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Staff: Neil Anderson, David Alves, Tim Blackwell, Scott Gillingham, Ann Godkin,
Paul Innes, Jocelyn Jansen, John Martin, Robert Wright
Tel: 519-846-0941, 519-846-0965 Fax: 519-846-8101 E-mail: neil.anderson@omafra.gov.on.ca
Web site: http://www.gov.on.ca/OMAFRA/english/livestock
Editor: Neil Anderson Graphics and Layout: Ora Zondervan

Professional dispensing includes ice packs

Dispensing livestock medicines is a routine part of veterinary practice. The accumulation of freezer packs also seems to be becoming a routine part of practice. During the summer months, ice packs and dispensing make a good combo.

Clients often stop at the clinic to pick up livestock medicines as one of a series of errands to be completed while "in town". With the advent of the cell phone, a one-stop-run to the veterinarian can turn into a two-hour swing past the grocery store, the arena, the feed mill and the drug store. Despite the best laid plans, vaccines and other perishable medicines may sit for extended periods of time in very warm cars or truck cabs.

You can help your clients ensure the potency of their livestock medicines while distinguishing yourself from other livestock medicine outlets. On hot summer days, pack medicines in a regular cardboard box with some newspaper and one or more of those ever-present ice packs. You will demonstrate to your clients the importance of following proper storage instructions while doing your part to ensure the potency of the products you sell. You might even free up some space where all those ice packs have been accumulating.

Tim Blackwell

Transit time and delivery affect milk culture

With the recent closure of the Kemptville milk laboratory, milk samples for bacteriological culture and identification of mastitis pathogens go to the University of Guelph, Animal Health Laboratory in Guelph. With this centralization of service, we need to focus on issues of sample submission that affect the quality of the results.

All milk samples contain some bacteria. The objectives of careful sample collection and proper handling are to minimize the entry and growth of bacteria not considered mastitis pathogens, while at the same time allowing the survival and growth of those bacteria of diagnostic significance.

In 1990, researchers at the Quality Milk Promotion Services (QMPS) laboratory in New York State evaluated the impact of milk sample delivery methods and arrival conditions on bacterial contamination rates. They studied the contamination rate of 871 cow quarter and composite milk samples.

Overall, 15% of the 871 samples were contaminated. The method of sample delivery influenced the contamination rate. Only 7% of samples hand-delivered directly to the laboratory were contaminated, compared to 14% of the samples delivered by UPS courier, and 26% delivered by the US Postal Service. Timing of delivery was also critical. *Samples delivered within one day of sampling had a contamination rate of 8.9% while those arriving sometime after one day had a 25.9% contamination rate.* No matter what the method of delivery, *all samples arriving at the laboratory more than 24 hours post collection had greater contamination rates.*

There was little effect on the contamination rate by the person taking the sample, whether the veterinarian or the producer. However, samples collected by the producer and submitted by the veterinarian had greater rates of contamination, due to the increase in transit time to the laboratory (see table).

Contamination rates for 3 combinations of sampler and delivery

	Producer sample/ producer deliver (%)	**Vet sample/ vet deliver (%)**	**Producer sample/ vet deliver (%)**
UPS courier	-	5/33 (15.2)	6/52 (11.5)
US postal service	2/6 (33.3)	19/143 (13.3)	38/101 (37.6)
By hand	13/182 (7.1)	9/137 (6.6)	3/30 (10)
By DHI	6/17 (35.3)	3/22 (13.6)	0/5
OVERALL	**21/205[a] (10.2)**	**40/361[a] (11.1)**	**49/147[a] (24.9)**

[a] Difference significant by chi square; $p < 0.0001$

Using ice packs to chill samples has been suggested as helpful for preventing overgrowth of non-diagnostic bacteria. In this study, 70% of samples had an ice pack included. *Ice packs were not enough to overcome the negative impact of the greater delivery times to the laboratory.*

We should learn valuable lessons from the New York research as we adapt to the change in laboratory services in Ontario. For mastitis culture submissions, practitioners will need to:

- plan ahead and carefully arrange timing of sampling and delivery with the Guelph mastitis laboratory to ensure samples arrive Monday through Friday;
- advise producers about proper sampling techniques, and remember, that with good guidance, they should be able to collect their own samples without contamination;
- take ice packs to the farm or advise producers or staff collecting samples to pack milk samples with ice packs as they are collected;

- advise your clinic staff who transfer milk samples to diagnostic laboratories to thoroughly chill samples and pack them with 2 or more ice packs in insulated containers;
- review shipping routes and methods to ensure that milk samples will remain chilled and arrive in the laboratory within 24 hours of collection; and
- check sample times and culture times on all laboratory culture reports as a preliminary means of assessing the report's validity.

The most reliable and interpretable results will be obtained from samples collected aseptically, in sterile sampling bottles, immediately cooled and kept chilled, packed in insulated containers with several ice packs, and received at the laboratory within 24 hours of collection.

Reference: Dinsmore RP, PB English, JC Matthews and PM Sears. Effect of milk sample delivery methods and arrival conditions on bacterial contamination rates. Cornell Vet 1990; 80: No. 3, p 243-250.

Ann Godkin

Ice packs and coolers

The preceding articles by Tim and Ann remind us about the importance of keeping laboratory specimens and vaccines cool during transit. Do we know how well the ice packs and coolers do the job? How quickly does the temperature inside the cooler drop to refrigerator-like conditions? Will the ice packs and coolers maintain refrigerator-like temperatures for 24, 36 or 48 hours? How many ice packs do we need to keep temperatures low for our intended transit time? The answers might reinforce our present packaging and transportation practices or stimulate us to change methods.

Our summer students, Tamara Keeley and Karine Toulouse, are looking for the answers this summer. One of their projects is to research temperatures and times using ice packs in insulated coolers. If we can obtain funding for several HOBO dataloggers, we will conduct the research with milk samples originating from veterinarians in various locations in Ontario. The results of their ice pack and picnic cooler research will appear in a future issue of CEPTOR.

Neil Anderson

FARAD – *a correction:* limited access is available to Canadian veterinarians

The March 2000 issue of CEPTOR carried an article describing gFARAD – the global Food Animal Residue Avoidance Databank. The article described efforts to get funding for Canadian membership in gFARAD. Membership would allow access by Canadian veterinarians and inclusion of data specific to Canada. At press time, Tim and I did not know that Canadians were able to access FARAD, the U.S. version of the global database. David Rubin brought this to our attention. Here are the details.

