Animal Health Monitor

OCTOBER 2013

BRITISH COLUMBIA | Ministry of Agriculture

Articles of Interest:

- **Dr. Tomy Joseph is New Veterinary Virologist**
- **AMU in Commercial Poultry Industry**

Inside this issue:

Veterinary Antibiotic Prescription Use Only Policy by Dr. Brian Radke

In the AMU/AMR world, there's lots of interest in Veterinary Prescription Use Only Policies to restrict access for livestock producers to antimicrobial drugs. One prescription use only policy is inclusive of all antibiotics. Another includes only antibiotics of very high, high or medium importance to human medicine (that is, antibiotics of low importance to human medicine [category IV] are excluded from the policy and don't require a prescription). A third prescription use only policy applies to all antibiotics except those in medicated feed (that is, products in the Compendium of Medicating Ingredients Brochure are excluded from the policy and don't require a prescription). These differences are not trivial – in BC, the category IV products (ionophores and bambermycin) account for approximately half of OTC antibiotic sales (measured by mass of antibiotic active ingredient) by non-veterinarians. And in BC, approximately 95% of these OTC antibiotics are in feed.

Such significant differences in the policies are troubling and the reasons for the discrepancies are unclear. Perhaps the differences are due to differing policy rationales or expected policy outcomes. Typically the policy proponents vaguely refer to antimicrobial usage and resistance in their rationale for the policy and don't include expected policy outcomes so it's not possible to determine if these contribute to the discrepancies.

Prescription use only for veterinary antibiotics is intuitively appealing, yet important policies should be based on science, if not evidence. Surprisingly, a cursory internet search failed to produce any evidence of the policy's impact. This lack of evidence is surprising given the policy has been in effect in various countries and Quebec for over a decade. The lack of published evidence, in the face of available data, raises the possibility of publication bias. For example, the Canadian Integrated Program for Antibiotic Resistance Surveillance (CIPARS) includes provincial comparisons of antimicrobial resistance. Casual review of these results does not indicate lower resistance levels in Quebec.

One need only reflect on human medicine to temper expectations for a prescription only policy to result in judicious antibiotic use. Injudicious antibiotic use in humans is a well recognized contributor to antibiotic resistance in human pathogens, and of course that system is prescription use only. It is unfortunate that the relationship between human health and animal health on the topic of antimicrobial usage and resistance has not been more collaborative for human medicine has much greater experience with various judicious use policies and their effectiveness.

The attractiveness of a veterinary prescription use only policy centers on the concern that producers have unfettered access to non-prescription antibiotics without veterinary supervision. And the policy corrects this by requiring veterinary supervision via a veterinarian-client-patient relationship (VCPR). The resulting number of new VCPRs and their impact on judicious use are both unclear.

.....Continued on page 2

What is clear is that, to the extent that a prescription use only policy results in more VCPRs, it can only *increase* the use of prescription products. That is, via a VCPR producers will have access to prescription products which they did not previously have legal access to. Veterinary prescription antibiotics are of the greatest importance to human medicine (category I and II products). This potentially increased use of the antibiotics such as cephalosporins and fluoroquinolones which are of greatest importance to human medicine is a non-intuitive outcome of a veterinary prescription use only policy. Consideration of any policy also needs to consider negative policy consequences. For a prescription use only policy, these include the accessibility and price of antibiotics which can impact animal welfare.

Regulatory change tends to be incremental and slow. For example, despite over a decade of calls for Health Canada to close the so called "own use" loophole which permits the importation and use of antibiotics not evaluated by Health Canada it remains open. (However, Health Canada appears to have renewed interest in addressing the loophole.) So a policy selection is likely long term and comes at the cost of the other policies which were not chosen. Other judicious use policy alternatives for veterinary antibiotics include: education of veterinarians, producers and clients; restricting certain uses (for example, growth promotion, disease prevention, extra label drug use, etc.); restricting certain antibiotics; and monitoring usage. It is possible a Canadian veterinary prescription use only policy will result in more judicious use of antibiotics and outweigh the negative consequences. However to assess this, clear rationale, evidence and expected outcomes of this policy and the alternatives are required and these are currently lacking. I don't find the rationale "it sounds like a good idea" and "everybody else is doing it" compelling when offered by my children, much less as the basis of public judicious veterinary antibiotic use policy.

