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# Veterinary Practice Project—Motivating Clients to Change Transition Cow Facilities and Management

Brian Keith, Rideau-St. Lawrence Veterinary Services, Kemptonville, Ontario

On Friday, December 7<sup>th</sup> 2012, a group of 20 dairy producers, clients of Rideau-St. Lawrence Veterinary Services, and our two dairy veterinarians toured a number of dairy farms in New York State. The tour was part of a focus group project set up by producer and veterinary participants to learn more about transition-cow-facility design and management. The group wrote a proposal and received financial support from the Agricultural Management Institute for the project. The first part of the project consisted of a workshop on designing ideal transition-cow facilities, facilitated by Dr. Nigel Cook of the University of

Wisconsin, held in October. The second part of the project was the tour to visit New York dairy farms with well managed transition-cow programs.

We toured four farms (herds sizes ranged from 250 to 1100 cows) that have a lot of success transitioning their dairy cows from the close-up dry period to early lactation. All four herds had minimal fresh cow diseases (Displaced abomasum rates of 0.5 to 3%, ketosis rates less than 5%, and retained placenta/metritis rates of 3 to 8%). The important highlights of the farms that contributed to this success were:

- deep-bedded sand stalls with adequate stall dimensions and design to enhance cow comfort,
- 80% stocking densities in the close-up pens to allow for a minimum 30 inches of bunk space per cow, and
- either all-in-all-out close-up pens or weekly pen moves to maintain as much social stability as possible.

These are all factors Dr. Cook had presented to the group as critical for optimal transition-cow performance and something all dairy herds should strive for and their herd veterinarians should promote.

Dr. Cook's workshop prepared the group for what to look for. We hope that the additional trip to visit farms that were successfully implementing the recommendations will encourage our clients to modify their own transition-cow facilities or management to improve fresh cow health and performance on their own farms. Evaluations of the workshop filled out by the participants revealed it was a very educational session with a lot of valuable information that could be applied to their own farms. The New York tour generated some good discussion about each farm and how applying Dr. Cook's guidelines to transition-cow facilities can produce excellent results.

*(Continued on page 3)*

**Ceptor is published by:** Veterinary Science and Policy Unit, OMAFRA

**Editor:** Ann Godkin

Graphics, layout and editing support provided by Ora Zondervan, Regional Economic Development Branch

**Website:** [www.ontario.ca/livestock](http://www.ontario.ca/livestock)

**Archived Issues of Ceptor:** [www.oabp.ca](http://www.oabp.ca)

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In conclusion, the project was very successful in promoting ways for producers to make improvements in the overall productivity of their farms. In my opinion, this was a good place to start. I've already had a number of participants suggest we do this for other topics. Although it does take up some

of your time, I found it very rewarding to be able to provide my clients with an avenue for gaining knowledge on an important topic related to their operation, and to engage them in discussions that will lead them to institute management changes as a result.

## Ceptor Forum

### News, Commentary and Suggestions

## Marketing Best Management Practices for Milk-fed Calves

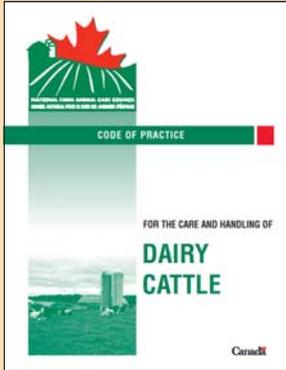
Neil Anderson, Veterinary Science and Policy Unit, OMAFRA

Without doubt, best management practices (BMPs) for milk-fed calves are good marketing tools. In 2009, had Dairy Farmers of Canada (DFC) defined BMPs as marketing rather than welfare practices, adoption might be quicker by producers and their advisors.

For decades, the emphasis has been on restricted feeding of milk or milk replacer (MR) and housing in hutches or individual pens. The focus has been on balancing nutrition with economics but not on marketing milk products to consumers.

Consumers expect milk producers to provide the highest level of care for their animals. It follows that suppliers of goods and services to farmers should provide feeding, management and health advice that strengthen marketing activities and meet the expectations of consumers.

Suckling, group rearing and nutrition programs for calves are fantastic marketing tools compared to some conventional rearing practices. In recent years, some MR manufacturers and distributors have augmented their feeding recommendations. Their new mixing ratios are closer to the solids content of whole milk. Daily feeding allowances are inching closer to DFC's standards. Mob and automated feeders necessitated the adoption of group rearing. Automated feeders are being programmed and free-access feeding systems adopted so calves can gain closer to their genetic potential. Ventilation specialists are introducing positive pressure fresh air systems to housing. Company officials, their



The Recommended Best Management Practices (BMPs) for calf feeding appear on page 17 of the Code of Practice for the Care and Handling of Dairy Cattle (2009). ([www.nfacc.ca/codes-of-practice/dairy-cattle](http://www.nfacc.ca/codes-of-practice/dairy-cattle)) One example is, "offer calves a minimum total daily intake of 20% of body weight in whole milk (or equivalent nutrient delivery via milk replacer) until 28 days of age".

employees and the usual core of on-farm advisors deserve praise for their contributions and efforts.

In spite of all the useful contributions, widely available knowledge and the passage of time, it's puzzling to witness inaction, slowness to change or out-and-out disagreement as sometimes seen in the field.

MR labels provide examples of inconsistency or indifference. There may be a 7% spread in recommendations for total solids content in a mix. Feeding schedules may result in weight loss, maintenance of body weight, or weight gain that is less than a calf's genetic potential. Labels tell us to follow directions, ask someone else for guidance, feed what you think is needed, and to look elsewhere for reasons for poor results.

*(Continued on page 4)*

What should be happening? Nutritionists and feed advisors should stop their waffling and disentangle their muddle. In fairness to our nutritionist colleagues, legal or marketing fluff may contribute to some, but not all, of the label confusion.

MR should be mixed to achieve a total solids content equal to whole milk. Feeding guidelines (i.e., daily nutrient intakes) should result in optimal gain from milk sources in the first 28 days of life. Labels should include the expected daily gain at their feeding levels. Realistically, nutritionists should give us feeding guidelines that support BMPs for calf well-being, farm profitability and meeting consumer expectations.

MR powders should be formulated to allow feeding at levels for optimum growth without the risk of poisoning from trace nutrients or medications. Labels should be on white paper with black print for ease of reading. Directions for mixing and feeding should be clear and concise and available in large print or graphical format for posting in the barn. Advisors should routinely observe, measure and weigh to be sure of compliance.

Automated calf feeders should be marketed as ways for farmers to meet consumers' expectations and DFC's BMPs and not for restricted feeding. They should be pre-programmed with mixing ratios, volume per meal and volume per day to meet Canadian BMPs and normal feeding behaviour of calves. Computer feeding specialists and on-farm support persons should know the BMPs and support their implementation.

Advisors should stop advising producers to withhold milk from neonatal calves to encourage grain consumption. It is contrary to calf well-being. As every producer knows, the advice to deprive calves of hay only forces them to eat contaminated

bedding. Why not feed forage in a clean trough? Even week-old calves want and need forage. Let them have it.

Science-based, nature-based, moral or ethical decisions on calf-rearing are a matter of choice. Consumers expect members of our dairy industry to make wise choices. Enough laboratory and on-farm research has been done to move to the next step. It's time to study what the best are doing, figure out how to standardize it, and then help all producers to follow suit.<sup>(1)</sup> This formula works for many businesses and is successful for dairy farms, too.

DFC's wait-and-see approach to implementing BMPs allows producers and their advisors time to change attitudes, opinions, knowledge and actions. DFC calls this "voluntary continuous improvement". In effect, early adopters find what does not work and what does work. Thankfully, producers share their findings; helpful advisors spread the word; and other producers avoid the costs of experimentation.

What would help dairy producers to adopt new calf-rearing practices? Timely adoption may be easier if BMPs were seen unmistakably as well-being practices as well as marketing strategies.

Voluntary continuous improvement is also a choice for advisors who provide product and service about calf feeding. Here is a remarkable opportunity for all to unite in a common goal – the well-being of milk-fed calves, farm profitability, and marketing of nutritious milk.

1. *Gawande, Atul. Big Med. The New Yorker. August 13 & 20, 2012; 53-63.*  
[www.newyorker.com/reporting/2012/08/13/120813fa\\_fact\\_gawande](http://www.newyorker.com/reporting/2012/08/13/120813fa_fact_gawande)

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## Warm Propane Makes Great Smoke

*Neil Anderson, Veterinary Science and Policy Unit, OMAFRA*

A propane-powered insect fogger and light mineral oil will make a lot of smoke for checking positive-pressure ventilation systems. Alas, it fails miserably with cold propane.

Here's my tip. Warm the propane cylinder in hot water prior to using it. It will light and operate like it does during warm summer weather. I don't know what will happen if you use extremely hot water. You are on your own.

# Ontario Johne's Program – Last Chance for Participation

Ann Godkin , Veterinary Science and Policy Unit, OMAFRA

The four-year Ontario Johne's Education and Management Assistance Program wraps up over the next 10 months, ending in October 2013. So far approximately 50 to 60% of producers per county have participated in the full program. The final three windows for the first round of participation (initial testing) will be completed as of May 2013.

Herd owners who still wish to participate but missed their original opportunity, or who tested once but wish to test a second time, will be allowed a final chance for participation.

The Ontario Johne's Program working group has created the following plan for additional participation. For all testing under the Ontario Johne's program a Testing Submission Form must be completed and submitted with milk or blood samples. The form is available on the Johne's website ([www.johnes.ca](http://www.johnes.ca)).

The two additional testing and participation opportunities offered are:

- For herd owners that have **never** participated (those herds never tested between January 2010 and January 2013) - full lactating herd testing between February 1<sup>st</sup> and March 31<sup>st</sup>, 2013.
- For herd owners that have **previously** participated (includes herds that tested after January 1 2010) - full lactating herd testing between April 1<sup>st</sup> and May 31<sup>st</sup>, 2013.

**Prior sign up is not required for herds participating in the program for the first time.**

**Sign up is required for herd owners wishing to test a second time. This enrollment started January 2nd, 2013.** For the second round of participation, enrollment is "first come, first serve". The number of herds able to be tested a second time will depend on the funds available. The date and time of sign up are noted, and the signup list will be used to determine the order of inclusion should demand be greater than funding allows. Herds

accepted for a second round of participation must receive confirmation from the Johne's program coordinator before proceeding.

To sign up, a request must be sent to either [johnes@uoguelph.ca](mailto:johnes@uoguelph.ca) OR to (226) 979-1664. The request must include the producer's DFO license number, full herd owner name, the approximate number of lactating cows to be tested and a phone number or e-mail address for contact.