Canadian veterinarians can obtain limited access to the Food Animal Residue Avoidance Databank (FARAD) in the United States by first accessing www.farad.org through the Internet and then going to the veterinary section. In this section of the website, you will be asked for your name and password. You can obtain a password by following the directions and entering your College of Veterinarians of Ontario license number when asked for an I.D. number. You will receive your password within days (or sometimes weeks).

With the password, you will have access to the veterinary section where you can view FARAD digests that have been previously published in the Journal of the American Veterinary Medical Association. These digests contain the most common extra-label drug-use recommendations for certain classes of injectable medications and the associated

withdrawal times. All withdrawal times are based on U.S. regulations for maximum residue limits in meat and milk. Information contained in these digests may assist Canadian veterinarians in establishing withdrawal times when injectable medications are used in an extra-label manner, provided the maximum residue limit for the drug in question is the same in Canada as in the United States.

Veterinarians in the U.S. can request information from FARAD for withdrawal times for specific injectable or in-water medications used in an extra-label manner in food producing animals. No information on extra-label in-feed medication is available since this practice is prohibited in the U.S.

FARAD will not address requests from Canadian veterinarians regarding withdrawal times for specific extra-label drug use since Canada does not contribute to the development or maintenance of the database. Canada must become a member of gFARAD before specific requests on extra-label drug use from Canadian veterinarians will be answered. A grant has been submitted to obtain funding for membership in gFARAD. A decision on the grant request is due later this summer.

Tim Blackwell, Neil Anderson, OMAFRA and David Rubin, Codrington, ON

A cure for dumb heifer syndrome

This spring, a dairyman asked me about "wrecks" in his first-calf dairy heifers. Calves born from the heifers were either listless at birth or born dead. He estimated an 80% calf-loss from the first-calf heifers over the last year. In addition, the heifers would "beat themselves up in the stalls." Foot and hock injuries were common. He lost eight heifers in his 45-cow herd.

I often refer to this problem as "dumb heifer syndrome." In spite of everyone's best intentions, these dumb heifers injure themselves. My initial rule-outs were some kind of nutritional problem and stall design problems.

One-month prior to calving, the owner moved heifers from a new heifer facility (built in 1998) into the tie-stall barn. He fed them dry hay and a commercial dry-cow grain mix. The same tie-stall barn and similar feeding programs have been used for years with no problems. Forage analyses and a nutritional investigation didn't reveal any problems with the nutritional program.

During our discussion about the heifer nutrition, the owner asked me how high the tie-rail should be for the tie stalls. I told him I didn't have any good dimensions for tie-stall barns, but I remembered seeing an article saying 39 inches was a common height. The owner immediately measured his tie-rail. It was only 33 inches in a 3.5-foot x 5-foot stall. That very day, as an experiment, he altered his tie-rail to 39 inches for 5 stalls.

A week later, I was at a meeting and heard Dr. Neil Anderson recommend even higher tie-rails and larger stalls for tie-stall barns. When I got back to the office that afternoon, I telephoned my producer and gave him the new dimensions. He reported that two heifers that had already injured themselves had actually improved over the previous week in his altered stalls.

Since that time, the owner has increased stall size to 4 feet wide by 6 feet long, raised the tie-rail to 44 inches (cow side), and raised the manger to 4 inches above the level where the heifer is standing. I talked to the owner again this week. He has had absolutely no problems with heifers or their offspring since this change to stall construction. He said he would highly recommend following Dr. Anderson's stall size dimensions.

As for dumb heifer syndrome, he suggested renaming it "dumb farmer syndrome!" I think he was too polite to say "dumb vet syndrome" which may have been more appropriate! The one change that occurred on this farm over the last several years was the new heifer barn. It was the *offspring* from that heifer barn that were coming into the tie-stall barn this winter. The owner estimated that they were calving about 200 pounds heavier than heifers raised in his old barn. I think these bigger heifers just couldn't adapt to the small stall sizes. When looking for a cure for "dumb heifer syndrome," I suggest examining the tie-stalls and administering the new cure as my client did.

Ewen Ferguson, Campbellford, ON

Gate-to-plate - the strength of traceback

Canada and all other major meat exporting countries are developing systems to trace meat products from the store shelf back to the farm of origin. The Dutch already have this ability. The capability to trace a product to its source is necessary if quality assurance programs are to be valid. For example, without the ability to trace a residue problem in pork to its source, no assurance can be given that a similar problem will not re-occur at a later date.

As these gate-to-plate quality assurance programs are implemented, they will have profound affects for everyone in the production chain. Several meat processing plants in the United States went from profitable corporations to bankruptcy in a matter of weeks when authorities traced a Listeria, Salmonella or an *E. coli* problem back to the packing plant. What would happen at the farm level if authorities traced a biological, chemical or even physical residue from a store shelf overseas to an individual Ontario producer? The entire Canadian pork industry is blemished every time a sulfa residue or a broken needle is identified in a Canadian pork product. What if that entire industry could focus their concern at an individual farm gate?

Veterinarians serving livestock farms must make producers aware that gate-to-plate quality assurance means that residues will no longer be lost in the system. No producer wants to find that a sulfonamide residue in Canadian pork in Japan has been traced back to his or her operation. Nor does any veterinarian want to find that the traceback process has identified one of his or her clients as the source of the residue.

Gate-to-plate programs will be great marketing tools for meat exporters around the world. Veterinarians have been given a large portion of the responsibility for Canadian quality assurance programs. We must ensure that gate-to-plate quality assurance programs demonstrate the high standards of Canadian meat production to all our customers.

Tim Blackwell

Whey source versus dried skim milk

At the recent Dairy Health Management Certificate Program Update meeting in Guelph, Dr. Jud Heinrichs got my attention when he asked: "Are calf managers creating the starvation syndrome in the first few days of a calf's life by feeding milk replacer made from a whey source?" He told us that whey source replacers do not contain casein and therefore do not clot. In comparison, dried skim milk has casein and is the best milk source for replacers. However, the cost of dried skim milk powder is considerably greater. When feeding whey source milk replacers, Dr. Heinrichs advised that we might see loose feces or scours for the first three days of age. After three days of age, the gut starts to produce the enzyme needed to form milk clots and the calves do well on the whey source milk powders. Please refer to the resources section of this newsletter for two websites related to calf management and health.