Neonicotinoids and Pollinator Declines by Paul van Westendorp

Population declines of honey bees and wild pollinators, have been widely reported in different regions of the world over the last few years. The precise causes have not been identified but it is believed to be a combination of factors including habitat alteration and destruction, monocultural farm practices, bee pathogens and the widespread use of farm chemicals.

Since 2000, heavy honey bee colony losses in Europe and North America have been reported in many areas where corn, potatoes and soybean have been planted. These crops are only incidentally visited by insect pollinators and are not important food sources for them. Due to the strong link between elevated colony losses and the proximity to these crop plantings, it has been suspected that the widespread and persistent use of neonicotinoid insecticides may have a far greater impact on the pollinator fauna than previously thought. The neonicotinoids are a group of insecticides that mimic the action of nicotine, a potent nerve toxin that affects the central nervous system of invertebrates. The relative low mammalian toxicity has made neonicotinoids the most widely used insecticides in the world since their introduction in the late 1980s.

Acute toxicity of neonicotinoids to insects is undisputed but there are strong indications that a contributing cause of pollinator population declines is the result of chronic exposure to these chemicals at sub-lethal levels. Chronic exposure at sub-lethal levels is due to residue persistence in the environment, application frequency of neonicotinoids and their systemic action in the crop plant.

Many crops today are grown from neonicotinoid-treated seed. Treated seed is now so common that it has become standard management practice for many crops. This method of indiscriminate, standardized use of neonicotinoids has been justified as an effective prophylactic method against plant-feeding pests, regardless of need. While this may be a cheap and effective "insurance policy" for growers and profitable for corporate shareholders, this trend is contrary to IPM principles developed over many decades that advocate chemical application only when needed. It is disconcerting that the incessant, indiscriminate use of neonicotinoids has not caused regulators and end-users to question the true impact these chemicals may have on non-target organisms in the local environment.

European countries including Germany and France have become sufficiently concerned that some neonicotinoid formulations have been banned altogether while other member states placed temporary restrictions on their use. Most recently, the EU imposed the "precautionary principle" where all new formulations would not be registered until manufacturers could prove that these products will not harm the pollinator fauna.

Given the serious implications of pollinator declines, further research is urgently needed to settle the debate about the environmental impact of neonicotinoids.

Antimicrobial Use in the Commercial Poultry Industry by Dr. Bill Cox

Improved management methods and technologies have led to healthier commercial poultry flocks.

These improvements have already led to significant reductions in the need for antimicrobials.

In recent months, there has been much press coverage over statements from various groups about the use of antimicrobials in livestock in general, and poultry in particular. The topic of Antimicrobial Use (AMU) and consequent Antimicrobial Resistance (AMR) has been debated for some time and more continues to be learned with each passing year. On a national level, the poultry industry has been discussing the issue and formulating strategies for several years. The BC poultry industry, in collaboration with staff from the BC Ministry of Agriculture, has now taken steps to learn more about their own AMU.

In February 2012, the poultry industry held a workshop with participants from all groups coming together to learn about the complexities of AMR and AMU and to develop means by which some of the questions can be answered. Speakers representing Public Health and retailers were invited to present their various points of view. The outcome of the workshop discussions identified the principal objectives to be more precise knowledge about the quantity and purpose of AMU in poultry, greater education of producers about AMU, and more research into AMR and AM alternatives in poultry production.