Testing can be done using either DHI test day milk samples (at CanWest DHI) or blood samples (Animal Health Laboratory, Guelph). Producers are referred to veterinarians for details regarding testing. Non-DHI herds should contact DHI if they wish to test using milk samples. All testing is for the full lactating cow herd only.

Program activities for this final round of testing are the same as those for the original program and are explained in more depth on the Johne's website at [www.johnes.ca](http://www.johnes.ca)

Test costs of \$8 per cow are rebated provided the full requirements of the program are completed. To receive reimbursement enrolled producers must:

- Test the full lactating cow herd
- Complete a Risk Assessment and Management Plan (RAMP) with a trained veterinary practitioner
- Dispose of all High Titre (HT) cows found on testing (HT cows are those with test results of 1.0 or higher, but are NOT all positive cows) by burial, composting or deadstock removal. HT cows continue to be eligible for reimbursement provided disposal is done as required and prior to the next calving after testing.
- Complete all program requirements within 90 days of test date.

*(Continued on page 6)*

Herd owners participating for a second time, and who have completed a RAMP within the 12 months prior to their second herd test, will be exempt from completing an additional RAMP.

For more information contact the program directly at [johnes@uoguelph.ca](mailto:johnes@uoguelph.ca) or (226) 979-1664. Further information is also available from Ann Godkin, OMAFRA, Elora, [ann.godkin@ontario.ca](mailto:ann.godkin@ontario.ca) or (519) 846-3409

## Formaldehyde Footbaths for Dairy Cattle— Human Safety Information

**Gerard Cramer, Cramer Mobile Veterinary Services, Stratford, Ontario**

The Canadian Quality Milk (CQM) program has stimulated producers using formalin footbaths for the control of Bovine Digital Dermatitis to request prescriptions for this extra-label use from their herd veterinarians. Veterinarians fulfilling such requests require scientific information regarding both human and animal safety, as well as withdrawal information, to support their recommendations.

A recent small study by the Vermont Department of Health set out to address some of the safety concerns with formalin use in footbaths and contributes to general safety knowledge regarding on-farm use. The full study write-up is available at <http://tinyurl.com/ag4274z>

In the article, the Vermont group summarize the concerns with formaldehyde. “Formaldehyde exposure can cause irritation of the eyes, nose and throat, as well as headaches, fatigue and dizziness. Concentrations in air from 100 to 500 parts per billion (ppb) can lead to nasal and eye irritation in humans, as well as an increased risk of asthma (ATSDR, 2010). Exposure to formaldehyde at 600 to 1,900 ppb in air can lead to changes in pulmonary function (ATSDR, 2010). Skin exposure to formaldehyde (1 to 5% solutions) can cause irritation and allergic contact dermatitis. Repeated skin exposure to formaldehyde can lead to sensitization, resulting in allergic reactions at concentrations much lower than the original exposure level.

Formaldehyde is a known human carcinogen. Formaldehyde that enters the body is broken down into formic acid, which has low toxicity and is excreted in urine. Formaldehyde does not bioaccumulate in the body. When the air concentration of formaldehyde exceeds the body’s

capacity for detoxification, formaldehyde is able to enter the body and exert carcinogenic effects.

In the environment, formaldehyde rapidly degrades under both aerobic and anaerobic conditions.

Formaldehyde is very soluble in water and is efficiently transferred into rain and surface water where it biodegrades to low levels within a few days (ATSDR, 1999). Formaldehyde is broken down in the air by sunlight. The half-life of formaldehyde in air is 1.6 to 19 hours, depending on air quality.”

The key results from the Vermont group’s study are summarized as follows. They sought to determine if the spreading of manure from farms using formalin footbaths would lead to excess formaldehyde concentrations in the air. For the study, formaldehyde levels in the air were measured at three different dairy farms at different time points. Two of the farms were using formalin footbaths and one was not. Locations sampled included: the formalin dispensing area, the air right above the footbath at filling and emptying, above the manure pit, in the milking parlour and in the cow feeding area. Additionally, a farm worker dispensing the formalin wore a sampling device to measure the formaldehyde concentration in the air they were breathing.



*(Continued on page 7)*

In the US, the personal exposure limit for formaldehyde is 750 ppb over eight hours. The Canadian recommendation for indoor air quality for short term (one hour) is <100 ppb and <40 ppb for long-term exposure.

The findings in this study showed that the background formaldehyde level on the control farm was 10 ppb. At the two farms that used formalin footbaths, formaldehyde was detected in the air at concentrations ranging from 420 to 590 ppb. Areas sampled included the air directly above where the concentrated formaldehyde was dispensed, directly above the footbaths during use, and as the footbaths were being emptied. The air concentrations were highest (1300 ppb) in the storage area immediately after formaldehyde was dispensed. Even with the high formaldehyde concentrations, the air sampled from the farm worker handling the formalin was always below the detection limit (9 ppb). None of the samples taken from the manure storage before and during spreading tested above 20 ppb.

To summarize, this study detected short-term levels above the Canadian recommended level for indoor

air. However, the person handling the formalin did not breathe in these high levels. Based on these findings, the risk associated with formalin footbaths can be managed by:

- Minimizing direct exposure and contact,
- Having good ventilation in the storage area and near the footbath.
- Wearing proper clothing, including a protective splash shield with air filters.

ATSDR, 1999. *Toxicological profile for formaldehyde*.  
<http://www.atsdr.cdc.gov/ToxProfiles/tp111.pdf>

ATSDR, 2007. *An update and revision of ATSDR's February 2007 health consultation: Formaldehyde sampling of FEMA temporary-housing trailers*.

ATSDR, 2010. *Addendum to the toxicological profile for formaldehyde*.  
[http://www.atsdr.cdc.gov/ToxProfiles/formaldehyde\\_addendum.pdf](http://www.atsdr.cdc.gov/ToxProfiles/formaldehyde_addendum.pdf)

Environment and Health Canada, 2001. *Priority substances list assessment report—formaldehyde*.  
<http://tinyurl.com/aqlwrbu>

## Contraindication for Bicarbonate-containing Oral Electrolytes for Calves

Neil Anderson, Veterinary Science and Policy Unit, OMAFRA

Geof Smith's research cautions us to reconsider using bicarbonate-containing oral electrolyte solutions (OES) for treating calves with rumenitis, omasitis and abomasitis (ROA). I reported on the syndrome and a treatment regime including bicarbonate from a paper by A. Gentile (2004) in **Ceptor** Animal Health News, JUNE 2011. Smith recommends acetate-containing OES to avoid persistently high abomasal luminal pH and the growth of enteropathogenic bacteria. Here is the abstract and reference for his research.

**Smith GW, Ahmed AF, Constable PD. : Effect of orally administered electrolyte solution formulation on abomasal luminal pH and emptying rate in dairy calves: Journal of the American Veterinary Medical Association 2012; 241:1075-1082.**

**Objective**—To determine the effects of three commercially available, orally administered electrolyte solutions (OAEs) on abomasal luminal pH and emptying rate in dairy calves, compared with the effect of orally administered milk replacer.

**Design**—Randomized crossover study.

**Animals**—Six male dairy calves (age 12 to 31 days).

**Procedures**—Calves were surgically instrumented with an abomasal cannula and were administered four treatments in randomized order: all-milk protein milk replacer, high-glucose high-bicarbonate OAE, high-glucose high-bicarbonate OAE containing glycine, and low-glucose OAE containing acetate and propionate. Abomasal luminal pH was measured with a miniature glass pH electrode prior to treatment administration and every second afterward for 24 hours.

*(Continued on page 8)*

**Results**—Feeding of orally administered milk replacer resulted in a rapid increase in mean abomasal luminal pH from 1.3 to 5.8, followed by a gradual decrease to pre-prandial values by eight hours afterward (mean 24-hour pH, 3.2). High-glucose, high-bicarbonate OAEs caused a large and sustained increase from 1.3 to 7.5 (mean 24-hour pH, 4.1 for the solution without glycine and 3.5 for the solution with glycine). In contrast, feeding of the acetate-containing OAE was followed by only a mild and transient increase (mean 24-hour pH, 2.1); luminal pH returned to pre-prandial values by three hours after ingestion.

**Conclusions and Clinical Relevance**—Ingestion of a bicarbonate-containing OAE resulted in sustained abomasal alkalization in dairy calves. Because persistently high abomasal luminal pH may facilitate growth of enteropathogenic bacteria, administration of OAEs containing a high bicarbonate concentration (> 70mM) is not recommended for calves with diarrhea.

## **Formic Acid May Harm Coatings on pH Meter Probes**

**Neil Anderson, Veterinary Science and Policy Unit, OMAFRA**

A producer replaced several pH meters before discovering that formic acid was destroying the protective coating on the pH meter probes. He now buys and uses narrow-range pH paper. The paper must be kept in a dry environment, away from high ammonia levels.

For others with similar problems, here is one Ontario source for the pH paper. There may be other sources.

This is pH Paper # 325 by Micro Essential Labs. It covers the pH range of 3.0 to 5.5 and is packaged rolls enclosed in a plastic dispenser. There are 10 rolls in a box.

The Ontario distributor is:

VWR International  
2360 Argentia Road  
Mississauga, ON  
L5N 5Z7

Telephone: 1-800-932-5000

VWR product number is 60784-102.

VWR will ask you to set up an account before completing the sale.

## **Salmonella Dublin—OMAFRA May Subsidize Some Laboratory Fees.**

**Neil Anderson, Veterinary Science and Policy Unit, OMAFRA**

An article on page 23 of this issue of **Cepton** alerts practitioners to a recent diagnosis of *Salmonella* Dublin associated with respiratory disease in Ontario calves. To enhance surveillance for *Salmonella* Dublin in 2013, OMAFRA may subsidize the cost of specific laboratory fees for some sample submissions from suspect animals. To qualify, Ontario practitioners must receive prior approval by contacting Ann Godkin, (519) 846-3409,

[ann.godkin@ontario.ca](mailto:ann.godkin@ontario.ca), or Neil Anderson, (519) 846-3410, [neil.anderson@ontario.ca](mailto:neil.anderson@ontario.ca). Our primary focus is novel outbreaks of respiratory disease with high morbidity and mortality in calves ranging from one week to 4-6 months of age. From clinically ill calves, suitable specimens may include lung tissue, feces, or the entire calf. Specimens from mature cattle may be considered in outbreaks of severe diarrhea or abortions.

# Slant-bar Restraints for Feed Bunks

Neil Anderson, Veterinary Science and Policy Unit, OMAFRA

In free-stall barns, hair loss and blemishes on necks are often associated with repetitive contact with restraints at the feed bunk. This article describes modifications to slant-bar restraints to prevent the injuries. It also summarizes some guidelines for construction.