Neil Anderson

Nothing is worth more than this day. **- Goeth**

To test or not to test? That's a tough question.

To test or not to test is a tough question. Problems can arise with both over or under testing. What would or could I do if the results are positive? What would or could I do if the results are negative? Answers to those two questions provide a good starting point for deciding to carry out a diagnostic test. Let's look at a case in pigs as an example.

You may suspect a recrudescence of a PRRS problem in a herd with a recent increase in morbidity and mortality in nursery pigs. While sending in sera, you notice that disease X testing is also now available from the laboratory and check that box as well. The results show that the sera are positive for both PRRS and disease X. The owner is very interested in this new disease and wonders how he got disease X. He asks you if his breeding stock supplier might be the source. He is anxious to know what you plan to do about this new disease. He also wants you to test the finishing-barn pigs because they haven't been doing very well either. The owner has even asked if a recent slump in conception may be tied into disease X. In fact, he just read an anecdotal article in the lay press reporting just that. The owner is now sure he can trace the problem back to when it began and realizes he got a supply of breeding stock just three weeks prior to that date.

While you are discussing PRRS management and control strategies, the owner keeps going on about disease X. Finally, in frustration, you tell him there isn't really anything you can do to fix a disease X problem with our current knowledge of the disease. He asks why you bothered to test for the disease in the first place. You start to wonder the same thing.

He's already called his breeding stock supplier to complain about disease X and is furious to learn that the breeder is not even testing for this new disease. The breeder then calls you and says he hasn't had any nursery problems at all and wonders what's going on. When the breeder asked his own veterinarian about testing, his veterinarian advised against it since there were no problems in the breeding stock supplier's herd. His veterinarian further told him that the organism associated with disease X appears to be endemic in the province and once positive results are found, the breeder would be obliged to make those results known to all buyers both old and new. This could lead to more confusion. His veterinarian also said that not enough was known about the disease to give dependable advice regarding treatment or prevention anyway.

Your client thinks this all sounds like a big cover-up. He's even more annoyed because he paid for the testing and now you appear reluctant to act on the results. Now you are really wishing you hadn't checked that box on the laboratory submission form.

The "test it for everything" approach to diagnosis can prove more problematic than helpful in some situations. To avoid such a scenario, discuss with your client why tests are being done, and how you will use the test results to alter treatment or husbandry protocols on the farm. As a general rule in commercial herds, if test results for a specific disease will not affect your current treatment or management of the affected pigs, and are not of public health significance, you should refrain from the testing. For herds selling breeding stock, you may need to implement more stringent testing.

Answer the questions about use of the test results before ordering the tests. This simple strategy will avoid unnecessary confusion and cost for your clients. It's the answer to the tough question - "to test or not to test?"

Tim Blackwell and Neil Anderson

Bactoscan test and bacteria in raw milk

Changes to Ontario's raw milk testing program and penalty levels have dairy producers asking questions about lowering bacteria counts and improving milk quality.

In January 2000, the Bactoscan (BSN) became the official regulatory test for determining bacterial numbers in bulk tank milk samples from Ontario herds. At the same time, Dairy Farmers of Ontario (DFO) lowered the regulatory limit for bacteria in milk from 370,000 to 110,000 BSN units (equivalent to a decrease from 100,000 to 50,000 Plate Loop Count, the old testing procedure). As before, exceeding the penalty level in 2 of 3 consecutive monthly tests results in a penalty. Shut-off still occurs after 4 penalties in a 12-month period.

The Bactoscan test. DFO contracts with the Laboratory Services Division (LSD) of the University of Guelph to conduct all regulatory testing, including the BSN test.

The BSN machine counts live, individual bacterial cells in a 3-ml sample of refrigerated raw milk. The testing technique involves:

- using a lysing solution, added to the milk to break down protein and somatic cells,
- removing material by centrifugation,
- adding a fluorescent dye to stain living bacterial cells, and
- "counting" the strength of the light emitted from the stained cells to estimate the number of bacteria present.

The advantages of the BSN are that it is a rapid test, taking minutes instead of days, is fully automated, gives repeatable results, and BSN can handle large numbers of samples.

Ontario herds with elevated bacteria counts. The majority of elevated bacteria counts are successfully remedied by cleaning the milking equipment, fixing washing deficiencies, providing more hot water at the correct temperature, using water of better quality for washing, or improved milk cooling. However, in a few Ontario herds, elevated Bactoscan counts have not been "cured" following compliance with conventional sanitation practices.

Are the cows the reason for elevated BSN? Some investigators have speculated that cow udder infections may be responsible for elevated bacterial numbers in bulk milk. The suspected herd situations include:

- several high-producing cows infected with specific pathogens (*Streptococcus agalactiae* or Prototheca),
- several high-producing cows infected with chronic Strep non-ag. or environmental Streptococcus infection,
- frequent short duration infections with Strep species or *E. coli* where virtually every tank of milk includes milk from several cows with quarters starting new infections.

We need to be cautious about focusing on cows as contributors to elevated bacteria counts. Previous research has shown that herds may have elevated bacterial counts in bulk tank milk when a high percentage of cow quarters in the herd are infected with *Streptococcus agalactiae (Strep ag.)*. The elevated bacteria counts occur because the infected cows shed high numbers of *Strep ag*., frequently have multiple infected quarters, and are in herds with inadequate sanitation practices that lead to many infected cows in a short time. Also, research has shown that the bacteria found when bulk milk bacteria counts are repeatedly elevated are rarely the types associated with mastitis, with the exception of *Strep. ag*.

Ann Godkin, Neil Anderson

Tests for investigating high bacteria counts

Investigators often conduct additional tests on bulk milk or individual cow samples in attempts to identify the types and sources of bacteria. We need to be aware of the tests and issues concerning sampling procedures to avoid confusion when interpreting tests, especially when dealing with the non-mastitic bacteria in milk.

Bulk milk tests. When investigating refractory bacteria counts, DFO fieldstaff may request specialized tests, the Laboratory Pasteurized Count (LPC) and the Coliform Count (CC). The LPC and CC may help classify bacteria in milk into those associated with milking equipment cleaning problems or those associated with poor milking hygiene (see *Testing bulk milk samples for sources of contamination* in this issue). DFO field staff can advise you about requesting these tests at Laboratory Services Division, University of Guelph.