The use of AM's in poultry production has evolved over the years. Many older drugs with labels for growth promotion are no longer used while newer drugs with more specific disease prevention claims now take up the bulk of the use. Nevertheless, in-feed use is still equated with growth promotion in the eyes of some observers. Some of the AM's currently used represent little or no risk of promoting harmful resistance patterns while others may carry more risk. There is, however, currently no way for the poultry industry to assess AMU in poultry or to estimate the proportion of products used that carry greater risk over those that carry little risk.

In addition to those drugs given in-feed to prevent coccidiosis and necrotic enteritis, there are water soluble products available that are used to treat bacterial diseases that may, on occasion, appear in a flock. Again, there is no mechanism available that allows the industry to quantify such use.

Because of these gaps, the poultry industry has embarked on a project to develop a tool that will allow for the accurate estimation of the quantity of drug use, the types of drugs used, and the purposes for which they are used. With such information in hand, some of the questions about how much, where, and why AMU occurs can be answered. Additionally, each participating producer will be able to assess his or her own use relative to that of the industry as a whole. This type of feedback will be very useful in helping producers more appropriately use those few drugs that are available.

The current system of drug distribution is under review by Health Canada and changes will be happening nationally in the next few years. In the meantime, drug distribution still allows for certain products to be available for livestock owners without veterinary prescription. While the list of drugs labelled for use in poultry is quite short, it is very important that producers know how to use them. Consequently, educational programs and educational materials focused on AMU for poultry owners are now being done.

Improved management methods and technologies have led to healthier commercial poultry flocks than ever before. These improvements have already led to significant reductions in the need for antimicrobials. With greater knowledge of antimicrobials and their use, we can be confident that any use will be responsible.

Porcine Enteritis Sample Collection Guidelines by Dr. Jane Pritchard

Porcine Enteritis Sample Collection Guidelines

The best specimens are collected from acutely-ill (<24 hours) live untreated pig(s).

Feces	>10 ml of feces
Colon and cecum	Entire organ, fresh/chilled Several 1 cm pieces, formalin-fixed
Ileum	10-15 cm segments, fresh/chilled Three 1 cm pieces, formalin-fixed
Jejunum	10-15 cm segments, fresh/chilled Three 1 cm pieces, formalin-fixed
Other Lesions as warranted	Fresh/chilled tissues Several 1 cm pieces, formalin-fixed

Samples collected from a field necropsy are better than a whole dead pig submitted to the lab.

Sampling Techniques

1. Samples must be taken as soon after death as possible (within minutes).
2. Intestines do not need to be tied off at the ends.
3. Flush intestinal segments for histopathologic examination with formalin and drop in fixative or gently open ends of ½ in. segments with a scissors or forceps to expose mucosa as immersed.
4. Pool all formalin-fixed tissues from each pig in one bag; individual pigs can be pooled or kept separate as desired.
5. Package fresh intestines separately from other tissues and each pig in a separate bag. Chill fresh tissues before mailing. Do NOT freeze.
6. Do not send whole, dead pigs (intestines autolyze quickly).