Shortly after entry to their new free-stall barn, our case study cows had unsightly blemishes high up their necks in the area of the supraspinous processes. The top rail of slant-bar restraints was the obvious point of contact. The injuries arose because of mismatching of cow size (height at her top line) with the manufacture of the slant-bar panels.

The cows in **Figure 1** contact the horizontal top pipe of the slant-bar restraint at the feed bunk. The distance from the standing alley to the top of the bottom horizontal pipe is adequate at about 22 inches. However, the distance from the standing alley to the bottom of the top horizontal pipe is too low for the cows in this herd. They contact the pipe. The result is hair loss, hair ruffling, gall, callous, hygroma, or bursitis. It would be a mistake to raise the slant-bar panels because that 'fix' would set the bottom pipe too high and create problems with ease of access to feed and repetitive injuries at another body site.



**Figure 1.** shows pre-manufactured slant-bar restraints installed on top of a 20-inch conventional curb at a feed bunk in a free-stall dairy barn. The mismatch of cow size (height) and slant-bar design is apparent because most cows contact the horizontal top pipe of the slant bar installation.

The owner rebuilt the slant-bar restraints shown in **Figure 1** to dimensions shown in **Figure 2**. A local shop made longer slant bars. The clamps and top and bottom horizontal rails are from the original equipment. The top horizontal pipe is about two inches higher than the top line of the tallest cow in the herd. This on-farm research is a work in progress. The bends in the slant bars were a challenge. Time will tell if the angles need to be modified to avoid contact of the slant bar high up on the necks.



**Figure 2.** shows the rebuilt slantbar restraint with longer slant bars and the top rail higher than the top line of the tallest cows in the herd.

Practical aspects of slant-bar design, construction and installation appear in the following list.

- Slant-bar restraints are built in panels, rest on the top of the manger curb, and are fixed to mounting posts.
- Slant-bar restraints have a top and bottom rail with slanted bars on 12- to 14-inch centres for mature Holstein cows.
- The top bar must be located higher than the withers height of the tallest cow in the group.
- The top of the slant-bar panel may be offset over the manger by 6 to 8 inches.
- The height of the concrete curb plus the bottom bar of the panel should be about 20 inches for mature Holsteins. Allow for the thickness of the bottom bar when building the concrete curb.

*(Continued on page 10)*

- Slant-bar restraints minimize bullying, displacements at the bunk, wastage of feed, or injuries to necks.
- Dimensions of the animals in the pen should be used to design and install slant-bar restraints for heifers.

Blemishes on necks may be seen with self-lock head gates and post-and-rail restraints. The design and dimensions of slant-bar and self-lock head gates

must be matched to the height of the cattle in the pen. In addition, the height of the concrete manger curb is an important consideration. A post-and-rail system may cause severe injuries in the area of the supraspinous processes with a high mounting position. An alternative may be a low mounting position that results in hair loss along the nuchal ligament. A feed front would keep feed within easy reach of the cows and it may be an asset in barns with post-and-rail restraints.

## Impact of Reducing the Ontario BTSCC Regulatory Limit to 400,000 cells/mL

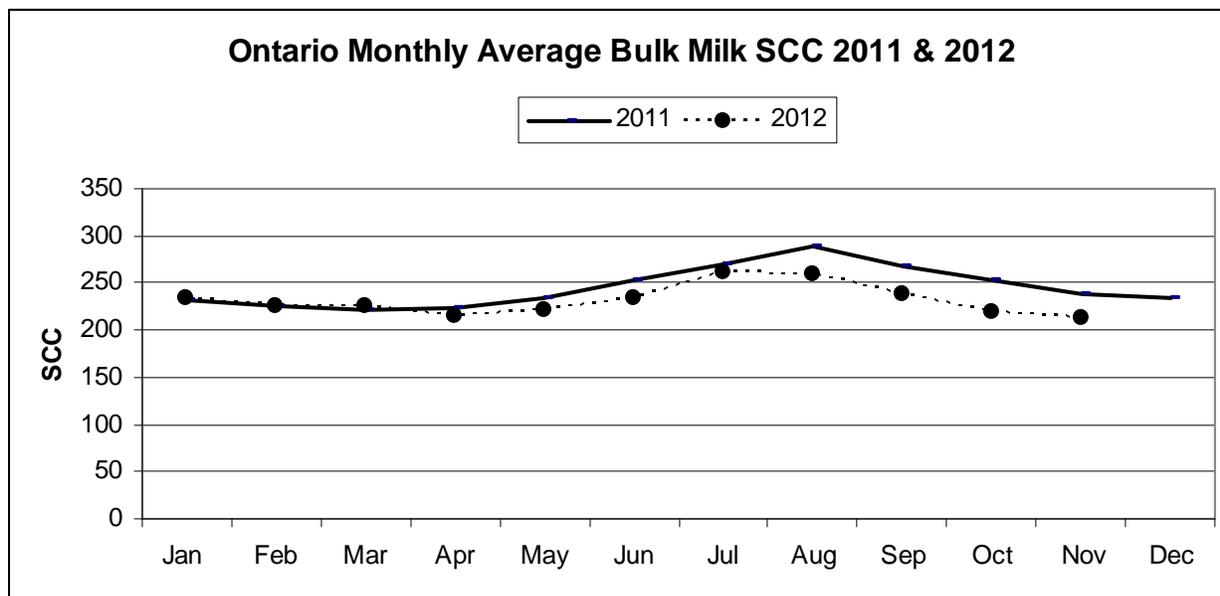
**Ann Godkin, Veterinary Science and Policy Unit, OMAFRA  
David Kelton, Department of Population Medicine, Ontario Veterinary College, Guelph  
and Karen Hand, Strategic Solutions Inc., Puslinch**

On August 1 2012, the new regulatory limit for bulk tank SCCs (BTSCCs) of 400,000 cells/mL took effect in Ontario. Producers must keep monthly average BTSCCs below this level to avoid a reduced milk price (penalty) due to poor quality and to maintain their market for their milk.

The impact of the regulatory change remains to be determined over time; however, the early indication is that the BTSCCs of milk sold in Ontario have decreased. In **Figure 1**, a graph of the monthly

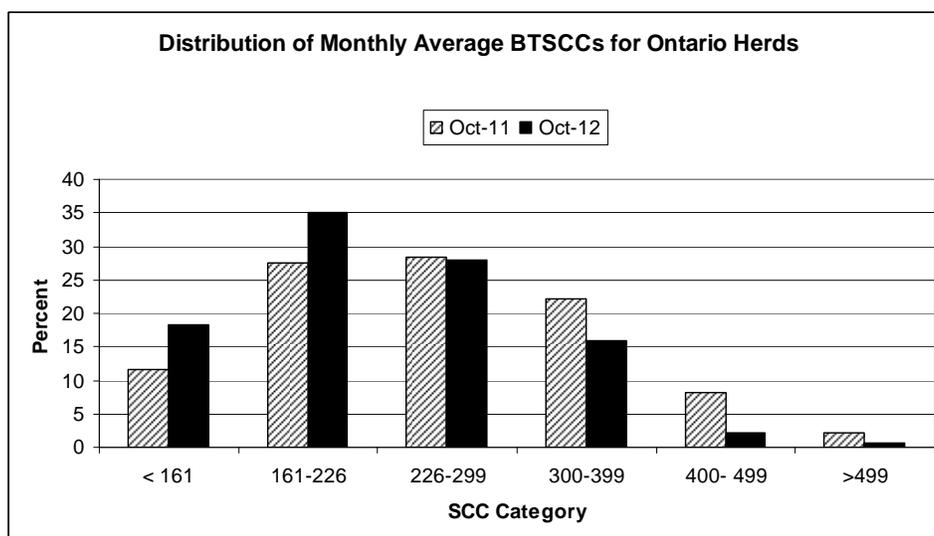
BTSCCs for the province, the BTSCCs for 2012 are compared to those for 2011. From April 2012 to November 2012 (the last month for which we currently have data), the count has been lower in 2012. The monthly average BTSCCs in August and September, typically the highest count months each year, were 260 and 239 respectively in 2012. **Figure 2**, the distribution of producer BTSCCs in October 2011 and October 2012, shows that the reduction has occurred because of a general shift of herd counts to the lower percentages in 2012.

**Figure 1. Bulk Milk SCC Test Results for all Ontario Dairy Farms (4,071 herds)**



*(Continued on page 11)*

Figure 2. Distribution of Monthly SCCs for October 2011 and October 2012



Given the response that shows lower BTSCCs, we need to look at why such success has occurred so that we can be sure the improvements are maintained in 2013 and beyond.

Optimistically, farm BTSCCs may be lower because the cows contributing to the bulk tank actually had lower SCCs (less mastitis) or, more pessimistically, it may be because cows with high SCCs were excluded from the bulk tank. Cows can be excluded temporarily (i.e. while under treatment or selectively held out) or permanently (culled). If the removal of high-SCC cows from the tank is the reason for the lower bulk tank SCCs, then mastitis prevention has not truly occurred. Herds using this strategy would be at risk of having seasonal mastitis again in future years.

Examining the reasons producers report to CanWest DHI for cow culling and the SCCs of cows culled from Ontario herds is one way to investigate if cow removal is a large part of the reason for SCC improvement.

In **Figure 3**, the distribution of reasons reported for cows culled in June to September of 2012 are

shown, compared to those for 2011. The graph shows that the proportion of cows producers reported as culled for mastitis or elevated SCCs was higher in 2012.