Individual cow bacteriological culture. Composite milk samples are collected from individual cows for the presumptive identification of mastitis-causing bacteria. The milk samples are collected at milking time. Prior to sampling, teats are disinfected and dried using conventional milking procedures such as a wash and dry or a predip and dry. Herds not using these techniques for udder preparation need to adopt them before collecting milk samples. After prep, each teat end is scrubbed in 3 directions with an individual alcohol swab. Strip two streams of milk from each teat and add a sample of milk to the bottle. Each quarter should be represented as equally as possible.

Cow culture samples for identification of mastitis bacteria may go to the Animal Health Laboratory (AHL) in Guelph. The cost is $6.50 per sample.

Individual cow somatic cell counts (SCCs). Individual cow SCCs identify cows likely to have mastitis and, when conducted on the whole herd, estimate the prevalence of mastitis within the herd. There are 3 testing options.

1. The preferred choice is to request the individual cow SCC option in the herd's regular DHI milk test. The DHI samples are collected through calibrated milk meters. This inline meter collects a sample representative of the entire volume of milk produced at that milking. Only samples collected in this way can be interpreted using conventional benchmarks for SCCs. For example, attaching significance to cow SCCs over 200,000 cells/ml as being suggestive of infection is only relevant to samples collected via meters. DHI provides a cow SCC for less than $0.50 per cow per test.

2. The second choice is to request SCC counting at the University of Guelph, Animal Health Laboratory, which involves the laboratory counting cells in milk samples originally collected for culture. These samples are not representative of the entire volume of milk. Samples from clinical cases may contain high levels of SCCs. Individual quarters are not necessarily represented equally in composite samples. Additionally, counting SCC in quarter or composite samples requires the use of different benchmarks than those we are accustomed to using or have available. For these reasons, SCCs from the AHL samples are virtually impossible to interpret. The cost for a SCC at the AHL is $1 per sample tested.

3. The third choice is to request a SCC from Laboratory Services Division, University of Guelph, where the regulatory testing is done. The same challenge of interpretation exists with these samples as described above for the AHL samples, if the samples are not

collected through milk meters. SCC testing at LSD costs $3 per sample for less than 40 samples and $2.50 per sample when more than 40 are submitted.

Individual cow Bactoscan (BSN) counts. Investigators have used the bulk milk Bactoscan test in attempts to identify individual cows that might contribute to elevated herd BSN counts. The test is done at LSD and the cost is $3.00 per cow.

The appropriate method for collecting individual cow samples for BSN determination is unknown. Collecting samples for BSN via milk meters is inappropriate because the samples are likely to be contaminated by bacteria from the metering equipment or by residual milk from the preceding cows. The BSN test on samples collected in this manner would be a test of a meter and not a test of a cow's level of bacteria. Collecting BSN samples using cow culture methodology presents the same problems as using these samples for SCC determination. Bacteria concentrate in the premilking strippings. The BSN from these samples are not representative of an individual cow's overall contribution to bacteria in the bulk milk tank.

Research is needed to look at the influence of sampling technique on BSN results. Until further information is available, it is extremely difficult to advise on a sampling protocol. There is no published information on the interpretation of individual cow BSN tests. We need to be cautious about interpretation, especially when considering BSN results for making culling decisions without milk culture testing.

Ann Godkin, Neil Anderson

Investigating elevated bacteria counts: a protocol

The research and practical literature contain scant information about techniques for investigating and solving elevated bacteria counts in raw bulk milk. Here is a suggested protocol for investigating elevated milk bacteria counts in herds that failed to respond to intensive hygiene practices.

1. **Use all the milk quality records.** The available records include: Dairy Herd Improvement (DHI) individual cow somatic cell counts (SCCs), bulk tank SCCs, Bactoscan test results, the special tests (Laboratory Pasteurized Count (LPC) and Coliform Count (CC)), mastitis treatment records, milk cultures done for mastitis bacteria identification, DFO Udder Health Specialist reports, and milking equipment dealer service reports. Assemble and examine all available records relevant to milk quality.

2. **Request the tests to complete the dataset.** Consider sampling a subset of cows with elevated SCC for bacteriological milk culture. This is a reasonable approach if cost is a limiting factor and if there is only limited evidence of infection. Use the milk culture services at the Animal Health Laboratory, University of Guelph, to determine the presence of unusual pathogens such as Prototheca (see *Prototheca and mastitis* in this issue) or the proven culprit, *Streptococcus agalactiae*. Consult with Dairy Farmers of Ontario fieldstaff about obtaining the special bulk tank milk tests, LPC and CC.

3. **Create a chronological record of events and tests.** Use this information to determine if there has been evidence of bacterial infection of cows coincident with the time of elevated BSN tests. Additionally, verify that there is no evidence suggesting poor milking

equipment hygiene, cleaning or cooling.

4. **Assess milking hygiene at milking time.** Inadequate milking preparation, wet teats, liner slips, and unit drop-offs allow bacteria to enter the milk at milking time, even though the cows may not have mastitis. Teats and udders must be clean and dry before the unit goes on. Advise producers to adopt milking practises that will reduce bacteria entering the milk at milking time.

If there is no strong evidence to implicate cow infections as the source of high bacteria counts, then it's back to milking equipment cleaning, milk cooling and milking procedures as the most likely sources of chronically elevated bacterial numbers in milk.

Ann Godkin

Testing bulk milk samples for sources of contamination

Differential bacteriology has been used to classify bacteria and, knowing the bacterial types, guide us to the potential sources of bacteria in bulk tank milk. Two commonly used tests are the Laboratory Pasteurized Count (LPC) and Coliform Count (CC).

Laboratory Pasteurized Count (LPC). To determine the LPC, a volume of milk from the bulk tank milk sample is placed in a water bath at 62.8ºC and held there for 30 minutes (pasteurized). After removal and cooling to below 10ºC, 0.1 ml of milk is plated on blood agar and incubated for 48 hours at 37ºC. The LPC is the number of bacterial colonies multiplied by 10.

The organisms that survive pasteurization but do not grow at pasteurization temperatures, and are counted in the LPC, are called thermoduric. Typically the thermoduric organisms found in bulk milk include species of Micrococcus, Streptococcus, Lactobacillus, Bacillus, Clostridium and, occasionally, gram-negative rods.