Agents Detected by Routine Examination

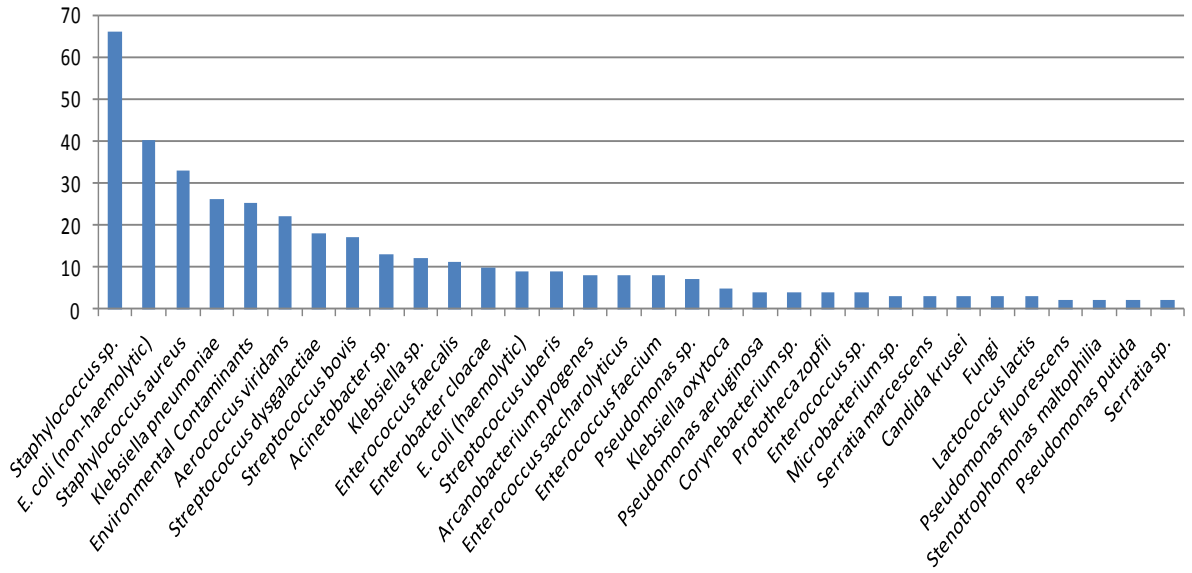
Viruses	PED virus, TGE virus, Rotavirus
Bacteria	Brachyspira spp., Clostridium spp., E. coli, Enterococcus durans, Lawsonia intracellularis, Salmonella spp. Brachyspira spp.
Parasites	Coccidia, Cryptosporidia, Nematodes

Comments

- Feces from acutely affected pigs are useful for PCR detection of PED virus, TGE virus, Lawsonia intracellularis and fecal flotation for parasites.
- Fecal samples (10-20 ml) should be taken on the first day of diarrhea. Brachyspira hyodysenteriae can occasionally be isolated from feces (swabs are less reliable). Salmonella spp. can be difficult to recover from feces and/or rectal swabs.

Milk Culture Results by Dr. Jane Pritchard

January 1—September 30, 2013—Results of milk cultures sorted by frequency of isolation to a minimum of two times.



* The following isolates were single occurrences during the period of January 1-September 30, 2013, and not included in the chart above: Actinomyces sp., Aeromonas hydrophila, Brevibacterium sp., Candida sp., Chryseomonas sp., Citrobacter sp., Corynebacterium bovis, Enterobacter amnigenus, Enterobacter sp., Kocuria sp., Lactococcus sp., Proteus sp., Streptococcus agalactiae, and Streptococcus sp.

Between January 1 and September 30, 2013, 589 milk samples (131 submissions) were received for culture and sensitivity at the Plant and Animal Health Centre. Out of the 589 samples submitted, no bacteria was isolated in 258 samples.

Resistance by Isolate										
	amp	kf	ob	e	xnl	p10	pyr	sxt	tet	# of isolates tested
Staphylococcus sp.	12%	0%	14%	3%	3%	14%	17%	5%	6%	66
E. coli (non-haemolytic)	60%	45%	60%	60%	8%	60%	63%	5%	15%	40
Staphylococcus aureus	12%	0%	3%	3%	0%	9%	9%	0%	0%	33
Klebsiella pneumoniae	69%	27%	69%	69%	12%	69%	69%	4%	12%	26
Aerococcus viridans	14%	0%	55%	9%	0%	5%	9%	32%	50%	22

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

Leptospirosis in Two Holstein Dairy Calves by Dr. Ann Britton

In late March and early April of 2013, two 6 month old Holstein heifer calves were observed to be slightly depressed and were subsequently found dead the following day. On post mortem examination, the calves were jaundiced (yellow tinged body tissues) with dark red (port wine) coloured urine indicative of intravascular hemolysis (breakdown of red blood cells in the circulation). The calves also had sunken eyes indicative of dehydration and pale mucous membranes and thin watery blood indicative of anemia.