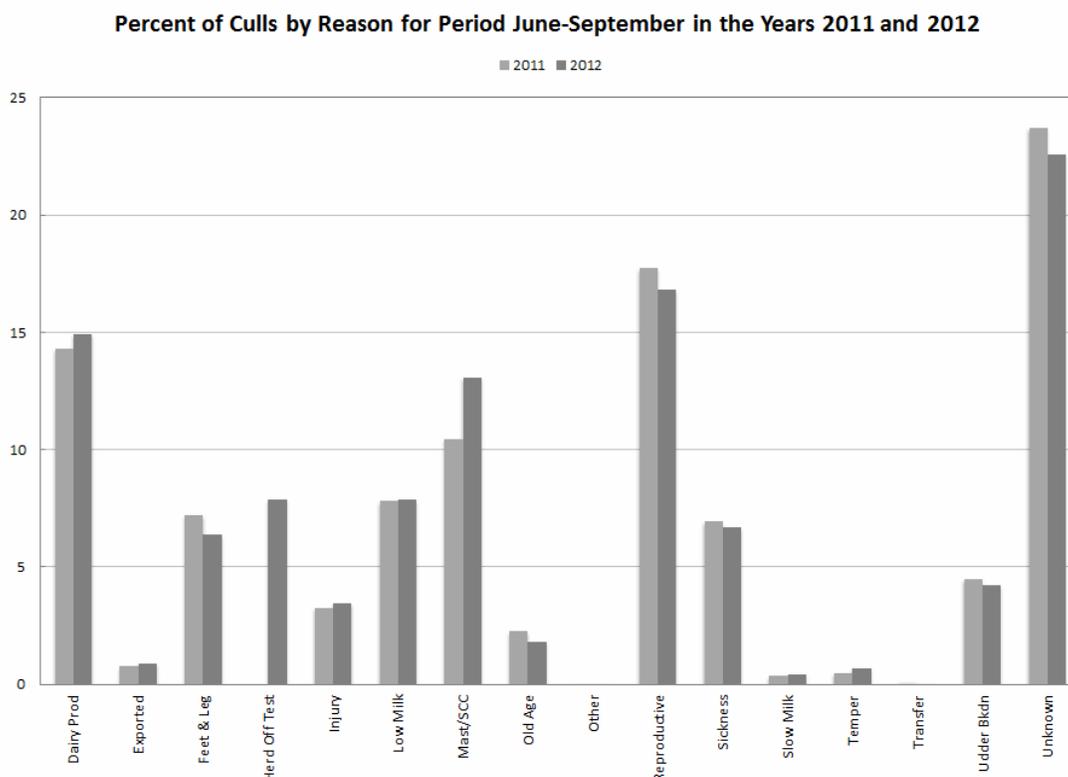
For the same time period, June to September 2011 and 2012, a statistical analysis was performed using individual cow data from Ontario's DHI herds. The SCCs at the last DHI test prior to culling, after controlling for herd production and average SCC were compared. The average SCC for culled cows in 2011 was 385, while in 2012 it is 412. This difference was statistically significant at  $p < 0.01$ .

This preliminary analysis suggests that veterinary practitioners should investigate the reasons for BTSCC improvement this past year on their clients farms. If improvement has occurred predominantly because of the removal of high-SCC cows, the farm may remain at risk of seasonal mastitis in summer and fall in 2013. Now may be the time to discuss calving patterns, maternity facilities, maternity pen management and heat abatement.

Removing high-producing cows for preventable mastitis is an expensive way to keep BTSCCs low. Preventing seasonal, environmental mastitis in fresh cows is far more cost effective.

*(Continued on page 12)*

Figure 3. Percent of cows culled by reason in June to September 2011 and June to September 2012



## Interpreting Mast 3 PCR Results for *Staph aureus*

*Ann Godkin, Veterinary Science and Policy Unit, OMAFRA*

*David Kelton, Department of Population Medicine, Ontario Veterinary College, Guelph*

Use of the Mast3 PCR offered by CanWest DHI has become very popular with veterinarians and dairy producers. Use of this test, a PCR done using DHI cow milk samples, requires examination of test interpretation.

The Mast3 PCR tests milk for the presence of *Staphylococcus aureus* DNA (as well as DNA of *Strep ag* and *M. bovis*) in the DHI milk sample. DNA can enter the milk as part of live or dead bacteria, from within the udder (mastitis) and/or from teat skin contamination. Thus detection of DNA in a cow milk sample may not always indicate that active udder infection (mastitis) is present.

*Staph. aureus* (SA) mastitis is a very dynamic disease in its early stages. In herds where the teat ends of milking cows are frequently exposed to SA bacteria at milking time, cows and heifers likely become infected and clear infections frequently. Until survey testing is done, we rarely know the frequency with which this occurs. Exposed cows that cannot clear

the SA go on to become persistently infected “Staph cows” with chronically elevated SCCs and mastitis refractory to therapy. If only cows with persistently elevated SCCs are selected for mastitis testing, the impression is left that all SA-positive cows have high SCCs all the time and that all cows with positive SA tests must be persistently infected. This is not the case, especially in the early stages of infection.

Frequent use of the Mast3 to identify SA in cow milk samples, (over 45,000 cow milk samples have been tested in the last two years) is providing a broader picture of herd mastitis patterns. The Mast3 results must be interpreted in light of the cow’s indicators of mastitis (“Is this cow/heifer’s SCC elevated?” “Has this cow/heifer had clinical mastitis or been treated for mastitis?”) and the herd history (“Is this a Staph herd where exposure of teat skin, teat ends and glands is likely and frequent?” “Is this a herd where poor milking time hygiene makes

*(Continued on page 13)*

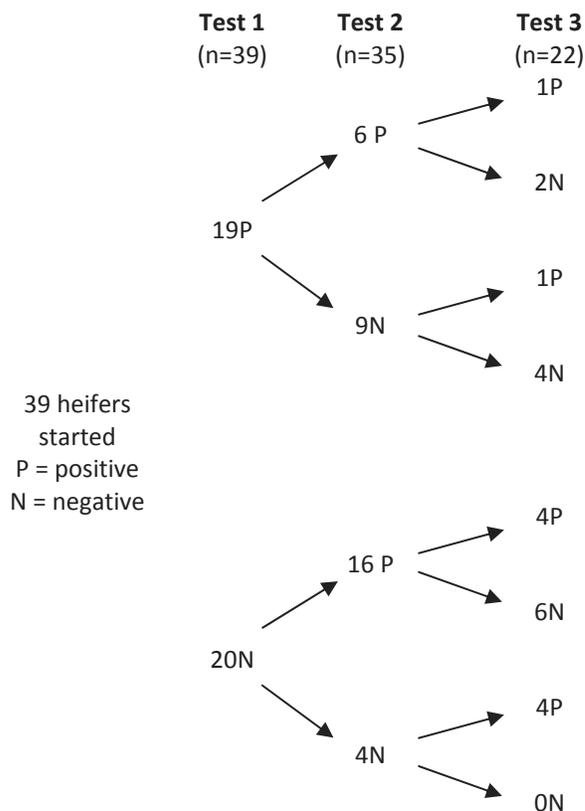
exposure to contagious mastitis very likely?”). When the SA PCR is positive and the SCC is elevated, it is highly likely the cow has mastitis caused by SA. Where the PCR is positive but cow SCC is low, it may indicate that SA contamination from teat skin is occurring. While mastitis may not be present, the positive PCR does indicate that teat end exposure to SA is quite likely.

Illustrative of the dynamic nature of SA udder infection, 39 first-lactation cows (regardless of mastitis or SCC), calving into 11 herds known to always have cows with *Staph aureus* mastitis, were tested on their first three DHI tests post-calving or until culled. **Figure 1** shows their test results. Ultimately only 22 cows were present for all three tests (**Table 1**). Positive tests were followed by positive tests 11 times and by negative tests 17 times. Of 19 cows positive on their first test, only two were positive on the third test. The study demonstrated that, while SA DNA and often evidence of inflammation was detected in the cows, not all exposures resulted in persistent infection. As has been seen in a number of other studies, when survey testing was done, as in this study (i.e. all first lactation cows were tested regardless of SCCs), most of the first-lactation cows cleared the SA DNA, after exposure in early lactation.

When testing is done using the Mast3, where all animals in a group are tested regardless of SCCs, the dynamic nature of SA infection is demonstrated. Early in the course of SA infection it is unknown whether a particular cow or heifer will be able to clear SA, or whether they will go on to be persistently infected. The Mast3 provides individual cow information but also can provide an indication of the risk of SA exposure and whether transmission from teat to teat is likely occurring.

In summary, to interpret the Mast3 test results you must know how the cows were selected for testing. To diagnose SA **mastitis** you must have evidence of inflammation (increased SCC) and a positive SA test (i.e. positive SA PCR). Where the SA PCR is positive but inflammation is lacking (i.e. the cow SCC is < 100 or heifer SCC < 75) mastitis may not be occurring; however, useful information is provided. In herds with existing SA mastitis cases, skin contamination with SA is common when

**Figure 1. MAST3 Test Results (*Staph. aureus* only) on 39 First-lactation Cows Tested on their First Three DHI Tests Post-calving in 11 Dairy Herds Known to Have Cows with *Staph aureus* Mastitis**



**Table 1. Test Results for First-lactation Cows in 11 Herds on First three DHI Test Days**

	First-lactation Cows Present on Test Day	Positive	Negative
1st Test	39	19	20
2 <sup>nd</sup> Test	35	22	13
3 <sup>rd</sup> Test	22	10	12

milking hygiene (notably post-milking teat dipping) is deficient. Positive SA PCR tests without evidence of inflammation, suggest that a milking time visit and assessment of milking time procedures is warranted. To further evaluate the status of individual cows, where the Mast3 is positive but the SCC is low (< 150 for cows or < 75 for heifers), the Mast3 should be repeated on a subsequent test day if SCC increases or a different test, such as the CMT, should be used to assess inflammation at the quarter level.

# The Ontario Johne's Beef Project

Ann Godkin, Veterinary Science and Policy Unit, OMAFRA  
Paul Stiles and Katie Dettman, Ontario Cattlemen's Association

The Ontario Johne's Beef Project is a pilot initiative for seedstock cow-calf herds conducted last year. The project supported producers to blood test each cow or bull on the farm, two years of age and older, for Johne's. The samples were tested at the Animal Health Laboratory in Guelph, Ontario, for antibodies to *Mycobacterium avium paratuberculosis* (MAP). Once the test results were back, the veterinarian and producer met to discuss the test results and to complete the Johne's Risk Assessment and Management Plan (RAMP) for Beef Cow-Calf Herds.

During the year, 68 herds and their veterinarians completed the full project. Thirty-three veterinarians from 43 practices across the province were involved. In the 68 herds, 3,375 head were tested, including 3,333 cows and 42 bulls. Of the tested cattle, 101 (3%) had a positive test. Of the 68 herds, 35 (51.5%) had at least one positive test and 19 (27.9% of the 68) had two or more positives. Although half of the herds had evidence of Johne's, the good news was that half of these had only one positive animal. For the one third of all participants who had multiple positive tests however, the news was not so good.

As a first step in our Ontario project we wanted to find out how much knowledge about Johne's the project's producers had absorbed. Each veterinarian had their client fill out a 10-question Johne's quiz at the beginning of the herd consultation.

From the quiz responses we learned that 70% of the producers knew, or could get pretty close to, the correct name for the cause of bovine Johne's, *Mycobacterium avium paratuberculosis* (MAP). A very high percentage (96%) knew the main signs of Johne's disease in cattle (diarrhea and weight loss). Most (86%) knew that the infection spreads from cows to calves, but far fewer knew that it was unlikely to spread from calf to calf or among mature animals (33% and 42% respectively). Many participants (66%) knew MAP could be in cow manure, but 25% also wrongly thought that spread could occur by direct contact, in saliva, urine, or air.

Quite a few producers left parts of this question blank, suggesting they were unsure of what to record.