The sources of these bacteria are poorly cleaned and sanitized udders, milk handling and milking equipment. Elevated LPCs are suggestive of deficiencies in milking equipment sanitation or of incubation of bacteria within the milking equipment. Usually an LPC equal to, or less than, 10 indicates excellent milk quality.

Coliform Count. To determine the CC, 0.1 ml of milk from the bulk tank milk sample is plated on either violet red bile or MacConkey agar. After incubation for 18 hours at 37ºC, the number of lactose fermenting colonies, multiplied by 10 is the coliform count.

The coliform bacteria are aerobic or anaerobic, gram-negative, non-spore-forming rods that ferment lactose and produce acid and gas at 32ºC and within 48 hours of incubation. The main coliform organisms found in bulk tank milk include *E. coli*, Enterobacter, and Klebsiella species.

Elevated coliform counts may indicate poor milking preparation from the milking of wet and dirty teats. Coliform bacteria thrive in the milk film that remains in improperly cleaned milking equipment. Therefore, very high counts are also consistent with incubation in the milking equipment. Cows with coliform mastitis rarely contribute to elevated coliform counts. Even though bacterial numbers are elevated in early infection, the duration of high counts is very short, infected cows give little milk from affected quarters, and, once clinical signs occur, milk from affected quarters is withheld from the bulk tank. Usually a CC equal to, or less than, 10 indicates excellent milk quality.

Richardson GH, editor. Standard Methods for the examination of dairy products. American Public Health Association. 1985.

Guterbock WM and Blackmer PE. Veterinary interpretation of bulk-tank milk. Vet. Clinics of North America. Vol 6, No. 2 1984 p 257-268.

Ann Godkin

Prototheca and mastitis

Investigators have isolated Prototheca in cultures of individual cow milk samples from a few Ontario herds with elevated bacteria counts in bulk tank milk. Prototheca is an infrequent and sporadic isolate from milk in Ontario. From milk cultures done at the Animal Health Laboratory, Paul Innes, our Surveillance Epidemiologist, found 48 Ontario herds in 1999 with isolates of Prototheca. Three herds had 2 cows positive. The others were single isolates. Between January 1 and May 2, 2000, 18 herds had at least one milk culture positive for Prototheca.

To date, an association between elevated bacterial counts and the concurrent isolation of Prototheca from cows has not been established. Most herds with cows with protothecal mastitis do not have elevated bacteria counts in bulk tank milk samples.

The Laboratory Handbook on Bovine Mastitis, National Mastitis Council, Inc., 1995, provides the following background information on Prototheca and mastitis (*copied with permission*).

"Prototheca spp. are achlorophyllic algae that can cause acute as well as subclinical and chronic mastitis. Prototheca zopfii and P. wickerhamii are the only two species identified as mastitis agents. Infections are refractory to antibiotic treatment.

The primary sources include soil, plants, streams, ponds, bovine and porcine feces, barns and holding areas. Improper teat sanitation prior to treatment is a common means by which the mammary gland is exposed to Prototheca spp. Prototheca spp. can be transferred from environment to cow, and from cow to cow at milking.

Appearance on blood agar – Creamy-white or greyish-white, pasty colonies form after 24 to 36 hours' incubation at 37ºC. Colonies on blood agar can be confused with yeast and coagulase negative staphylococci.

Selective media – Prototheca spp. grow well on Potato Dextrose Agar and Sabouraud Dextrose Agar at 25 to 37ºC."

For more information about Prototheca, including preliminary results from studies conducted by Quality Milk Promotion Services in New York, check the 1996 National Mastitis Council Annual Meeting Proceedings, page 82 for the article "Prototheca, Yeast, and Bacillus as a Cause of Mastitis" by Ruben N. Gonzalez. The paper is also available on the NMC website at http://www.nmconline.org/articles/prototheca.htm.

Ann Godkin

When the germ is found, too often further quests for the underlying causes are terminated. The reality is that germs have little primary importance in livestock production.
Our graduates are not prepared to search for noninfectious risk factors that cause suboptimal production and trigger infectious diseases.

