VIRGINIA COOPERATIVE EXTENSION SERVICE
EXTENSION DIVISION – VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY – BLACKSBURG, VIRGINIA 24061

THE FOOD ANIMAL VETERINARIAN

VIRGINIA-MARYLAND REGIONAL COLLEGE OF VETERINARY MEDICINE

Spring 2005 No. 32

Dear Food Animal Practitioner,

Animal Identification is a moving issue to which food animal practitioners should be paying attention. The National Animal Identifications System (NAIS) has been developed to a significant extent. Virginia is up-to-date with the system and has its premise identification number allocator up and working. Several hundred premises have already been identified in our state.

Below is a schedule of steps toward full implementation of the system that was just published by the US Secretary of Agriculture. The document can be found at: http://animalid.aphis.usda.gov/nais/about/pdf/NAIS_Draft_Strategic_Plan_42505.pdf Although the final date for having premise and animal identification required is January 2008 seems a long way off, there is much to be done and this date will push the industry and the government to have the necessary structure in place to make the system work.

Timeline Key milestones:

- July 2005: All States capable of premises registration.
- July 2005: Animal Identification Number system operational.
- April 2007: Premises registration and animal identification "alerts". USDA will publish a proposed rule establishing new requirements that follow NAIS standards.
- January 2008: Premises registration and animal identification required.
- January 2009: Reporting of defined animal movements required; entire program mandatory.

Of course, there are many concerns about the system. In the thinking paper released by the Secretary of Agriculture these concerns are categorized as listed below. Dealing with these concerns will be somewhat laborious but my association with the development of the system to date convinces me there is the will to deal with issues and that a functional system will result.

Four key stakeholder concerns:

1. Financial – Who will pay what costs and how will the program be funded?
2. Confidentiality – Who will have access to the data, and how will the data be used?
3. Flexibility – Will the NAIS accept data from existing identification systems, and will producers be able to use the NAIS for other purposes?
4. Liability – Will producers be exposed to unfair financial or legal liability?

So what does this have to do with food animal practitioners? Since the stated purpose of the system is to assure animal health, I think the answer to the question is, "A lot!" Of course it will change the way that health certificates are handled. Food animal veterinarians with a haul-in clinic will have to have a premise ID and comply with reporting movements of animals into and out of the clinic. But I believe that even bigger issues/ opportunities are presented by animal ID.

One of the major steps in the system being developed is the certification of tag managers. These businesses dispense the tag to animal owners and have the responsibility of linking the premise ID with the animal IDs in the electronic ear tags for cattle. Will food animal practices become tag managers? Is this an opportunity to insert ourselves into a huge value-added position? If cattle will need to be restrained for tagging, will this be an opportunity to sell other veterinary services such as deworming, vaccination, pregnancy diagnosis, etc?

As the number of veterinarians required to supply services to a dramatically changing dairy industry inevitably decreases, a viable food animal veterinary community in Virginia will be dependent on developing and marketing veterinary services to an expanding beef cattle industry. Let's not allow the NAIS system to come into play in Virginia without carefully evaluating the opportunities that it holds for food animal veterinary practice.

Sincerely
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Extension Veterinarian, Cattle

Virginia Tech 1872

This newsletter is published quarterly in support of the outreach program of the Veterinary Teaching Hospital VMRCVM, Blacksburg, VA and is prepared for and distributed to veterinarians in the Mid Atlantic Region.

Virginia State University Since 1882

Antimicrobial Use in Treating Calf Diarrhea

Calves with naturally acquired diarrhea, regardless of age and etiologic cause for the diarrhea, have altered small intestinal bacterial flora. Specifically, *E.coli* bacterial numbers are increased 5- to 10,000-fold in the duodenum, jejunum, and ileum of calves with naturally acquired diarrhea, even when the diarrhea was not caused by enterotoxigenic strains of *E.coli* and when rotavirus and coronavirus were identified in the feces. The largest increase in *E.coli* bacterial numbers occurs in the distal jejunum and ileum, with *E.coli* being more numerous in the feces of colostrum-deprived than colostrum-fed calves. Small intestinal overgrowth with coliform bacteria can persist after departure of the initiating enteric pathogen.