Many producers and veterinarians believe that Johne's is a "dairy problem" and that it is not common in the beef industry, but, in some sectors of the beef industry, it appears that may not be true. MAP can spread to infect any kind (or breed) of cattle. For this project we invited seedstock producers to participate. We felt that they might have greater interest in disease status and also have specific risk factors. Seedstock herds often calve in confinement early in the year and buy and sell more cattle. They may also have a tendency to "swap" cattle within a restricted population of herds. Veterinarians probably solicited herds they thought might be more at risk of having Johne's for this project. So it is unlikely that across the entire population of cow-calf herds in Ontario that 50% have Johne's and we should not extrapolate the results this way.

The only way Johne's enters a herd is via the introduction of an infected bovine. Adding genetics is important for seedstock producers. Many herds in this project were ranked as high risk in the "Additions" section because they had added cattle from many different sources to the herd within the last five years. Herds with high "Additions" risk scores were also more likely to have at least one positive test result. Buying more cattle was associated with having more positive tests. Reducing the number of live animals added, buying from low-risk herds, embryo transfer and AI are all options that should be utilized to minimize disease risk due to cattle additions.

Keeping Johne's completely off the farm may be difficult but keeping Johne's from spreading on the farm **IS** controlled by management. Closing off the routes of MAP transmission protects future generations of cattle.

*(Continued on page 15)*

The RAMP assessment provided insight into transmission risk. Overall, a maximum of 155 “risk points” were available in the RAMP. Among the 68 herds the lowest risk score achieved was 8.5 while the highest was 94. The great range in herd scores highlighted the availability of opportunities to prevent Johne’s transmission. The calving area scores were statistically ( $p < .001$ ) associated with a herd being a Johne’s-positive or negative herd. Again, like the overall herd scores, the large spread in calving area scores illustrated the variation in risk among herds. We need to look more closely at the herds with low scores, so others can learn to do what they do, that works so well.

Excellent calving area and young calf management and hygiene remain highlighted as critical to Johne’s control in Ontario herds.

The take-home messages from the Johne’s Beef project are:

- Johne’s is present in Ontario’s beef cow-calf sector.

- Adding live cattle increases the risk of bringing Johne’s into a herd but there are ways to minimize this risk.
- Calving-time hygiene and management are associated with Johne’s.
- Preventing of the spread of Johne’s within a herd is achievable.
- Good examples of strong preventive programs already exist among our cow-calf producers.

Veterinarians and producers need to look more closely at the examples the herds with low scores provide, so that others can learn to do what they do, that works so well. In preparation for the upcoming calving season, a Johne’s prevention consultation could be done now by cow-calf producers with their herd veterinarian. The RAMP document developed for the project is available on the OABP website—[www.oabp.ca](http://www.oabp.ca).

*This project was funded by the Ontario Cattlemen’s Association, the Agricultural Adaptation Council, the Ontario Association of Bovine Practitioners, and Ontario Ministry of Agriculture, Food and Rural Affairs.*

## **Abstract: Herd-level Prevalence of *Mycobacterium avium* subsp. *paratuberculosis* Infection in United States Dairy Herds in 2007**

**Ann Godkin, Veterinary Science and Policy Unit, OMAFRA**

Testing of composite fecal (environmental) samples from high-traffic areas in dairy herds has been shown to be a cost-effective and sensitive method for classification of herd status for *Mycobacterium avium* subsp. *paratuberculosis* (MAP). In the National Animal Health Monitoring System’s (NAHMS) Dairy 2007 study, the apparent herd-level prevalence of MAP was 70.4% (369/524 had  $\geq 1$  culture-positive composite fecal samples out of 6 tested).

Based on these data, the true herd-level prevalence (HP) of MAP infection was estimated using Bayesian methods, adjusting for the herd sensitivity (HSe) and herd specificity (HSp) of the test method. The Bayesian prior for HSe of composite fecal cultures was based on data from the NAHMS Dairy 2002

study and the prior for HSp was based on expert opinion. The posterior median HP (base model) was 91.1% (95% probability interval, 81.6 to 99.3%) and estimates were most sensitive to the prior for HSe. The HP was higher than estimated from the NAHMS Dairy 1996 and 2002 studies but estimates are not directly comparable with those of prior NAHMS studies because of the different testing methods and criteria used for herd classification.

*Lombard JE, Gardner LA, Jafarzadeh SR, Fossler CP, Harris B, Capsel RT, Wagner BA, Johnson WO. Herd level prevalence of *Mycobacterium avium* subsp. *paratuberculosis* infection in United States dairy herds in 2007. *Prev Vet Med* 2013;108:234-238.*

## **Lead Toxicity in Cattle — Determining When Meat and Milk are Safe**

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Tim Pasma, Veterinary Science and Policy Unit, OMAFRA  
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Lead toxicity is the most common heavy metal toxicosis diagnosed in cattle. Affected cattle are often found dead or with neurological clinical signs, including depression, ataxia, blindness and seizures. According to the Animal Health Laboratory (AHL) at the University of Guelph, there have been ten cases of bovine lead toxicity in the past five years, one of which is from 2012. Cases were confirmed by testing tissues following post-mortem of mortalities.

In investigations where lead toxicity is suspected, the source of lead is often difficult to identify. Potential sources include batteries, motor oil from engines burning leaded gas, lead-based paints and old shingles. Other cattle in the herd or group may also have been exposed and have high lead levels without clinical signs. Exposure to lead can result in elevated lead levels in meat or milk. Prolonged elevated lead levels will occur when fragments of lead are retained in the gastrointestinal tract, especially the reticulum or rumen.

Practitioners have questioned when it is safe to consume milk and meat from animals where lead toxicity has occurred. Currently, there is no defined safe level for meat or milk in Canadian legislation, although the Food and Drugs Regulation limits the amount of lead in edible bone meal to 10 parts per million (ppm) <sup>(1)</sup>. A review of current research and cases in other jurisdictions showed that lead blood levels are a good indicator of recent lead exposure and that < 0.11 ppm can be used as the cut-off for a safe level of lead in blood <sup>(2)</sup>.

In a recent case in Ontario, in May 2012 several head of cattle were found dead in the pasture on one farm with an otherwise healthy herd. Post-mortem

examination and testing at the AHL confirmed lead toxicity as the cause. OMAFRA staff detained the cattle under the *Animal Health Act*, tested the cattle to ensure animal health and food safety and performed a field investigation in July 2012 to determine the source of the lead. Out of 51 cattle tested, 50 tested below 0.11 ppm and were released from detention. One animal had slightly elevated blood lead levels and was retested three months later. At that time, the animal's lead blood level was below 0.11 ppm and all animals were released from detention.

During the on-farm investigation, several materials were collected from the pasture and tested for lead. Paint chips from a water tank were found to contain high levels of lead, although an additional source could have been old shingles that were not available for sampling at the time of the visit. Some studies have demonstrated that the half-life of lead ranges from 70 to 90 days in cases of short-term exposure (2, 3), to more than 200 days in animals retaining lead in their gastrointestinal tract <sup>(2)</sup>. Another study determined that the half-life of lead in blood is highly variable, ranging from 48 to 2,507 days <sup>(4)</sup>.

Lead toxicity in cattle causes economic losses for producers and the risk of lead residues in food is serious. Producers should be advised of the importance of eliminating sources of lead exposure, and, in cases of lead toxicity, all animals in the herd must be tested before they enter the food chain.

*(Continued on page 17)*

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## **Maedi Visna and its Control in Ontario Sheep Flocks**

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**Jocelyn Jansen, Veterinary Science and Policy Unit, OMAFRA**

**Jennifer Johanson, Ontario Sheep Marketing Agency**

**Susy Carman and Beverley McEwen, Animal Health Laboratory, University of Guelph**

Maedi Visna (MV), also called Ovine Progressive Pneumonia (OPP) in the USA, is a common chronic viral disease of adult sheep in Ontario. Infected flocks tend to have between 5 and 40% of the sheep seropositive. The most dramatic sign of MV is chronic pneumonia. Approximately 2 to 24% of seropositive adult sheep develop a chronic productive cough without a fever. A much higher proportion of infected ewes develop a chronic lymphocytic mastitis of either one or both glands. The neurological component is less common and most often accompanied by cachexia and chronic wasting. Affected sheep may be ataxic, parietic and drag a leg. They may also be depressed, have a head tilt and a fine tremor of the lips. Much less dramatically than in goats with Caprine Arthritis Encephalitis, adult sheep may develop arthritis of the carpus and tarsus.

Maedi visna virus (MVV) (a retrovirus) infects the host for life. The most important routes of infection are through respiratory fluids and through ingestion of colostrum and milk. Contaminated needles, either from vaccinating or taking blood, do not appear to successfully transmit the virus. Virions excreted into the environment do not survive long, making environmental contamination of drinking water and feed troughs much less important as a way of transmission. The major source of transmission, then, is other infected sheep. Thus, MV control programs focus on removing the infected sheep and preventing new infected sheep from entering the flock.

To control or eradicate MV infection from a flock, we need to be able to accurately detect infected sheep either by detecting antibodies or antigen (e.g. PCR). Sheep and lambs seroconvert between two weeks and six months after infection, with only a small proportion of infected sheep never developing detectable levels of antibody. The level of antibody varies depending on the stage of infection (e.g., level of active inflammation and provirus present); stage of production (titres tend to decrease around lambing); and level of infection in the flock. Faster seroconversion occurs in flocks with more disease, perhaps because of higher levels of viral challenge or repeated infections.

A recent study at the University of Guelph compared six diagnostic tests to the existing serological test (gold standard) developed by the Canadian Food Inspection Agency (CFIA), to determine the best test to detect and remove infected animals. Using sera from known infected and negative animals (300 in total) across Ontario, we found that the test with the best comparative sensitivity (99.3%) was the Elitest-MVV/CAEV (HYPHEN Biomed SAS/MV Diagnostics). PCR on peripheral blood also had very high agreement with the CFIA test but was less sensitive and is currently much more expensive than serology. The Animal Health Laboratory (AHL), University of Guelph currently offers the Elitest for detection of MVV infection. Veterinary practitioners can send sera from suspect flocks directly to this laboratory.

*(Continued on page 18)*

This study was funded by the Animal Health Strategic Investment Fund, University of Guelph, OMAFRA, and Growing Forward (Ontario Sheep Marketing Agency).