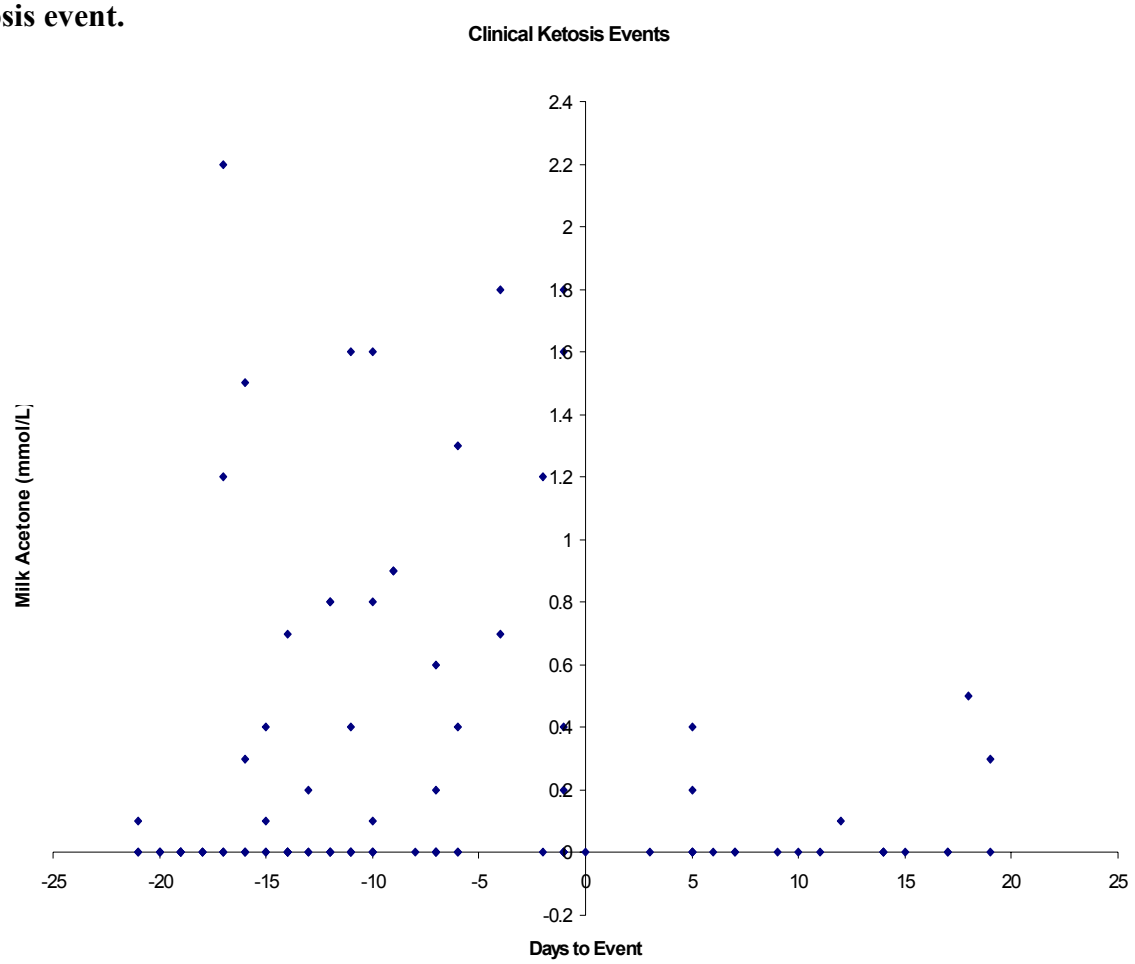
- Leman, 1988

Is more sustained treatment the answer?

During the recently completed milk acetone pilot project, 287 displaced abomasum and 214 clinical ketosis events were diagnosed and treated on 158 Ontario dairy farms. Each clinical disease event was mapped to its nearest DHI test day milk acetone determination. Given the usual 30 to 42-day interval between DHI tests, this meant that the acetone value could precede or follow the disease event by up to 21 days.

Visual examination of the acetone values associated with clinical ketosis events suggests that some of the cows diagnosed with clinical ketosis had elevated milk acetone levels up to 16 days prior to the date of diagnosis and treatment. On the other hand, very few cows had elevated acetone levels after the diagnosis and treatment, suggesting that most of the cows responded to the treatment administered (Figure 1).

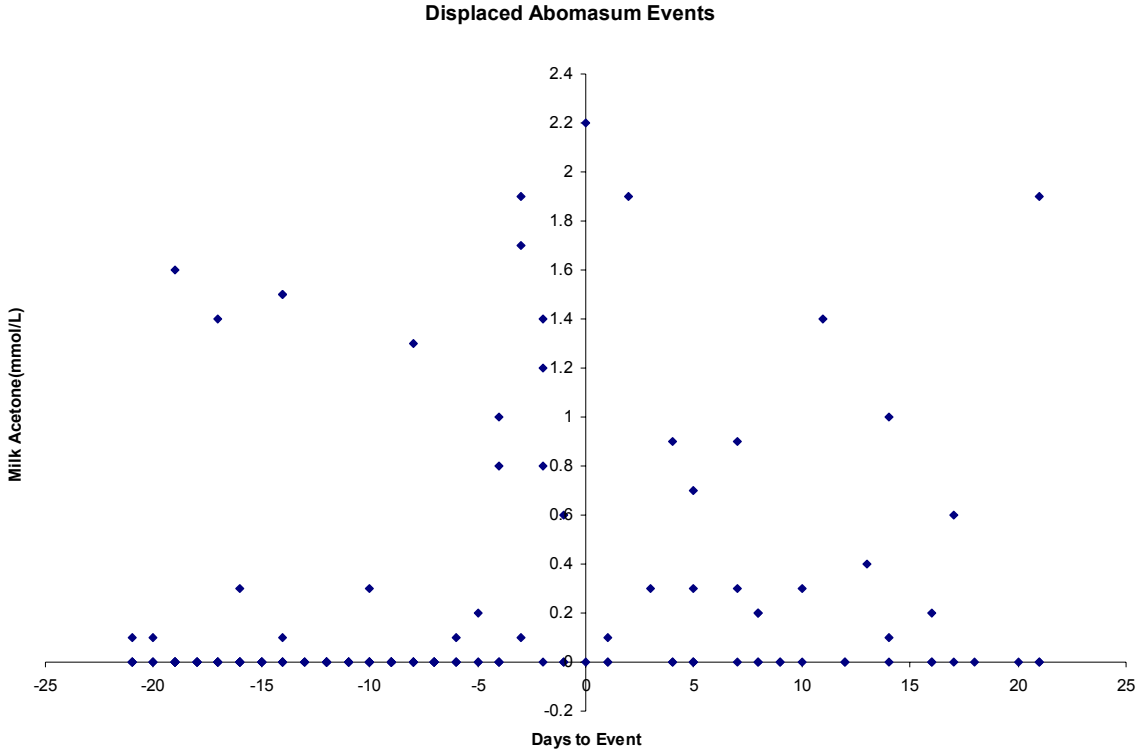
Figure 1. Milk acetone value at DHI test date closest to diagnosis and treatment of clinical ketosis event.



Examination of the acetone values associated with the diagnosis and treatment of displaced abomasum suggests that some cows eventually diagnosed with DA had elevated milk acetone levels up to 18 days prior to diagnosis. This is similar to the observations made for the ketosis events. However, in the case of DA, there were a significant number of cows that were treated for DA who still had elevated milk acetone levels up to 21days after treatment (Figure 2). This might suggest that on some farms our follow-up medical and supportive treatment of cows with

DA might be lacking.There is evidence in the veterinary literature that DA is associated with decreased milk yield in the concurrent lactation. The mechanism by which this effect is mediated is unclear. Could a lack of sustained medical and supportive treatment of the accompanying subclinical ketosis be part of the answer?

Figure 2. Milk acetone value at DHI test date closest to diagnosis and treatment of displaced abomasum event.