Calves with diarrhea are more likely to have failure or partial failure of passive transfer, and this group of calves, in turn, is more likely to be bacteremic. In one study of 169 dairy calves with severe diarrhea, 76% of the calves had failure of passive transfer of colostral immunoglobulin, and 28% of the affected calves were bacteremic, predominantly with *E.coli.*

Antimicrobial treatment of diarrheic calves should therefore be focused against *E.coli* in the small intestine and blood, the two sites of infection. Fecal bacterial culture and antimicrobial susceptibility testing is not recommended in calves with diarrhea because fecal bacterial populations do not accurately reflect small intestinal or blood bacterial populations. Susceptibility testing in calf diarrhea probably has clinical relevance only when applied to fecal isolates of enterotoxigenic strains of *E.coli* or pathogenic Salmonella spp. and blood culture isolates from calves with bacteremia. Antimicrobial efficacy is therefore best evaluated by the clinical response of a number of calves to treatment, with calves randomly assigned to treatment groups. Amoxicillin, chlortetracycline, neomycin, oxytetracycline, streptomycin, sulfachloropyridazine, s,ulfamethazine, and tetracycline administered PO are currently labeled in the United States for the treatment of calf diarrhea.

On the basis of published evidence for the oral administration of these antimicrobial agents, only amoxicillin can be recommended for the treatment of diarrhea. Dosage recommendations are amoxicillin trihydrate (10 mg/kg PO ql2h) or amoxicillin trihydrate-clavulanate potassium (12.5 mg combined drug/kg PO ql2h) for at least 3 days; the latter constitutes extralabel drug use. Parenteral administration of broad-spectrum 13-lactam antimicrobials - ceftiofur (2.2 mg/kg IM or SC ql2h) and amoxicillin or ampicillin (10 mg/kg IM ql2h - or potentiated sulfonamides (25 mg/kg IV or IM q24h) is recommended for treating calves with diarrhea and systemic illness; both constitute extralabel drug use. In calves with diarrhea and no systemic illness (normal appetite for milk, no fever), it is recommended that the health of the calf be monitored and that oral or parenteral antimicrobials not be administered.

Veterinarians should assume that on average 30% of severely ill calves with diarrhea are bacteremic, that the risk of bacteremia is higher in calves with failure of passive transfer than in calves with adequate passive transfer, and that the risk of bacteremia is higher in calves less than S days old. Treatment of calves with diarrhea that are severely ill should include routine treatment against bacteremia, with emphasis on treating potential *E.coli* bacteremia. Veterinarians should also assume that 8% to 18% of diarrheic calves with adequate passive transfer and systemic illness are bacteremic. Effective antimicrobial treatment for potential bacteremia should be routinely instituted, regardless of passive transfer status and treatment cost. Administration of antimicrobial agents that decrease small intestinal coliform bacterial numbers in calves with diarrhea might prevent the development of bacteremia, decrease mortality, and decrease morphologic damage to the small intestine, thereby facilitating digestion and absorption and increasing growth rate.

Taken from: Constable, P. D., J Vet Intern Med 18:8-17, 2004, as reported in Vet Med, Volume 11, Issue 1, October, 2004, Iowa State University, Ames, Iowa

Evaluation and Use of Three Cowside Tests for Detection of Subclinical Ketosis in Early Postpartum Cows

The objective was to evaluate the performance of 3 cowside diagnostic tests for detection of subclinical ketosis, defined as a serum 13hydroxybutyrate (BHBA) concentration 1400 1lmol/L. On 16 d over a 5-mo period, samples of serum, milk, and urine were collected on a large dairy facility from cows of all parities between 2 and 15 DIM. The sample proportion of subclinical ketosis was 7.6% (n = 859 samples from 545 cows). The KetoCheck powder (Great States Animal Health, St. Joseph, MO) detecting acetoacetate in milk samples was very specific (99%) but poorly sensitive (41%). Respective sensitivities and specificities of the Ketostix strip detecting acetoacetate in urine samples (Bayer Corporation, Elkhart, IN) were 78 and 96% with a cut-off point of "small", or 49 and 99% with a cut-off of "moderate." The KetoTest strip (Sanwa Kagaku Kenkyusho Co. Ltd., Nagoya, Japan) using milk samples had a sensitivity and specificity of 73 and 96% with a cutoff of 100 µmol of BHBA/L or 27 and 99% with a cut-off of 200 ~mol of BHBA/L. On average, use of the Ketostix at the "small" cut-off point, or the KetoTest at 100 µmol/L would result in no more than 3 or 4 false positives per 100 cows screened, with prevalence levels ranging from 5 to 30%, whereas the number of false negatives would range from one false negative at 5% prevalence to 7 or 8 false negatives at 30% prevalence. Either the Ketostix or KetoTest strips would provide acceptable results for screening individual cows on commercial dairies to detect subclinical ketosis. Over this prevalence range, the KetoCheck powder test would have limited application as a screening test. Despite only one false positive per 100 animals screened, false negatives resulting from screening with the KetoCheck test would be too frequent, ranging from 3 false negatives at 5% prevalence to 18 at 30% prevalence in a population of 100 tested cows. Finally, given their relative imprecision, use of any of these individual cowside tests to estimate herd prevalence must be done cautiously, especially when only a small number of animals are sampled.

