some weeks, nearly all submitted samples were positive. The last case was detected at the beginning of October (collected Oct 3) (Fig 2).

West Nile virus disease is a federally notifiable disease so PDS reports positive results to the Canadian Food Inspection Agency. It is also a provincially notifiable disease (by veterinarian) in Alberta, Saskatchewan, and Manitoba. Consequently, accurate recording of the horse's location on the submission form is an important feature for disease surveillance. Vaccination history is important for test interpretation. The Public Health Agency of Canada maintains a summary of surveillance data for West Nile virus infections on their website (http://www.phac-aspc.gc.ca/wnv-vwn/index-eng.php).

Table 1.
2018 WNV Submissions and Results by Province

PROV	SUBMISSIONS	POS	% POS
AB	79	45	57%
MB	9	6	67%
SK	52	30	58%
Total	140	81	58%

Fig. 1 Equine Testing for West Nile Virus by Year

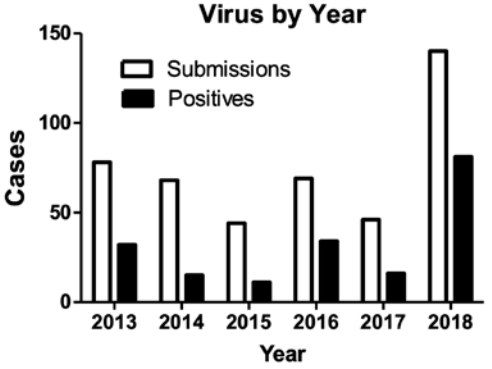
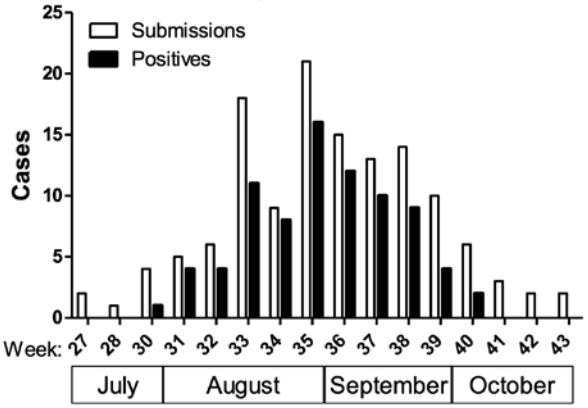


Fig. 2 Equine Testing for West Nile Virus by Month for 2018



"Unconventional viruses" in Bovine Respiratory Diseases (BRD)

By: Yanyun Huang (Veterinary Diagnostic Pathologist, PDS)

In the May 2017 issue of Animal Health Perspectives (http://www.pdsinc.ca/Portals/0/AHP_MAY_2017.pdf), we announced that a project was underway to investigate whether there were "unconventional viruses" that could play a role in BRD. The project was made possible by the support from Saskatchewan Agricultural Development Fund (ADF) and Saskatchewan Cattleman Association's Saskatchewan Beef Industry Development Fund (SBIDF). The objective of this project was to find out whether there are viruses that we do not test and/or vaccinate for (i.e. unconventional viruses) but contribute to the development of BRD.

To find unconventional viruses is difficult. Previously, virus isolation was the main method to achieve this goal. However, to use virus isolation to find out these viruses is difficult. Some significant roadblocks are: What kind of cell lines to use? How to know there are actually viruses growing in the cells? And time… just to name a few. Thus the first step of this project was to develop a method that can overcome the difficulties in detecting unconventional viruses. We have successfully utilized high throughput sequencing (HTS) to achieve this goal. In an overly simplistic way, HTS can tell us all the genetic information in a given sample. Thus, if the input is a piece of cow lung with pneumonia, the output of HTS will be cow DNA, bacterial DNA (if any) and viral DNA/RNA (if any). To our best knowledge, PDS is the first animal health laboratory in western Canada to use this method to study viruses in BRD. HTS was then used to screen respiratory samples from 116 (58 with BRD and 58 without) cattle from 4 different feedlots. Not surprisingly, there were close to 20 unconventional viruses identified in these samples. However, more importantly, the results showed that three unconventional viruses - influenza D virus (IDV), bovine rhinitis A virus (BRAV) and bovine rhinitis B virus (BRBV) – were associated with BRD. Also, bovine coronavirus (BCV) and bovine respiratory syncytial virus (BRSV) were found to be associated with BRD in this data set. These findings have been published in the Journal of Transboundary and Emerging Diseases on March 15th, 2019 (https://doi.org/10.1111/tbed.13172).