David Kelton, Ontario Veterinary College

Ontario Association of Bovine Practitioners – *New Executive*

We extend our best wishes to the volunteer executive members and directors of OABP as they work for bovine practitioners in Ontario this coming year. For more information, please contact Nancy Charlton at 519-323-9002 or ncharlton@metzgarvet.on.ca

Dr. Nancy Charlton, Mount Forest	President
Dr. Clarice Lulai, Barrie	Vice-President
Dr. Randy Graham, Orangeville	Secretary-Treasurer
Dr. Barry Sutherland, Guelph	Past-President
Dr. Rick Healey, Paris	Director and OVMA Rep
Dr. Todd Duffield, Guelph	Director
Dr. Randy Bagg, Guelph	Director
Dr. Willy Armstrong, Winchester	Director
Dr. Ken Bridge, Ripley	Director
Dr. Brent McLaughlin, Cannington	Director
Dr. Ann Godkin, Fergus	Vet Science liaison
Dr. Ed Empringham, Guelph	CVO liaison

Disease data flow into Dairy Comp 305

A major benefit of adopting Dairy Comp 305 as the DHI data capture system is the ability to collect, store and retrieve non-traditional data within the Canadian milk recording system. From January to September 1999, 201 Ontario dairy producers participated in a milk acetone pilot project aimed at assessing the usefulness of an automated test-day milk acetone measurement for predicting production and metabolic disease problems in dairy herds. As part of this effort, the collaborating producers were asked to record all cases of displaced abomasum, clinical ketosis and lameness in their herds. However, these project participants were not the only ones recording disease events in 1999. Through the co-operation of dairy producers, veterinary practitioners and DHI field staff across Ontario, 1150 herds had atleast one major disease event entered into the milk recording database through Dairy Comp 305 last year. A total of 10,678 disease events, including displaced abomasum, mastitis, metritis, retained placenta, ketosis, milk fever and lameness were recorded on Ontario farms (Table 1).

Unfortunately, we do not know how many of the 1,150 herds recorded all or only some disease events that occurred through the year. However, this is a foundation on which the industry can build. Collection of disease data will enable us to provide summary information about the rate of occurrence of disease in the provincial herd. For instance, based on data collected from the farms participating in the milk acetone project, we can estimate that in Ontario there are about 4 displaced abomasums, 3 cases of ketosis and 13 cases of lameness per 100 cows per year (Table 1).

Table 1. Disease events recorded on Ontario dairy farms in 1999.

Disease	Number of Events	Number of Farms	Events on 158 Acetone Farms	Estimated Incidence Rate
Displaced Abomasum	1238	552	287	3.8 cases/100 cows/year
Ketosis	584	258	214	3.3 cases/100 cows/year
Lameness	1642	386	969	13.0 cases/100 cows/year
Mastitis	3963	591		
Metritis	711	138		
Milk Fever	778	358		
Retained Placenta	1762	495		
TOTAL	10678	1150		

It is likely that most dairy farms record the occurrence of clinical disease events somewhere in their records. By making these events accessible to the DHI field staff on test day, either by recording the diseases on the DHI calendar or providing a list of cows, dates and events, these important disease events can become part of the permanent DairyComp 305 cowfile. The benefit to producers and veterinarians lies in the opportunity to use the analytical tools in DC305 to analyze, summarize and report the disease events in each herd. This should facilitate the prompt identification of disease "outbreaks." The Ontario dairy industry also stands to benefit from having disease data collected and analyzed centrally. Through this effort we can generate large sets of data that can be used by researchers to learn more about the causes and relationships of metabolic and infectious

diseases in dairy cattle, with an aim at improving our disease prevention programs. There is also an increasing interest in examining the genetic susceptibility to disease within our dairy cattle population. Access to disease data from a large number of herds is required to answer these questions. All of this can only be accomplished through the co-operation of Ontario dairy producers and their veterinarians. In the end, this means that through the sharing of data, we can all benefit.

If you are willing to promote the recording of disease events for entry into Dairy Comp 305 on test day, please talk to your producer clients and their DHI testers about how best to record and code the associated remarks. Examples and templates for standardizing recording of diseases and remarks are available from Ontario DHI (1-800-549-4373).

David Kelton and Victoria Edge,
Ontario Veterinary College

Refrigerator doors and vaccines

Temperatures on refrigerator door shelves are not stable. That's why vaccines should not be stored in refrigerator doors. The instability comes from the frequent opening of the door to retrieve items. It's not just the temperatures on the door - temperatures within the refrigerator also fluctuate when the door opens. To minimize the swings in temperature, store staff lunches and cold drinks in another refrigerator.

The only way to show that a refrigerator is working properly is to monitor temperature. A thermometer, a chart and someone assigned to record temperatures regularly are the only items needed to monitor temperatures. Without these simple tools, it is impossible to assure that vaccines are being stored correctly. Once the system is set up in our clinics, the next step is to advise our clients how to monitor the refrigerators on their farms. Supplying them with a thermometer and checking it during monthly visits would be a great service.

Neil Anderson

Thank You !!

Chickens and mosquitoes on the alert

As mentioned in our last issue of CEPTOR, a joint Ministry of Heath and OMAFRA sentinel project is monitoring chickens and mosquitos for the entry of the West Nile Virus into Ontario. The sentinel project sited small flocks of chickens at eighteen strategic locations in the six migratory bird flightpaths across Ontario. The West Nile Virus Surveillance Team members are collecting blood samples from the chickens and trapping live mosquitoes at the same locations. Both the blood samples and mosquitoes are being tested for the virus to forewarn of a possible intrusion into Ontario.

We asked several veterinary practitioners to enlist the participation of their clients to place the flocks and attend to their care. We extend our thanks to them and their clients for making the sentinel project possible.

