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Animal Health Perspectives

Meat Inspection in Saskatchewan

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

The recent evaluation of Performance of Veterinary Service in Canada by the World Organisation for Animal Health (OIE) was a reminder of the role veterinarians play in meat inspection and food safety and the OIE guidelines on meat inspection. The OIE expectation is that animals consumed for human consumption receive ante-mortem and post-mortem inspection, and are hygienically dressed to minimize contamination. This inspection is important for zoonotic disease detection, food safety, residue avoidance and to ensure animal welfare (humane transportation, stunning and slaughter).

According to the Food and Agriculture Organization (FAO), the purpose of meat inspection is to ensure that only apparently healthy, physiologically normal animals are slaughtered for human consumption and that abnormal animals are separated and dealt with accordingly and to ensure that meat from animals is free from disease, is wholesome, and is of no risk to human health.

Saskatchewan is one of the few provinces in Canada (along with New Brunswick and Newfoundland) where meat inspection is not required for meat sold to the public. Only meat sold to hospitals must be inspected, by regulation. Some retail stores only sell inspected meat as a company policy. Meat sold to restaurants, or in farmers' markets must be, at a minimum, from a certified source. Certified sources include facilities inspected by public health inspectors, without any inspection of the animals or meat. There is a voluntary domestic meat inspection program offered by the Ministry of Agriculture, under *The Meat Inspection (Saskatchewan) Regulations*. In this program, full ante-mortem and post-mortem inspection occurs, along with humane handling assessments, residue sampling, and disease surveillance. Abattoirs pay a small fee for inspection, which is contracted to the Food Industry Development Centre and carried out by Ministry-appointed meat inspectors. Operators are able to access some additional markets through this inspection. No provincial plants, whether inspected by public health inspectors or through the domestic meat inspection program, can export product out of the province. A federal registration is required for this, with inspection under the Canadian Food Inspection Agency. Federally registered abattoirs may also export meat out of the country, if they meet the certification requirements of the importing country. This is complex and, even provincially, with abattoir inspections occurring under two provincial ministries- Health and Agriculture- and under three different regulations.

The Ministry of Agriculture has been tasked with developing a unified meat inspection system, under the Ministry of Agriculture, and under a single set of regulations within the province. We began the process, last summer, meeting with industry organizations to define what we need in an inspection system. We then began to explore various options for meat inspection. Four options and some variations were presented to stakeholders in a series of five consultation meetings in late February and early March. Over 90 people participated, exploring pros and cons of the options and how tools such as virtual technology or cold-carcass inspection could supplement inspection. Can inspection be based more on risk? Can inspection frequency be decreased with good compliance, well-trained plant employees and excellent record-keeping? Could uninspected meat still be sold, as long as buyers were aware?

Each group was asked to build the "ideal system" that could meet the needs of plant operators and consumers, while still ensuring food safety and animal welfare are maintained.

Further analysis of the feedback is underway and a recommendation on a new system will be provided to the government early this summer. If accepted, it is expected that implementation will take place over the next couple of years.

WHAT'S INSIDE

PDS tackles the two sides of bovine

By: Drs. Yanyun Huang (Veterinary Pathologist, PDS) and Anatoliy Trokhymchuk (Disease Surveillance Veterinarian, PDS)

PDS is pleased to have obtained funding for an in-depth investigation of bovine respiratory disease (BRD). BRD is almost an accepted reality in feedlot cattle, despite the availability of good antimicrobial and vaccine products and the question, of course, is "Why?"

On the one hand, bacterial infection and antibiotic resistance need to be addressed. Currently, using traditional methodologies, veterinarians receive an antimicrobial sensitivity profile

TEST UPDATES:

1. "Calf Diarrhea Panel' now available:

Cost: $145.00; $99.95 [SK supported]

Preferred sample: Feces or intestine from acutely affected and non-treated calves

Calf diarrhea remains one of the most important clinical problems during calving and different infectious agents can all cause clinically similar diarrhea. PDS Inc. is offering a 'calf diarrhea panel' to make the diagnostic investigation of calf diarrhea more convenient for veterinarians. The panel (see below) covers the majority of infectious agents associated with calf diarrhea in Western Canada.

CALF DIARRHEA PANEL

BACTERIA:

- Aerobic culture and sensitivity
- Anaerobic culture
- F5 agglutination test in E. coli isolatesfrom calves < 1 week old

VIRUSES: Duplex PCR for

- bovine rotavirus
- bovine coronavirus

PARASITES:

- Routine floatation
- FAT for Cryptosporidium and Giardia

2. Prebreeding vaginal smears (canine only):

Air-dried, unstained vaginal smears should be sent directly to the attention of 'Dr. Claire Card' (Diplomate, American College of Theriogenologists) c/o the 'Large Animal Clinic, WCVM, University of Saskatchewan, 52 Campus Drive, Saskatoon, Saskatchewan, S7N 5B4'.

Dr. Card will review the slide(s) and provide a final report. The Veterinary Medical Centre, not PDS, will be invoicing this test.