## The Role of the Flock Veterinarian in the Ontario Maedi Visna Flock Status Program (OMVFSP)



The Ontario Maedi-Visna Flock Status Program (OMVFSP) was developed over a decade ago in conjunction with the University of Guelph, the Ontario Sheep Marketing Agency (OSMA) and the CFIA. OSMA is responsible for administering the program and manages the test results and status levels. A producer may enter either the Whole Flock Program, developed for producers (e.g., purebred breeders) that wish to have the highest status, or the Monitored Flock Program, developed for large flocks that are seeking a less rigorous and less expensive way to reach a high health status. The OMVFSP protocols, forms and appendices can be found at [www.uoguelph.ca/~pmezies/mv/Index.htm](http://www.uoguelph.ca/~pmezies/mv/Index.htm)

A licensed veterinarian, or their designate, is responsible for collecting blood samples from the appropriate sheep (according to the protocol), completing the necessary paperwork, assuring animal inventories are up-to-date and reviewing biosecurity requirements for flocks enrolled in the program. All program forms can be obtained from OSMA or from the website listed above. The veterinarian

submits the samples to the AHL. Laboratory costs are billed by the AHL directly to OSMA, who then bills the client. The veterinarian charges the client for the sample collection and handling, including time and consumables.

Results are sent from the AHL directly to the OMVSP program administrator at OSMA, and not to the veterinarian. OSMA uses the results to determine the status of the flock or if follow-up testing is required. Flock results are categorized as: a negative flock test, a positive flock test, or further testing is required. Samples or animals must be retested if suspect or low prevalence results occur. For example, if a flock with a previous negative flock test has a current test that is not negative and has less than 5% of sheep as test positive, the OMVFSP program administrator at OSMA will request retesting using a more specific test. The protocols are explained in detail on the website. Once the flock's status has been determined, OSMA sends the test results, required actions and status level to the client and the veterinarian simultaneously.

Experience with this production-limiting disease tells us it can be eradicated from a flock and a low risk status can be kept if testing and biosecurity protocols are followed.

The flock veterinarian is an integral part of the OMVFSP testing and monitoring program. If you have further questions, please contact Paula Menzies ([pmezies@uoguelph.ca](mailto:pmezies@uoguelph.ca)) or Jocelyn Jansen ([jocelyn.jansen@ontario.ca](mailto:jocelyn.jansen@ontario.ca)).

## Schmallenburg Virus Continues to Spread

*Ann Godkin, Veterinary Science and Policy Unit, OMAFRA*

The European Food Safety Authority (EFSA) has reported that by the end of October 2012, 14 countries were reporting the presence of the virus with approximately 6,000 holdings having laboratory confirmed cases. Countries newly reporting Schmallenburg virus (SBV) cases over the summer of 2012 included Denmark, Finland, Poland, Sweden and Switzerland. Up to May 2012, eight other countries (Belgium, France, Germany, Italy, Luxembourg, the Netherlands, Spain and United Kingdom) had reported infection with SBV.

In August 2012, 294 herds reported having arthrogryposis hydranencephaly syndrome (AHS) in cattle. Reports of AHS are likely to increase in the next few months with an increase in the proportion of at-risk cattle (those not previously exposed and in a susceptible stage of pregnancy). Reports of acute cases in adult animals are limited, likely because clinical signs are transitory and non-specific. In Great Britain, 715 premises had confirmed cases and six

*(Continued on page 19)*

cases were confirmed in Scotland. In all six Scottish cases, the affected animals had been introduced from counties in England where SBV had been previously identified.

The EFSA's epidemiological analysis is available at

[www.efsa.europa.eu/en/supporting/pub/360e.htm](http://www.efsa.europa.eu/en/supporting/pub/360e.htm)



## Update on Vitamin D Supplementation in Suckling and Weaned Pigs

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*Tim Blackwell, Veterinary Science and Policy Unit, OMAFRA.*

A review of vitamin D deficiency in young, growing pigs was published in the previous issue of **Ceptor** (October, 2012, pp. 5-7). The review included the results from a vitamin D supplementation study on one farrow-to-finish farm in southern Ontario. This report expands on that study by including data from a second farm where pigs were treated orally with Hydro-Vit D<sub>3</sub>®<sup>a</sup> within the first week of life and a third farm where pigs were treated at weaning with Hydro-Vit D<sub>3</sub>®.

The serum levels of 25-hydroxy-vitamin D<sub>3</sub> for 110 pigs treated within five days of birth with either 1 mL of Hydro-Vit D<sub>3</sub>® or 1 mL of a strawberry syrup placebo (SSP) on two farrow-to-finish operations in southern Ontario are shown in **Table 1**. Similar to the results reported in the previous issue of **Ceptor**, pigs at the second farm showed low levels of vitamin D at birth. Supplementation with 1 mL of Hydro-Vit D<sub>3</sub>® containing 80,000 I.U. of vitamin D<sub>3</sub> increased the mean serum concentration on average by approximately 15 ng/mL compared to the control group. The normal serum concentration of 25-hydroxy-vitamin D<sub>3</sub> for pigs at 3 to 4 weeks of age is reported to be between 25 to 30 ngs/mL.<sup>b</sup>

On a third farm, as shown in **Table 2**, before treatment with either 1 mL of Hydro-Vit D<sub>3</sub>® or a strawberry syrup placebo (SSP), 56 pigs at weaning at 19 to 24 days of age had serum vitamin D<sub>3</sub> concentrations similar to the placebo treated pigs in Table 1. Serum concentrations were re-examined four weeks following treatment at which time serum concentrations were similar between treated and control pigs. The very small difference between treatment and control pigs in Table 2 is likely because all had been consuming a nursery ration with adequate levels of vitamin D for four weeks at which time they were re-tested for serum 25 hydroxy-vitamin D<sub>3</sub> concentrations. Thus the placebo treated group in Table 2 were ingesting vitamin D while the placebo group in Table 1 were not, since sows' milk has little to no vitamin D content.

This study demonstrates that 1 mL of Hydro-Vit D<sub>3</sub>® administered orally within five days of birth, increases serum concentrations of 25-hydroxy-vitamin D<sub>3</sub> in suckling pigs. When the same dose was administered to 21- to 24-day-old pigs at weaning, a much smaller difference was observed

**Table 1. Serum concentrations (ng/mL) for 25-hydroxy-vitamin D<sub>3</sub> in 1- to 5-day-old pigs pre-treatment and in the same pigs 19 to 23 days later.**

Treatment Group	Pre-treatment Mean ± SD	Range	Sample Size	Post-treatment Mean ± SD	Range	Sample Size
Hydro-Vit D <sub>3</sub> ® (HVD) ng/mL	5.73 ± 1.58	<2.5 to 9.8	53	23.29 ± 12.06	2.5 to 61.5	53
Strawberry syrup placebo solution (SSP) ng/mL	5.32 ± 1.95	<2.5 to 9.2	57	8.01 ± 5.91	<2.5 to 41.3	57

*(Continued on page 20)*

**Table 2. Serum concentrations (ng/mL) for 25-hydroxy-vitamin D<sub>3</sub> in 21- to 24-day-old pigs at weaning immediately pre-treatment and in the same pigs 28 days post-treatment.**

Treatment Group	Pre-treatment Mean ± SD	Range	Sample Size	Post-treatment Mean ± SD	Range	Sample Size
Hydro-Vit D <sub>3</sub> ® (HVD) ng/mL	11.00 ± 3.73	5.5 to 20.3	28	22.34 ± 6.01	13.9 to 34.5	28
Strawberry syrup placebo solution (SSP) ng/mL	9.81 ± 2.29	6.4 to 14.6	28	18.68 ± 3.99	12.3 to 25.1	28

between treatment and control pigs, likely due to the fact that nursery starter rations are adequately supplemented with vitamin D<sub>3</sub>.

*This study was a cooperative investigative effort between the Ontario Ministry of Agriculture, Food and Rural Affairs and the Ontario Veterinary College, University of Guelph. Funding for this project was provided by Ontario Pork, the University of Guelph, and the Ontario Ministry of Agriculture, Food and Rural Affairs.*

*Notes*

- a. *Hydro-vit D<sub>3</sub>® Vetoquinol Canada.*
- b. *Reference ranges provided by Drs. Jesse Goff and Ron Horst, Heartland Labs Iowa and Iowa State Veterinary Diagnostic Laboratory, May, 2012.*

## **Toxoplasma gondii—Renewed Interest in Human Risks Via Exposure in Meat**

**Kathy Zurbrigg, Veterinary Science and Policy Unit, OMAFRA**

From the executive and chapter summaries of the 2012 Advisory Committee on the Microbiological Safety of Food (ACMSF) *Report on Risk Profile in Relation to Toxoplasma in the Food Chain*.

In September 2012 the Advisory Committee on the Microbiological Safety of Food (ACMSF) in the United Kingdom released their “Report on the Risk Profile in Relation to Toxoplasma in the Food Chain”. The report summarized evidence regarding human health risks attributable to exposure to Toxoplasma via the food chain. Key points fuelling a renewed interest in this endemic infection include:

- The estimation that 350,000 people become infected with Toxoplasma each year in the UK, of which 10-20% are symptomatic. Information from the USA and Netherlands shows that even though the proportions of human cases with severe disease are low, healthcare expense associated with these cases makes toxoplasmosis one of the most costly gastro-intestinal infections;
- A potential increase in the proportion of individuals that are non-immune-competent;
- A lack of sero-prevalence data among food animals, coupled with animal disease information suggesting Toxoplasma infection is very common in some species such as sheep.
- A lack of information regarding the prevalence and concentration of Toxoplasma contamination in a variety of meats and other foods in the UK;
- The lack of studies assessing the effectiveness of a number of microbiological reduction/destruction processes such as salad washing, milk fermentation and various meat curing methods on inactivating Toxoplasma, and

*(Continued on page 21)*

- The observation that the decline in *Toxoplasma* sero-prevalence in animals in many developed countries in recent decades is largely due to modern agricultural practices such as housing that reduce animal exposure to *Toxoplasma* oocysts; yet, recent trends to organic food production systems using outdoor-housing practices is likely to increase animal exposure to the parasite.

The full report can be accessed at <http://acmsf.food.gov.uk/acmsfreps/acmsfreports>



## Broken Hearted about In-transit Losses? Your Pigs May Be.

*Kathy Zurbrigg, Veterinary Science and Policy Unit, OMAFRA*  
*Tony van Dreumel, Animal Health Laboratory, University of Guelph*

### Rates of In-transit Losses

Mortalities of hogs during transport to slaughter plants are an infrequent occurrence. The 2008 US national average hog mortality at shipping was calculated to be 0.20% of all hogs shipped <sup>(1)</sup>. The 2011 average for Canada was 0.10% and Ontario's 2001 rate was 0.17% <sup>(2, 3)</sup>. The 2010 average for Ontario's three federally-inspected abattoirs was 0.07% <sup>(4)</sup>.

Although infrequent, in-transit losses are an important economic and welfare issue for producers, transporters and packers. Without a definitive cause of death, each stakeholder tends to blame the other for losses. Producers blame a transporter's schedule or unloading techniques, while transporters associate death losses with poor loading facilities at the farm or unloading delays at the plant. In-transit hog deaths are a welfare issue that requires that all industry partners ensure that everything possible is being done to prevent shipping mortalities.