J. Carrier, S. Stewart, S. Godden, J. Fetrow and P. Rapnicki Veterinary Population Medicine Department, College of Veterinary Medicine, University of Minnesota, J. Dairy Sci.2004. 87:3725-3735, as reported in Veterinary News, October, 2004, Penn State University, University Park, PA

Crohn's Disease and Mycobacterium avium ssp. Paratuberculosis

Mycobacterium avium ssp. paratuberculosis (MAP) is recognized as the organism that causes Johne's Disease in cattle. Besides the economic impact that may be associated with clinical and subclinical Johne's Disease in a herd, there is a concern that the MAP bacteria may be associated with at least some cases of Crohn's Disease. Two new pieces of evidence have recently come to light which appear to add strength to argument that this association is real.

It appears that Johne's Disease (JD) was first recognized as an infectious disease in 1895 by Drs. Johne and Frothingham, and it was first described in a publication in the United States in 1908 (right here in Pennsylvania, nonetheless!). JD is a chronic, granulomatous, inflammatory disease affecting primarily the ileum. It eventually progresses to chronic diarrhea and weight loss due to marked thickening of the intestinal wall. Surveys suggest that more than 20% of dairy herds in the US have at least one JD positive cow, and estimates are that at least 3-4% of animals are infected.

Ernest Hovingh, Extension Veterinarian, as reported in Veterinary News, October, 2004, Penn State University, University Park, PA

Displaced Abomasum and Milk Production Traits in Holstein Cows

Displaced abomasum (DA) occurs in Holstein dairy cattle more frequently than in other cattle breeds. Lactational incidences of DA ranging from about 0.5 to 5.5% have been reported for Holstein dairy cows. Milk losses attributable to DA or diseases associated with DA or both have been estimated at about 300-600 kg milk, 12 kg fat and 10 kg milk protein per lactation. High milk yield is one of the reported predisposing risk factors for DA in diary cows. Milk losses caused by DA were greatest among the highest yielding cows. Long-term selection responses for increased fat yield may lead to higher prevalences of DA in dairy cows.

The objective of this study was to analyze the heritability of the lactational incidence of displaced abomasum and the relationships of DA with milk production traits in Holstein cows. Data were recorded between February 1999 and January 2000 in cooperation with five veterinary practitioners. The investigation included 160 dairy farms under the official milk-recording scheme with 9,315 cows. The lactational incidence of the left abomasal displacement amounted to 1.21%, and of the right abomasal displacement to 0.41%, respectively. The linear heritability estimates for the lactational incidences of left and right DA were h2 = 0.05 + 0.012 and h2 = 0.004 + 0.005, respectively. Using the Dempster-Lerner-transformation the corresponding heritaiblities were h2 = 0.53 and 0.09, respectively. Milk losses for the lactation when DA was diagnosed were significant and reached 1,016 kg milk, 41 kg fat,36 kg protein, and 0.07% protein. Fat content significantly increased by 0.18%.

Among the cows affected by DA and cows that had not been diagnosed with DA no significant differences in breeding values for milk performance traits could be estimated. The analysis of 305-day milk performances according to the lactation groups by disease status for DA showed no significant differences for the lactation records prior to the lactation when the diagnosis of DA was recorded. The additive genetic correlation between 305-day milk performance and left DA was low. The results indicated that cows with a high milk production and superior breeding values for milk performance were not exposed to an increased risk for DA.