3. Cytology samples from dermatology cases (eg. unstainedskin scrapings with oil, acetate tape impressions):

Stained or unstained acetate tape preparations and unstained slides covered in oil are not processed by the PDS Clinical Pathology Laboratory or reviewed by the Clinical Pathologists. The Clinical Pathologists do not have the degree of clinical expertise or training as would a Veterinary Dermatologist.

Please indicate on the submission form what you are clinically concerned about (i.e. parasites, bacteria, acantholytic keratinocytes, presence of inflammation, etc). If your concern is external parasites (mites) then the slide(s) will be sent to the Parasitology Laboratory for identification. If you are concerned about bacteria or yeast then the slide(s) will be sent to the Bacteriology Laboratory.

respiratory diseases (BRD)

a minimum of 4 days after the sample(s) arrive at the veterinary diagnostic laboratory. This may be an unacceptably long wait and result in the initiation of treatments that are not evidence-based but chosen based on experience alone. Supported by Growing Forward (GF) 2 from the Saskatchewan Ministry of Agriculture, PDS is looking into the development of sequence-based technology for quick identification of antimicrobial resistance. We intend to build the capacity for whole genome sequencing which has been shown to be a powerful tool for both research in and the diagnosis of antimicrobial resistance. The goal is to enable the development of an alternative, quicker, state-of-the-art method to guide veterinarians in their selection of the most appropriate antimicrobial therapy.

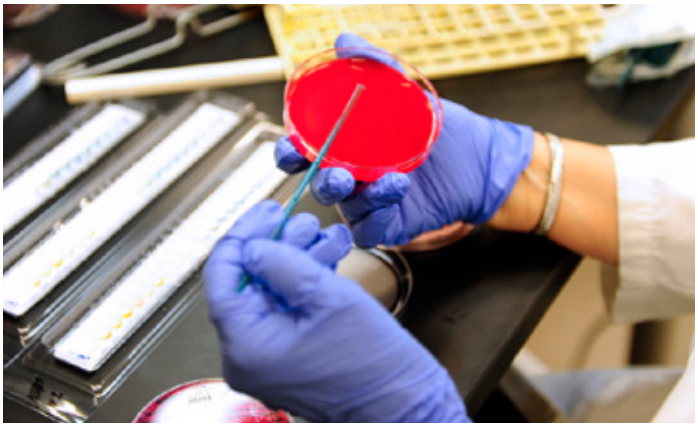
On the other hand, we need to consider two other questions. The default treatment for BRD is antimicrobial products, but how do we know we are dealing with a primary bacterial infection (i.e. are there viruses that may be initiating the clinical problem)? Although we vaccinate our cattle, are the viruses that are present in the vaccines all that can cause BRD? Supported by the Saskatchewan Agricultural Development Fund (ADF) and Saskatchewan Cattleman Association's Saskatchewan Beef Industry Development Fund (SBIDF), PDS is also conducting multi-institutional research to find out whether there are unconventional viruses that are potentially associated with the development of BRD. In this study, metagenomics sequence is again utilized to take a closer look at the bovine respiratory virome. This technique has helped the discoveries of many clinically significant viruses, for example, Schmallenberg virus (SBV) causing bovine reproductive losses, and atypical porcine pestivirus (APPV) associated with porcine congenital tremor, just to name a few. When virus(es) are discovered, more specific PCR assays can be developed as a quick diagnostic method for these viruses. What's more, these viruses, if they have a strong association with BRD, can be included in future vaccine studies which can lead to new tools to combat BRD.

By working on the two sides of BRD, PDS believes the outcomes of these projects will generate significant knowledge for the beef industry, leading to better control of BRD and a higher quality Canadian beef product.

Discordant laboratory and in-house urine sediment analysis and quantitative bacterial culture results

By: Musangu Ngeleka (Microbiologist, PDS) and Moira Kerr (Veterinary Pathologist, PDS)

In the majority of veterinary clinics, the diagnosis of a bacterial urinary tract infection (UTI) in dogs and cats is based upon clinical signs, physical examination findings, evaluation of the urine and bacterial culture. Of course, the identification of bacteria in urine is not always synonymous with a UTI. Bacteria may represent contamination of a urine sample particularly if the sample is collected by voiding or urethral catheterization. Urine may also be contaminated after collection. High bacterial numbers in a properly collected and cultured urine sample indicates a bacterial UTI. **Quantitative bacterial aerobic urine culture is considered the 'gold standard' when diagnosing bacteriuria.** Bacteria that cause UTI mainly include *Staphylococcus* spp., *Streptococcus* spp., *Enterococcus* spp., *Escherichia coli*, *Enterobacter* spp., *Klebsiella* spp., *Proteus* spp. and *Pseudomonas* pp. These organisms grow quite readily in an aerobic environment. (Note:



On rare occasions, anaerobes such as *Clostridium perfringens* have been isolated from UTI cases at the PDS Bacteriology Laboratory.) The examination of refractile, unstained wet-mount preparations in the traditional urinalysis method is not optimal for the detection of bacteria. False positives (other structures misidentified as bacteria) and false negatives (failure to detect bacteria) are considered common, leading to unnecessary antimicrobial treatment or unattended infection, respectively. Refractile, unstained urine sediment examination has been reported to have a sensitivity of 82% when identifying bacteriuria in dogs. Urine sediment examination and quantitative bacterial culture frequently yield discordant results.