Histopathology examination of tissues from both calves revealed acute death (necrosis) of liver cells in a periacinar pattern, which is typical of severe anemia. The first calf had mild kidney tubular cell necrosis with hemoglobin from broken down red blood cells in the tubules. The second had interstitial nephritis (inflammation of the kidneys) which is a change seen with infection by the spirochaete bacterium *Leptospira*.

Intravascular hemolysis is an unusual event in cattle which can occur with water intoxication, babesiosis, bacillary hemoglobinuria, Heinz body anemia due to ingestion of rye grass, onions or *Brassica* spp, copper toxicity and hypophosphatemia in post parturient cows. In calves, leptospirosis can also cause intravascular hemolysis. Polymerase chain reaction test of kidney from both calves revealed the presence of *Leptospira* indicating that the hemolysis was most likely due to leptospirosis.

Leptospirosis is a bacterial disease which affects both animals and people (zoonotic disease). It is contracted by exposure to water, feed or pasture contaminated by the urine of reservoir animals or infected animals and placenta or uterine discharges from cows which have aborted due to *Leptospira* infection. The organism can survive for months in moist environments but is highly susceptible to drying. Infection usually occurs across mucosal surfaces (such as the gastrointestinal tract) or softened skin.

Serovars of *Leptospira* reported to cause disease in cattle include *hardjo, pomona, grippotyphosa* and *icterohemorrhagiae*. Of these, *hardjo* is host-adapted to cattle and thus cattle serve as the reservoir. Seroprevalence studies report that 34-65% of cattle are positive at slaughter. *Leptospira* serovar *hardjo* is most commonly associated with chronic disease and abortion in cattle and rarely affects calves. *Leptospira* serovar *pomona* is reported to be the most common cause of non host-adapted leptospirosis in Canada.

Pigs, skunks, raccoons and opossums are host-adapted to *Leptospira* serovar *pomona* and thus may serve as a reservoir of infection. Other animals serving as reservoirs for *Leptospira* include raccoon, opossum, squirrel (*grippotyphosa*) and rat (*icterohemorrhagiae*).

Following infection, cattle will develop a strong antibody response, may or may not develop clinical disease and will shed in the urine for a limited time period. Clinically affected animals may present with acute hemolysis, anemia and kidney disease, especially calves.

Treatment with antibiotics is effective and vaccination can be preventative for leptospirosis in cattle. As *Leptospira* is a zoonotic organism, farmers and others working with cattle are advised to employ personal biosecurity to prevent exposure to the organism especially in urine, aborted tissues and uterine discharges.

Starvation and Renal Tubular Proteinosis in a Live Stranded Emaciated Humpback Whale (*Megaptera novaeangliae*)

T.D. Redford[1], P. Cottrell[2], L Akhurst[3], Haulena[3], M, and S Raverty[4]

[1]Western College of Veterinary Medicine, Saskatoon, SK, [2]Department of Fisheries and Oceans, Vancouver, BC, [3]Vancouver Aquarium, Vancouver, BC, [4]Animal Health Center, Abbotsford, BC

The Humpback Whale (Megaptera novaeangliae) ranges in size from 14-17 m, and is distributed throughout every ocean. They are identified by their long flippers, multiple nodular tubercles on their head and serration on the caudal border of their tail. Since the institution of stricter controls of herring roe harvest along the west coast of British Columbia, increased numbers of humpback whales have returned to the west coast of Vancouver Island and central regions of British Columbia. On June 12, 2012, post-mortem examination was performed on an emaciated subadult humpback whale that live stranded in Semiahmoo Bay, BC. Efforts to release the animal were unsuccessful and the whale died within 12 hours. ..Continued on Page 7

Cont'd Article- Starvation and Renal Tubular Proteinosis in a Live Stranded Emaciated Humpback Whale

On initial presentation, the whale was entangled in numerous ropes and fishing line. There was emaciation and the trunk, axillae and flukes showed multiple transverse to circumferential discontinuous fissures with varying degrees of ulceration from the ropes. The skin throughout the torso featured scattered elliptical ulcers associated with exudate and parasitic copepods. The urinary bladder could not be assessed and there was no urine in the ureters.