Taken from: Hamann, H., et al J Vet Med A 51 :203-208, 2004, as reported in Vet Med, Volume 11, Issue 1, October, 2004, Iowa State University, Ames, Iowa

Effect of Free Stall Surface on Daily Activity Patterns in Dairy Cows with Relevance to Lameness Prevalence

Differences in behavior of nonlame cows, slightly lame cows, and moderately lame cows in 6 free stall barns with sand bedding (SAND) vs. 6 free stall barns with rubber-crumb geotextile mattress surfaces (MAT) were documented in Wisconsin dairy herds. All lactating cows in the 12 herds were observed and given a locomotion score based on a 4-point scale: 1 = nonlame, 2 = slightly lame, 3 = moderately lame, and 4 = severely lame. Herd least square means ±SE for prevalence of clinical lameness (locomotion scores = 3 and 4) were 11.1 vs. 24.0 ± 1.7% for herds using SAND vs. MAT surfaces, respectively. Subsets of 10 cows per herd with locomotion scores of 1 to 3 were observed via video cameras for 24-h periods. Cows in MAT herds spent more time standing in free stalls per day than cows in SAND herds. Differences in standing times were 0.73 h/d for cows that were not lame, 2.32 h/d for cows that were slightly lame, and 4.31 h/d for cows that were moderately lame in MAT herds compared with equivalent cows in SAND herds. In MAT herds, the increase in time spent standing in the stall in moderately lame cows was associated with a significant reduction in stall use sessions per day, which impacted daily lying time. Although cause and effect are not clear, these findings have implications for housing, comfort, and care of cows in dairy herds with different types of free stall surfaces.

N.B. Cook, T.B. Bennett and K.V. Nordlund. School of Veterinary Medicine, University of Wisconsin, J. Dairy Sci. 87:2912-2922, as reported in Veterinary News, October, 2004, Penn State University, University Park, PA

Evidence-Based Cattle Medicine

Evidence-based Medicine (EBM) has been defined as "The integration of best research evidence with clinical expertise and patient values." Evidence is something that serves as proof to support (or refute) a fact and may range from weak to strong. There is an increasing body of opinion that EBVM is vital to the future development of the veterinary profession, and recent textbooks are now describing the concept (Bonnett 1998, Keene 2000, Polzin 2000, Radostits 2000, Cockcroft and Holmes 2003).

Evidence-based veterinary medicine (EBVM) can improve the quality of veterinary decisions and provide informed choices for farmers. Emphasis is put on evidence from clinical research studies or accurate recording of information. EBVM requires a new set of skills that are distinct from conventional veterinary training. New types of information resources are also required to support the process. Below are some of the key skills that are required to practice EBVM.

• Turning information needs into questions. The four main elements of a good clinical question can be remembered from the mnemonic PICO, Patient, Intervention, Comparison and Outcome.

• Sources of evidence. Examples include memory, anecdotal, old course notes, text books old and new, colleagues, phone a specialist, referral and the WVVW/Internet. Examples of WWW databases of scientific papers are Pubmed (www.pubmed.org), CONSULTANT (www.vet.cornell.edu/consultant/ consult.asp), and CABdirect (www.cabdirect.org).

• Searching for evidence. Following are some examples of websites with on-line access to scientific papers: RCVS (www.rcvs.org.uk) and RCVS Library (www.rcvslibrary.org.uk), www.ingenta.com, www.freemedicaljournals.com, and http://highwire.stanfoFd.edu/lists/freeart.dtl.

• Understanding types of research studies. In most clinical situations the value of evidence is directly proportional to the statistical power of the study. The power of the study indicates the ability of the study to demonstrate a difference. The power of a study is dependent on the size of the study population, the magnitude of the effect of the intervention, and the natural variation in the parameters being measured.

• Appraising the evidence. A hierarchy of evidence based upon the strengths of the different study designs to answer specific questions can be constructed. The greatest statistical certainty comes from well conducted meta-analyses that incorporate a number of randomized controlled experimental studies. Additional study designs include (from strongest to weakest): cohort studies; case control studies; case series; single case reports; editorials, opinions, and consensus reports; comparative animal research; and "in vitro" test tube research.

• Making clinical reasoning explicit.

• Understanding clinical decision support systems.

• Understanding decision analysis, models and economics as evidence.

• Understanding quality control and clinical audits. Clinical audits can be used to compare current practice with the best available evidence.

Taken from: P. Cockcroft and M. Holmes BCVA Cattle Practice 11:372-384, 2003, as reported in Vet Med, Volume 11, Issue 2, January 2005, Iowa State University, Ames, Iowa

BVDV Surveillance Strategies

Previous writings in the July and October, 2004 issues of the Vet Med News evaluated BVDV in "high" and "low" risk herds. Providing these herds with beneficial BVDV diagnostics may help achieve producer goals to reduce problems which may arise associated with BVDV. The Academy of Veterinary Consultants (AVC) has recently published suggestions for BVDV decision-making processes and management guidelines for veterinarians. This article will discuss biosecurity concerns for the cow-calf herd (as detailed by AVC's BVDV ad hoc committee) and what some call misconceptions about BVDV, or what I personally prefer to call "spoofs" or "stretchers."