In the PDS Bacteriology laboratory there have been instances of discordance between urine sediment examination from the submitting veterinary clinic for

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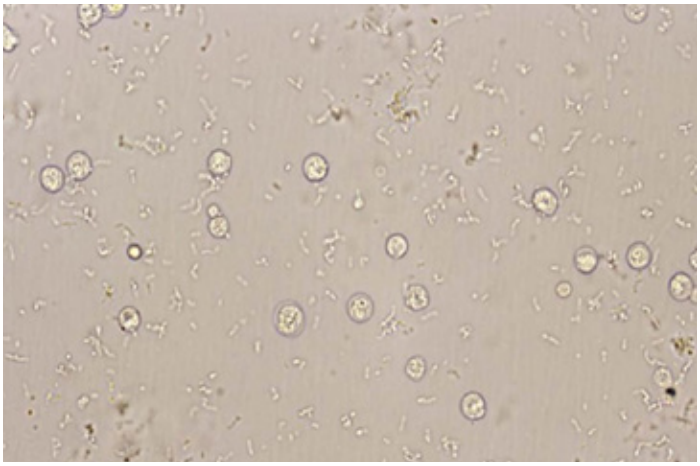
the presence of bacteria and negative bacterial culture. We reviewed the urinalysis results and interpretation provided by the PDS Clinical Pathology Laboratory and those from in-house urinalyses in which bacterial culture was requested. Over a six month period a total of 355 canine and feline urine samples were evaluated. In the majority of the cases (274/355 cases; 77.2 %), the urinalysis was performed at the PDS Clinical Pathology Laboratory while the remaining urinalyses (81/355; 22.8%) were performed by the submitting veterinary clinic.

Of the 274 cases where the urinalysis was performed by the PDS Clinical Pathology there was 96.7% (265/274 cases) concordance between the urinalysis interpretation and the bacterial culture results. A quiet or inactive sediment resulted in a negative culture and an inflammatory or active sediment resulted in a positive culture. Among the 9/274 (3.3%) cases in disagreement, results of clinical analysis from 7 cases were inconclusive with a recommendation to follow up with bacterial culture



due to potential occult UTI. For the remaining 2 cases, bacteria were seen on a concentrated cytocentrifuge preparation of the urine sediment but bacterial cultures were negative. In 1 of these cases, the patient was being treated with cephalexin. Follow- up aerobic and anaerobic cultures of these 2 cases were still negative. Therefore, it is possible that the organisms seen in these cases were probably non-viable (includes bacteria for which the growth was inhibited by antimicrobial therapy), fastidious or possibly, anaerobes.

Of the 81 cases where the urinalysis was performed by the submitting veterinary clinics, there was 44.4% (36/81) agreement between the urinalysis interpretation and bacterial culture results. In the discordant cases (45/81; 55.6%), bacteria were observed in 40 cases, but failed to yield positive bacterial cultures. For the remaining 5 cases, an inactive/quiet sediment was reported but bacterial cultures were positive, suggesting an occult UTI. In 55% (22/40) of the cases in which bacteria were observed the type of bacteria was described as being 'coccoid-like'. Gram-negative bacteria were reported in only 1 of the 40 cases; there was no mention of type of bacteria seen in the remaining 17 cases.

Based on the observations above, caution must be exercised given the low diagnostic accuracy of the routine examination of refractile, unstained wet mounts of the urine sediment for the detection of bacteriuria. Small particles ('pseudobacteria') can resemble bacteria in size, shape and Brownian movement. These particles may be small lipid molecules, cytoplasmic organelles, amorphous crystals or debris and may also obscure the detection of bacteria (false-negative). Individual bias, experience and the quality of training are likely factors in both the veterinary diagnostic laboratory and veterinary practice settings. Concern about potentially missing a UTI may result in the subconscious tendency to call equivocal structures bacteria. The application of a commercially available stain for wet-mount preparations of urinary sediment (Sedi-Stain®) stains only dead bacteria, the live (pathogenic) bacteria remain unstained and difficult to recognize. Air-dried urinary sediment stained with Wright-Giemsa or Gram stains have been reported to be superior to examination of refractile, unstained wet mounts of the urine sediment.

Staff Update:

We are pleased to announce that Dr. Erin Zachar has accepted a full-time position with PDS, beginning in September 2017. Erin worked in mixed and small animal practice for about 6 years before returning to the WCVM Department of Veterinary Pathology where she obtained her MVSc degree (Anatomic Pathology) and completed a senior residency in anatomic pathology. Dr. Zachar's clinical experience, diagnostic expertise and her approachable nature will be a great addition to PDS, and to the animal health profession in western Canada. She can be reached by email (erin.zachar@usask.ca) or by telephone 1-306-966-7316. Please join us in congratulating Erin on her new position with PDS.

READERS' FEEDBACK

The **Animal Health Perspectives** editorial team (Dr. Moira Kerr, Brian Zwaan and Kathryn Tonita) invite readers' comments 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.