The findings in the current project shed some new light on our understanding of BRD, and also can potentially lead to the development of additional tools for the industry to prevent BRD. Currently, several bacteria and viruses were regarded as the main organisms that cause of BRD. However, with robust antimicrobial treatment protocols and vaccination against these major organisms, BRD still remains a significant problem. We recognize there are many potential reasons for the continuing damage done by BRD, and the infection by unconventional viruses is one of them. If such viruses do exist, which, according to our research they do, the current methods for treatment and prevention of BRD will not be very effective in cases when these viruses are involved. The significance of IDV, BRAV and BRBV needs to be further studied and verified at this point. However, if further data confirms their role in BRD in western Canada, and effective vaccines and vaccination protocols developed, it is hopeful that the industry will have addition tools to battle BRD.

You are encouraged to visit our website to learn more about HTS (http://www.pdsinc.ca/Services/AppliedResearch.aspx). If you have questions regarding the findings and implications of our current research, you can contact me by email: yanyun.huang@pds.usask.ca

2019 Test and Services Guide

PDS is preparing to release the latest version of the PDS Test and Services Guide. The 2019 version has all the current updates for old and new tests and January 2019 price changes. The majority of veterinary clinics requested that a "hard copy" of the guide be made available in addition to the digital version available on the Web Client portal. PDS is happy to continue the tradition of an office copy of the PDS Test and Services Guide. Those clinics that have gone "paperless" may not want a hard copy of the PDS Test and Services Guide. You can opt out of receiving a mailed copy by sending the request to Brian Zwaan at the following email address: brian.zwaan@pds.usask.ca or calling 306-966-3256. If you receive a copy and want it returned please mark "RETURN TO SENDER" on the envelope and have Canada Post return.

Thanks for making Prairie Diagnostic Services "Part of your Practice"

Notification from the PDS Clinical Pathology Laboratory

SST tubes no longer accepted for endocrinology, phenobarbital and potassium bromide testing.

SST tubes have not been validated for use in veterinary practice. Maintaining our high standard of quality veterinary laboratory results is our primary goal for this change which has been implemented immediately (since Apr 2019). PDS staff will contact the clinic/clinician notifying that testing will not be done on these samples and asking for resubmission of a serum sample in a 'plain red top vacutainer' following centrifugation.

If you have questions or concerns, please feel free to contact our Director of Client Services and Marketing, Brian Zwaan (e-mail: brian.zwann@pds.usask.ca or telephone: 306-966-3256).

Achievements

Lois Ridgway (Assistant Quality Assurance Officer and Area Supervisor, Necropsy) received the '2018 Merck Mentorship Award 'at the 34th Annual Saskatchewan Association of Veterinary Technologists (SAVT) Banquet and Awards Night held at the Saskatoon Inn on November 3, 2018. The award is sponsored by Merck Animal Health and is selected by representatives from both Merck Animal Health and the Saskatchewan Association of Veterinary Technologists Board of Directors.

The award is given to an Active or Lifetime member who is in good standing with the SAVT for a minimum of 10 years; has made a significant contribution to the Veterinary Technology profession through their outstanding mentorship of colleagues and/or VT students and has facilitated colleagues and/or students efforts in acquiring the skills and resources needed to become successful RVTs.

PDS extends its congratulations to Lois on this well-deserved recognition from her peers.

Farewells

Dr. Rambod Movasseghi

Dr. Rambod Movasseghi (PDS Anatomic Pathologist) resigned from PDS on March 31st, 2019 to pursue a veterinary pathologist position in Laval, Quebec. Dr. Movasseghi joined PDS in 2016. Prior to joining the roster of PDS anatomic pathologists he worked as a veterinary diagnostic pathologist in the Department of Pathology, College of Veterinary Medicine, University of Georgia, Athens (2009) and was as a research fellow in the Department of Pathobiology, Ontario Veterinary College, University of Guelph, Ontario (2005) and in the Department of Ecosystem and Public Health, Faculty of Veterinary Medicine, University of Calgary, Alberta (2015).

We wish Rambod and his family every success and happiness. We also wish to thank Rambod for his exemplary dedication, diagnostic skills and contributions while we were fortunate to have him at PDS these past three years.

Veronica Bencze

Veronica Bencze (Chief Financial Officer, PDS) resigned from PDS on March 22nd, 2019. Veronica and her family have relocated to Oakville, Ontario. Veronika joined PDS in November 2014 and brought a unique skill set and broad and varied background to her role. She is originally from Hungary and has the equivalent of a Bachelor Degree in Business Administration, a Master Degree in Business Administration and a Ph.D. in the same field. After immigrating to Canada she completed her CMA designation (2010).

We wish Veronika and her family success in this next phase of their lives together. A big 'thank you' to Veronika for her contributions to the many projects, initiatives, budgets and policies during her five years with PDS.

READERS' FEEDBACK

The **Animal Health Perspectives** editorial team (Dr. Moira Kerr, Brian Zwaan and Kathryn Tonita) invite readers' comment on material published in the newsletter or questions on material submitted by contributors.

Submit your comments or concerns to Dr. Moira Kerr (email: moira.kerr@pds.usask.ca) and they will be forwarded appropriately.