What "should" be a major biosecurity concern for cow-calf herds and/or dairies or in fact any production animal system is purchased females.

• **Purchased Open Females**: Heifers and cows should be persistently infected (PI) test negative (either by IHC, PCR, VI or other appropriate tests) prior to introduction to the herd, or if possible prior to being purchased at all, particularly if both parties are willing to share a portion of the diagnostic costs. Animals should be quarantined for 30 days prior to herd introduction.

• **Purchased Bred Females**: Heifers or cows should be PI test negative (IHC, PCR or VI) and quarantined till after calving and the calf is proven non-PI. Even if the dam's PI-negative status is known this doesn't provide fetal status. Ideally the pairs should not be introduced into the herd until after the calf has been proven PI negative.

Bulls: Unfortunately, as long as he's breeding females, these fellows are often forgotten as a part of overall herd health status. Keep in mind that:,

• Persistently as well as transiently infected bulls will shed BVDV virus in semen as well as in other body secretions.

• Transmission of BVDV can occur following insemination with raw, extended or cryopreserved semen.

• BVDV-infected semen will not directly cause PI calves; however contact with BVDV-infected bulls or maternal viremia following virus transmission via infected semen can cause fetal infection and PI calves.

• Purchased bulls really should be isolated for 30 days and PI test negative prior to contact with the cow herd.

Fomites: BVDV can survive in fecal matter and other body excretions in the environment for hours to days depending on temperature, humidity, and light exposure. BVDV has been transmitted from PI animals to susceptible cattle via nose tongs, injection needles, and palpation sleeves.

Embryo Transfer: By all means donors as well as recipients should be PI test negative. Recipients should be quarantined for at least 30 days prior to transfer.

Wildlife: The real risk of BVDV propagated or carried by wildlife is unknown. Buffalo, pigs, sheep, deer and elk have all been found to be serologically positive for BVDV. Experimentally infected deer and elk can shed virus for several days; however, it is unknown if a PI state can be induced in deer, elk or other species.

Switching gears, there are a few misconceptions regarding BVDV which should be passed along. Propagation of these "spoofs" has occurred over time despite changes in the BVDV knowledge base.

• #1: BVDV problems will always be obvious. If BVDV was introduced into a herd by a PI animal several years previous, after an initial period of noticeable losses, herds may experience low reproductive loss and BVDV associated morbidity. This low level insidious loss may not be compatible with economic sustainability.

• #2: The greatest cost associated with a PI calf is the death of the calf. Reproductive loss associated with low pregnancy rates, more abortions, and higher calf mortality are the greatest economic costs of exposure to PI animals. Increased morbidity, treatment costs, treatment failure, and reduced gain in feedlot or stocker pen mates may exceed the cost of PI death in feeder cattle.

• #3: PI calves are thin, have rough haircoats, and are poor-doers. While many PI cattle exhibit ill thrift, reports indicate up to 50% will appear normal and may enter the breeding herd or feedlot in excellent condition. PI CALVES CANNOT BE IDENTIFIED VISUALLY!

• #4: Calves are PI because their dam is PI. Research has indicated that 7% of PI calves' dams were PI, the other 93% had calves with a normal immune response to BVDV and were not persistently infected.

• #5: PI calves will be killed by MLV vaccination. Controlled experimentation has not been able to induce morbidity or mortality in PI calves following MLV vaccination. Case reports have indicated that MLV vaccination can cause PI animals to become moribund or die -- though far less than 100% are negatively affected.

And last but not least

• #6: BVDV won't affect my herd because I vaccinate. PI calves can secrete an enormous amount of virus which can easily overwhelm a level of immunity that would be protective under lesser degrees of exposure. VACCINATION ALONE WILL NOT SOLVE BVDV PROBLEMS!

Feel free to contact any of the diagnostic pathologists at ISU-VDL for help in tailoring a herd health surveillance program with emphasis on BVDV for your producers.

Submitted by: V. L. Cooper, DVM Diagnostic Pathologist, as reported in Vet Med, Volume 11, Issue 2, January 2005, Iowa State University, Ames, Iowa

Would You Believe?

A recent study at Cornell University found that vampire bats of Central & South America can walk around on the ground, and even run. This in contrast to other bat species which cannot begin to walk at all.

Domestic U.S oil production will supply less than a third of the nations' needs by 2020.
Department of Energy

Of all the energy used on our planet, 26% goes to power our transportation vehicles world wide.

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