The cause of death of hogs that die during transport to a packing plant has rarely been investigated. The increase in shipping mortalities during the summer months is generally attributed to heat exhaustion or stress. Why so many hogs apparently tolerate conditions that result in the death of a very small percentage is rarely investigated. Determining if underlying risk factors exist that predispose some hogs to heat exhaustion or a stress-related death is necessary if transport deaths are to be reduced. For example, if a large percentage of hogs found dead on arrival (DOA) were found to have a preventable underlying pathology, then attention should be paid to the disease condition rather than simply the

transport process. On the other hand, if the DOA hogs are found to be lesion-free (with the exception of heat-stress lesions), then attention should remain focused on the shipping procedure.

### The 2012 Ontario Pork In-transit Loss Project

In 2012, Ontario Pork funded a study conducted at two federally-inspected slaughter facilities in Ontario. Slaughter plant A was enrolled in the study in May and Plant B in June. At the end of each receiving day at Plant A, all DOA hogs were transported to the Animal Health Laboratory, University of Guelph, for post-mortem examination. For Plant B, a veterinary pathologist traveled to the plant two days a week (on rotating scheduled days) to perform the post-mortems on DOA hogs. The same veterinary pathologist examined the hearts of the DOA hogs from both plants. Histology samples were collected on all DOA hogs at both plants.

A total of 62 DOA hogs had a post-mortem examination to determine their cause of death. So far, the majority of the hog deaths were not the result of uncomplicated hyperthermia or stress. Only 21% have been found to have no underlying pathologies. The cause of death data are summarized in **Table 1**.

Cardiac abnormalities have been the most common pathology identified in the 62 DOA hogs. For comparison, a total of 50 hearts from non-DOA hogs, 27 from Plant A and 23 from Plant B, were collected off the processing line. Each heart was

*(Continued on page 22)*

**Table 1. Summary of the Cause of Death of 62 Hogs from Two Federally-regulated Slaughter Plants in Ontario as Determined by Post-mortem**

Cause of Death of 62 DOA hogs	Plant A	Plant B	Total DOA Hogs	% of all DOA Hogs
Other (Fractures, enteritis, etc)	3	2	5	8%
Heat Stress alone (pulmonary congestion and edema were the only significant findings )	5	8	13	21%
Heat Stress plus additional condition(s) (pulmonary congestion and edema were present but a secondary disease was also present e.g., pneumonia, pyelonephritis)	2	0	2	3%
Heart Failure (one or more heart pathologies observed grossly)	34	8	42	68%
TOTAL post-mortems completed	44	18	62	100%

examined by the same veterinary pathologist who performed the post-mortems. No pathologies were found in the gross examination of the non-DOA hearts. Histological examination of the control hearts is ongoing.

### Heart Defects and Failure in Pigs

Heart lesions detected at post-mortem included: valvular endocardiosis, thickened AV valves, subaortic stenosis or fibrosis of the subaortic endocardium, left ventricular hypertrophy and dilation of the major vessels and of the right ventricle. Hearts were frequently visually enlarged.

Compared to all other species (including humans), a pig's heart is small in relation to its body size <sup>(5)</sup>. As a result, pigs have little cardiac reserve. If a pig with a heart defect is challenged with any type of stress that further increases the demands on the heart, such as fighting, loading or unloading onto a truck, the defective heart may be unable to compensate and heart failure can occur.

Pigs are documented to suffer from a variety of heart defects and are used as models for human medicine to study heart function and disease <sup>(5,6)</sup>. It has also been reported that sudden deaths in normal, healthy appearing pigs are frequently due to heart failure <sup>(7)</sup>. However, only one paper could be found that links

pre-existing heart defects with in-transit losses in pigs <sup>(8)</sup>.

### Conclusions

- The overall rates of in-transit losses at Ontario slaughter plants are low, suggesting that the majority of hogs are able to cope with the stresses associated with the industry's current transport practices.
- A high prevalence of heart defects (68%) was found in the DOA hogs examined. However, this in-transit loss study has investigated only some of the DOA hogs that occurred at two Ontario abattoirs. If heart defects are responsible for even 50% of DOA hogs, then understanding the causes of these defects (infection or congenital) may be a more appropriate way to reduce DOA hogs than simply adjusting density on the truck during hot weather.
- Veterinarians investigating death or DOA rates on swine farms should ensure they open and examine the heart at post-mortem or send the whole heart to the laboratory for gross and histological examination. Some heart lesions may be difficult to identify if a veterinarian is not familiar with the normal structures of the endocardium and valves of pigs.

*(Continued on page 23)*

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## Salmonella Dublin is in Ontario

Neil Anderson, Veterinary Science and Policy Unit, OMAFRA

Ontario's first diagnosis of *Salmonella* Dublin was from a late November 2012 submission from a 4-month old Holstein steer with respiratory disease. Quebec has reported diagnoses on 14 different farms from May 2011 to December 2012. The farms included red veal, milk-fed calves, steers and dairy cattle.

*Salmonella* Dublin is host-adapted to cattle. *Salmonella* Dublin resides in herds for years because of persistently infected carriers. Cows shed bacteria continuously or periodically. Control focuses on biosecurity and preventing the introduction of the bacteria into a herd. In endemic herds, culling is necessary to prevent new carriers. Vaccines are unrewarding and protection should not be expected. Since the bacteria are multi-drug resistant, don't expect a lot of success from antibiotic treatments. Diagnosis is possible by bacterial culture. The New York State diagnostic laboratory at Cornell offers an antibody-based screening test using bulk-tank milk.

For further education and information on *Salmonella* Dublin, please see: <http://nyschap.vet.cornell.edu/module/salmonella/salmonella.asp> 

The following is excerpted from an October 2012 Animal Health Advisory from Cornell University.

**“Cattle owners and caretakers should be especially alert to cattle illnesses involving fever, diarrhea, abortions, and respiratory signs (especially in calves), including coughing and laboured breathing. While pneumonia is not considered to be an unusual illness in cattle populations, all pneumonia associated with a high incidence or mortality rate should be investigated promptly by a veterinarian. *Salmonella* spp. have the potential to infect people and can cause illness and death. Consumption of raw milk is a high risk practice, especially from herds experiencing a suspected or confirmed outbreak of *Salmonella*.”**

Please be vigilant; enhance your personal biosecurity practices; and submit samples. Animal Health Laboratory veterinary microbiologist, Dr. Durda Slavic, advises that it is preferable to submit lung tissue and fecal samples for culture to the laboratory, rather than swabs. Additional culture enrichment steps will be undertaken to further enhance the timely diagnosis of *Salmonella* Dublin.

## United States Department of Agriculture (USDA) Publications

USDA's National Animal Health Monitoring System (NAHMS) has published two information sheets from the Sheep 2011 study:

1. Highlights of NAHMS Sheep 2011 "Part I: Reference of Sheep Management Practices in the United States"
2. Record-keeping Practices on U.S. Sheep Operations

In addition, the first descriptive report from the Sheep 2011 study is now available: Sheep 2011: Part I: Reference of Sheep Management Practices in the United States, 2011.

The report and information sheets are available at <http://nahms.aphis.usda.gov/sheep>

**APHIS Info Sheet**  
Veterinary Services  
Centers for Epidemiology and Animal Health  
October 2012

**Highlights of NAHMS Sheep 2011 "Part I: Reference of Sheep Management Practices in the United States"**

**APHIS Info Sheet**  
Veterinary Services  
Centers for Epidemiology and Animal Health  
October 2012

**Record-keeping Practices on U.S. Sheep Operations**

For its Sheep 2011 study, the U.S. Department of Agriculture's National Animal Health Monitoring System (NAHMS) collected data on sheep health and management practices from a representative sample of operations in 22 of the Nation's major sheep States. These operations represented 85.5 percent of the U.S. ewe inventory and 70.1 percent of U.S. ewes.

Keeping accurate records allows producers calculate flock productivity and establish flock benchmarks. Record-keeping systems range from simple pocket notebooks to sheep management software programs. Some commonly tracked include finances, productivity, reproductive or flock health, individual animal treatments, and management practices.

The percentage of sheep operations that produce records has increased in the last decade. For example, the NAHMS Sheep 2001 study reported that 67 percent of all operations kept some form of production records, while the Sheep 2011 study reported that 85 percent of all operations kept record percentages are somewhat misleading, however, because in the 2001 study all operations with more than 20 ewes were asked about record-keeping practices, while in the 2011 study only operations with 20 or more ewes were asked about record-keeping. Still, when operations of similar size from both the 2001 studies (25 to 99 and 20 to 99 ewes, respectively) were compared, the percentage of operations in 2011 that kept production records (85.1 and 76.5 percent, respectively).

In 2011, over half of all operations with 20 ewes (55.9 percent) kept handwritten records, 5.1 percent kept computerized records, and 38.1 percent kept both handwritten and computerized records. Of operations that use both record-keeping during 2011, 89.2 percent reported on the number of lambs born (Fig. 1).

**USDA**  
United States Department of Agriculture  
Animal and Plant Health Inspection Service  
Veterinary Services  
National Animal Health Monitoring System  
May 2012

**Sheep 2011**  
Part I: Reference of Sheep Management Practices in the United States, 2011

Table of Contents

## Sheep and Goat Management in Alberta

Alberta Lamb Producers and Alberta Goat Breeders Association have collaborated to produce three modules on the topics of

- reproduction,
- nutrition, and
- health of sheep and goats in Alberta.

Other modules available on the site include:

- The Busine\$\$ of Sheep
- Flock Snapshot—a Cost of Production tool.