David Alves

Resources

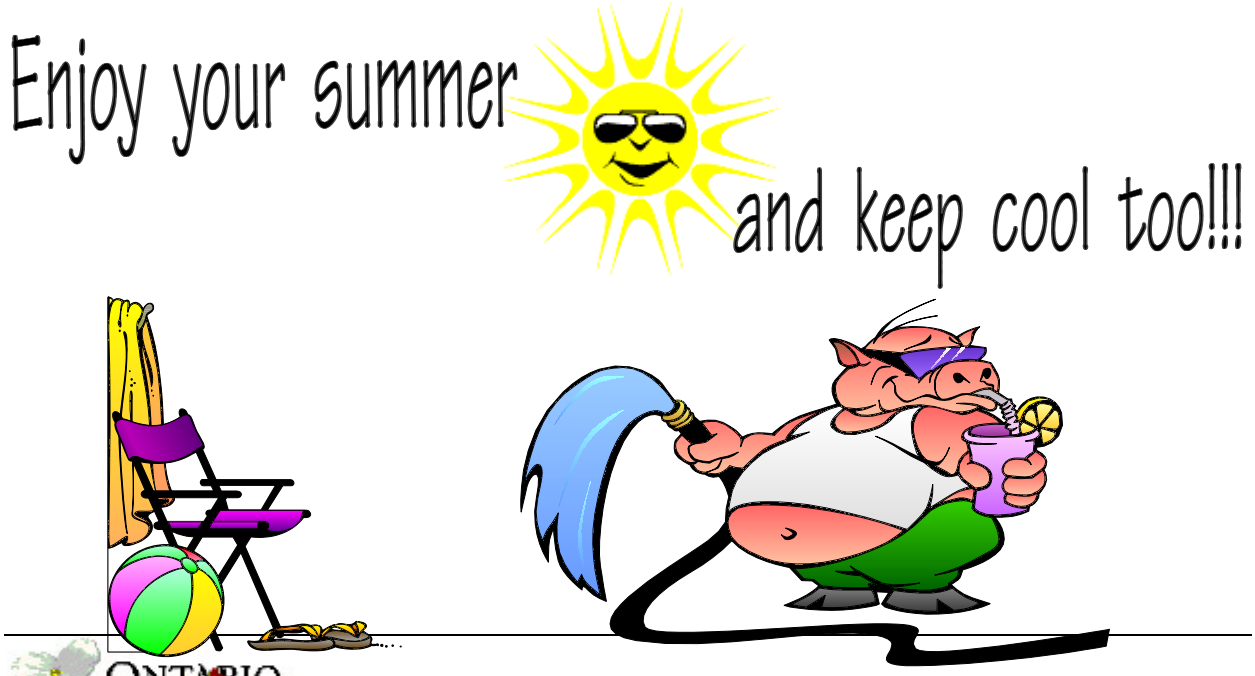
Dr. Jud Heinrichs from Penn State University maintains an extensive website with feeding and management information for calves and heifers, and also nutrition, forage quality and feeding management information for dairy cows.
Try his website at: http://www-das.cas.psu.edu/dcn/

Dr. Jim Quigley maintains the American Protein Corporation Calf Notes website with information about calf rearing.
http://www.americanprotein.com/calf/calfnotes/APCcalfnotes.htm

Dr. Jennifer Ivany and the Food Animal Medicine Faculty at Ohio State University present a website with information about alert and depressed downer cows. You will find a tutorial and list of differential diagnoses.
Try their website at: http://www.vet.ohio-state.edu/docs/ClinSci/bovine/downer/downer.htm

Information about the Canadian Cattle Identification Program is available from: Holstein Canada at 519-756-8300 or http://www.holstein.ca or the Canadian Cattle Identification Agency in Calgary at 877-909-2333 or http://www.cattle.ca/ccia .

The Tipping Point, *How Little Things Can Make a Big Difference,* by Malcolm Gladwell is an excellent summer read. Chapters include: The Three Rules of Epidemics; The Law of the Few: Connectors, Mavens and Salesmen; The Stickiness Factor: Sesame Street, Blue's Clues, and the Educational Virus; The Power of Context; two chapters with case studies; and Conclusion: Focus, Test, and Believe.



Continuing Education

July 11-13, 2000	Mid-Atlantic Dairy Grazing Conference, Abingdon,VA. http://fbox.vt.edu/E/ehovingh/index.html or Phil Blevins, Extension Agent, Washington County Extension Office, 234 W. Valley St. Suite B, Abingdon, VA. 24210, 540-676-6309, pblevins@vt.edu
July 20-22, 2000	2000 Foot Health Conference, Duluth, MN. Nichelle Martin, Baraboo, WI 608-355-7671 or nichelle@midplains.net for a brochure.
August 7-11, 2000	International Society of Veterinary Epidemiology and Economics Conference, Breckenridge, CO http://www.cvmbs.colostate.edu/cveadss/isvee.htm
August 11-15, 2000	Allen D. Leman Swine Conference, Hyatt Regency Hotel, Minneapolis, MN. 1-612-624-3434; swans032@tc.umn.edu
August 17-18, 2000	26th Annual Food Animal Short Course, College of Veterinary Medicine, Ohio State University, Colombus, OH. Contact Rita Remy at 614-292-9193 or remy.1@osu.edu or see http://www.vet.ohio-state.edu/docs/ce/classes/html/foodanimal.gif
August 18-23, 2000	Poultry Science Association Conference and World Poultry Congress and Marek's Disease Symposia. Palais de Congres, Montreal, QC. Congress Secretariat, Montréal, Tel: 514-286-0855 Fax: 514-288-7945 http://www.wpc2000.org
August 24, 2000	National Mastitis Council summer regional meeting, Cleveland, OH. Topics include reproduction and mastitis, trouble shooting high bacteria counts and identifying cow comfort issues. http://www.nmconline.org
Sept. 21-23, 2000	American Association of Bovine Practitioners 33rd Annual Conference, Rapid City, South Dakota. J. Jarrett. 706-232-2220 aabphq@aabp.org
Sept. - Oct., 2000	Bovine Reproductive Ultrasound Classes for Veterinarians. Wisconsin Dairy Extension Team. Dates and locations are Sept. 28-29, Tidyview Dairy, Kaukauna, WI; Oct. 6-7, and Oct. 20-21, Marshfield Research Station, Marshfield, WI; Oct. 26-27, Tidyview Dairy, Kaukauna, WI. Contact Dr. Jill Colloton, 715-353-2232 or colloton@home.dwave.net
Oct. 13-15, 2000	Kentucky VMA meeting and Mid-America Veterinary Conference, Galt House East, Louisville, KY. Contact KVMA, 800-552-5862 or kvma@aol.com

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Email: . . . . . .

Please return this form with your comments to:

Neil Anderson, Veterinary Science, OMAFRA,
Wellington Place, R.R. # 1, Fergus, Ont. N1M 2W3

Tel: (519) 846-3410 Fax: (519) 846-8101

Topics for future issues include: . . . . . .

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Deadline for next issue: **October 2, 2000**

Bovine Reproductive Ultrasound Class for Veterinarians

Dr. Jill Colloton is willing to bring her hands-on training class to Ontario. First, we need to know if Ontario practitioners want the course. We need 8 or more practitioners and access to cows for hands-on training. Dr. Colloton offers two general time slots - September 2000 or Spring of 2001.

Please reply by July 22 and we will proceed accordingly.

Yes, I would participate in an ultrasound workshop held in Ontario.

I prefer the following time:

September 2000

Spring 2001