Histopathology revealed marked myocellular degeneration and interstitial nephritis with medullary tubuloproteinosis. The protein in the tubules could not be differentiated as hemoglobin, myoglobin, or another proteinaceous material, but the profound muscle atrophy suggested that the tubular protein is most likely myoglobin.

Myoglobinuric nephrosis is a syndrome that occurs during acute episodes of rhabdomyolysis, which, in wildlife, are often associated with capture and transport procedures, leading to use of the term, "capture myopathy", to describe this syndrome. In smaller porpoises and dolphins, a similar syndrome has been reported when animals have stranded out of water or entangled in fishing gear or lines.

The findings in this animal are significant because myoglobinuric nephrosis has not been described in this species, or any large cetacean species. This case is also important because it suggests that renal damage may occur secondary to live strandings or entanglements, and may be considered from a clinical perspective when evaluating live beach caste or entangled animals.

Dr. Tomy Joseph is new Veterinary Virologist

Tomy Joseph joined the Ministry of Agriculture on August 1, 2013 as a Veterinary Virologist at the Plant and Animal Health Centre. For the past 6 years, Tomy was the Veterinary Virologist at the Veterinary Diagnostic Services of Manitoba Agriculture, Food and Rural Initiatives (MAFRI) in Winnipeg, Manitoba. Tomy graduated from the College of Veterinary and Animal Sciences, Kerala Agricultural University, India in1993. After spending 5 years in public veterinary practice, Tomy immigrated to Canada in 1998 to pursue graduate studies in veterinary and molecular virology.

Tomy obtained a M.Sc. in 2001 and a Ph.D in 2004 for his thesis research on bovine herpesvirus-1 (BHV-1) and infectious salmon anemia virus (ISAV) respectively from the Atlantic Veterinary College, University of Prince Edward Island, PEI. His thesis research contributed to the development of diagnostic techniques for BHV-1 and ISAV and understanding of ISAV pathogenesis.

During his postdoctoral research from 2004 to 2007 at the Institute of Allergy and Infectious diseases, National Institutes of Health, Bethesda, Maryland, USA, Tomy developed live attenuated vaccines against avian influenza A H7 subtype viruses for human use and conducted preclinical evaluation in animal models. His research also focused on the development of diagnostic techniques for avian influenza viruses and the pathogenesis and immune response of avian influenza viruses in animal models.

Tomy's areas of professional interest include development of diagnostic virology techniques, monitoring emergence of zoonotic viruses and foreign animal disease viruses and research in viral pathogenesis.

Currently, Tomy collaborates with researchers from the Canadian Food Inspection Agency (CFIA) for the development of microarray based diagnostic tests and characterization of novel strains of avian and swine influenza viruses.

Tomy holds an Asst. Professor appointment with Dept. of Medical Microbiology, Faculty of Medicine, University of Manitoba (http://www.umanitoba.ca/faculties/medicine/medical_microbiology/faculty/joseph.html) and sits on the advisory committees of graduate students as well. Tomy is also a technical assessor for the Standard Council of Canada for ISO 17025 accreditation audits.

Tomy can be contacted at 604-556-3036 or tomy.joseph@gov.bc.ca.

Plant and Animal Health Centre
1767 Angus Campbell Road
Abbotsford BC V3G 2M3

Toll free (BC only):
1-800-661-9903
Phone: 604-556-3003
Fax: 604-556-3010

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

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

Send correspondence to:

Rosemary Pede
Email: Rosemary.Pede@gov.bc.ca
Phone: 604-556-3065
Fax: 604-556-3015

To receive this newsletter electronically, contact Lynette.Hare@gov.bc.ca