To view or download the modules, refer to the Alberta Lamb Producers' website at [http://ablamb.ca/producer\\_mgmt/sheep\\_mgmt.html](http://ablamb.ca/producer_mgmt/sheep_mgmt.html)

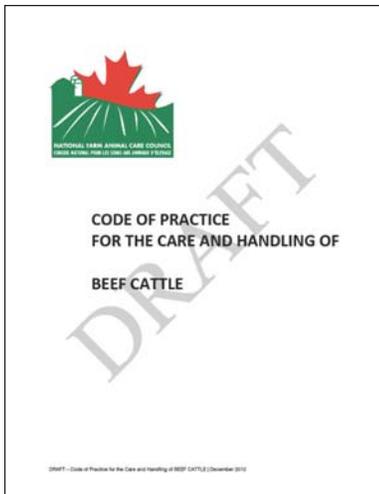
**Sheep and Goat Management in Alberta**

Alberta Lamb Producers  
Alberta Goat Breeders Association

**Nutrition**

Alberta Lamb Producers  
Alberta Goat Breeders Association

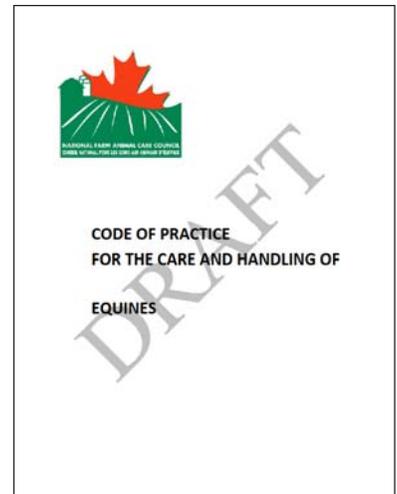
## Available Resources (continued)



### Two Draft Codes of Practice Released for Public Comment

Equine Canada and the National Farm Animal Care Council (NFACC) are offering a public comment period on the draft **Code of Practice for the Care and Handling of Equines**. (*News Release, December 3, 2012*)

The draft Code can be viewed and submissions made until **February 14, 2013** at [www.nfacc.ca/codes-of-practice/equine](http://www.nfacc.ca/codes-of-practice/equine)



The Canadian Cattlemen's Association and the NFACC have announced a similar comment period on the draft **Code of Practice for the Care and Handling of Beef Cattle**. (*News Release January 8, 2013*)

This draft Code can be viewed and comments made until **March 8, 2013** at [www.nfacc.ca/codes-of-practice/beef-cattle](http://www.nfacc.ca/codes-of-practice/beef-cattle)

All stakeholders are encouraged to provide input to ensure that these Codes reflect a common understanding of equine/beef cattle care expectations and recommended practices in Canada. Comments must be submitted through the online system.

## The Horse Report

The Horse Report is published by the Center for Equine Health—School of Veterinary Medicine, University of California, Davis.

The December 2012 issue and previous issues are available on their website—[www.vetmed.ucdavis.edu/ceh/current.cfm](http://www.vetmed.ucdavis.edu/ceh/current.cfm)

December 2012 A publication of the Center for Equine Health • School of Veterinary Medicine • University of California, Davis

### The Miniature Horse: More Than Just a Smaller Horse!

What comes in a small package, has all the characteristics people love about horses: it's easy to manage and a delight to have around! A miniature horse!

Miniature Horses are no taller than 38 inches and come in a rainbow of coat colors and patterns. They are easy trained, have a gentle nature, and can pull four times their own weight. These horses are descended from Shetland ponies and were selectively inbred for their size. In earlier times, small horse breeds were likely the products of surviving harsh natural climates and limited feed sources. As human knowledge of genetics grew, it became possible to breed specifically for size.

Miniature Horses have been bred for superb conformation and outstanding dispositions. The result is a beautifully proportionate little horse that is suitable to a variety of uses: as pets, show animals, and a form of therapy for disabled people and guides for the blind. In the show ring, "Mins" compete in halter/conformation and in performance events such as obstacle driving.

Mini require similar care to their full-sized counterparts but, based on their size, they require much less space, making them accessible to more people, including those who have had no experience with horses. It is important that owners of Miniature Horses educate themselves thoroughly in good basic horse care as well as in the unique needs of Mins. While many Miniature Horses are kept primarily as pets, they still need to be treated like horses, with appropriate nutrition, housing, room to run, regular hoof care, dental care.

—Continued on page 3

An organization devoted to small equines—the American Shetland Pony Club (ASPC)—includes the American Miniature Horse Registry (AMHR) among other registries. Founded in 1888, the ASPC began registering Miniature Horses in 1971. The AMHR includes an A division, which registers horses standing 34 inches or under at the last hair of the mane, and a B division for horses standing up to 38 inches. Regular Shetlands stand up to 46 inches.

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## Online Training—Webinars and Courses

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### DAIReXNET Webinars—

<http://www.extension.org/pages/29156/upcoming-dairy-cattle-webinars> 

- |                   |   |
|-------------------|---|
| February 12, 2013 | <b>Better Milk Quality from Better Mastitis Therapy Decisions</b><br>12:00-1:00 p.m. Central Time, Dr. Ron Erskine, Michigan State University       |
| March 18, 2013    | <b>Far Off to Fresh Cow – Opportunities to Improve Transition Performance</b><br>12:00-1:00 p.m. Central Time, Dr. Mike Overton, Elanco             |
| April 8, 2013     | <b>Economic Analysis Tools for Dairy Reproduction Programs</b><br>12:00-1:00 p.m. Central Time, Dr. Victor Cabrera, University of Wisconsin-Madison |
| April 22, 2013    | <b>New Tools for Dairy Reproduction Programs</b><br>12:00-1:00 p.m. Central Time, Dr. Paul Fricke, University of Wisconsin-Madison                  |
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### Hoards Dairyman and University of Illinois Webinars—

<http://www.hoards.com/webinars> 

- |                   |   |
|-------------------|---|
| February 11, 2013 | <b>New Dairy Software Tools and They're Free</b><br>12:00-1:00 p.m. Central Time, Dr. Victor Cabrera, University of Wisconsin-Madison |
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### Technology Tuesdays Webinar Series—“Dairy Systems Planning and Building” Penn State College of Agricultural Sciences

<http://extension.psu.edu/animals/dairy/health/educational-programs/technology> 

- |                   |                                       |  |
|-------------------|---------------------------------------|--|
| January 22, 2013  | Using the “Team Design Approach”      | } All sessions are held 8:30-10:00 a.m.<br>(EDT/EST) |
| February 12, 2013 | Milking Center Layout and Components  |  |
| February 26, 2013 | Transition Cow Housing and Management |  |
- 

### University of Illinois Online Dairy Courses—<http://online.ansci.illinois.edu/>

Two 10-week online dairy classes will begin on January 28, 2013

1. Advanced Dairy Nutrition (ANSC 423) covers nutrient classes, phase feeding, dry cow feeding and health, and forages.
2. Milk Secretion, Mastitis and Quality (ANSC 435) covers all phases of milk quality, secretion, nutrition, and mastitis control and prevention.

To review the class schedules, topics, and enrollment details, visit the website.

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## Continuing Education/Coming Events

- January 15-17, 2013 Banff Pork Seminar, The Banff Centre, Banff, Alberta. [www.banffpork.ca](http://www.banffpork.ca)
- January 15, 16 & 17 2013 2013 Herd Management Conference presented by CanWest DHI.  
January 15—Chesterville Legion Hall, Chesterville, Ontario  
January 16—Memorial Hall, Tavistock, Ontario  
January 17—PMD Complex, Drayton, Ontario  
[www.canwestdhi.com/pdf\\_files/2013%20herd%20management%20conference.pdf](http://www.canwestdhi.com/pdf_files/2013%20herd%20management%20conference.pdf)
- January 22, 2013 Dairy Housing Design Seminar—Calf Housing, Royal Canadian Legion, Kemptville, Ontario.  
[www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- January 23 & 24, 2013 Dairy Housing Design Seminar—Free-Stall Housing, Royal Canadian Legion, Kemptville, Ontario. [www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- January 27-29, 2013 National Mastitis Council 52nd Annual Meeting, Omni Hotel, San Diego, California.  
[www.nmconline.org](http://www.nmconline.org)
- January 30, 2013 32<sup>nd</sup> Annual Centralia Swine Research Update, Kirkton-Woodham Community Centre, Kirkton, Ontario. [www.centraliaswineresearch.ca](http://www.centraliaswineresearch.ca)
- January 30, 2013 Dairy Housing Design Seminar—Tie-Stall Housing, Community Centre, Codrington, Ontario. [www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- January 31, 2013 Dairy Housing Design Seminar—Tie-Stall Housing, East Perth Recreation Complex, Milverton, Ontario. [www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- February 6 & 7, 2013 Canadian Dairy Xpo, Canada's National Dairy Showcase, Stratford Rotary Complex, Stratford, Ontario. [www.dairyxpo.ca](http://www.dairyxpo.ca)
- February 7-9, 2013 2013 Hoof Health Conference, Holiday Inn—Visalia, Visalia, California.  
[www.booftrimmers.org/programs/HHC.html](http://www.booftrimmers.org/programs/HHC.html)
- February 13, 2013 Maxville Dairy Day, Maxville District Sports Complex, Maxville, Ontario.  
[www.omafra.gov.on.ca/english/livestock/dairy/confrcnrc.html](http://www.omafra.gov.on.ca/english/livestock/dairy/confrcnrc.html)
- February 14, 2013 Kemptville Dairy Day, W. B. George Centre, Kemptville College, Kemptville, Ontario.  
[www.omafra.gov.on.ca/english/livestock/dairy/confrcnrc.html](http://www.omafra.gov.on.ca/english/livestock/dairy/confrcnrc.html)
- February 18-22, 2013 International Sheep Veterinary Congress, Christchurch Convention Centre, Christchurch, New Zealand. <http://conference.intsheepvetassoc.org>
- February 20, 2013 Dairyland Initiative Workshop—Designing Supplemental Positive Pressure Ventilation Systems for Calf & Heifer Barns, Sheraton Madison Hotel, Madison, Wisconsin.  
[http://thedairylandinitiative.vetmed.wisc.edu/forms/brochure\\_fullpg\\_feb\\_2013.pdf](http://thedairylandinitiative.vetmed.wisc.edu/forms/brochure_fullpg_feb_2013.pdf)
- February 21, 2013 30<sup>th</sup> Annual South Western Ontario Dairy Symposium, Woodstock Fairgrounds, Woodstock Ontario. [www.dairysymposium.com](http://www.dairysymposium.com)

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## Continuing Education/Coming Events (continued)

- February 26 & 27, 2013 Dairy Housing Design Seminar—Free-Stall Housing, OMAFRA Resource Centre, Woodstock, Ontario. [www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- February 28, 2013 Dairy Housing Design Seminar—Calf Housing, OMAFRA Resource Centre, Woodstock, Ontario. [www.omafra.gov.on.ca/english/livestock/dairy/facts/info\\_freetiestall.htm](http://www.omafra.gov.on.ca/english/livestock/dairy/facts/info_freetiestall.htm)
- March 2-5, 2013 American Association of Swine Veterinarians 44th Annual Meeting—Purpose-Inspired Practice, Manchester Grand Hyatt, San Diego, California. [www.aasv.org/annmtg](http://www.aasv.org/annmtg)
- March 6-8, 2013 Western Dairy Management Conference, John Ascuaga's Nugget, Reno, Nevada. [www.wdmc.org](http://www.wdmc.org)
- March 7 & 8, 2013 2nd ISIRV International Symposium on Neglected Influenza Viruses, The Royal College of Physicians of Ireland, Dublin, Ireland. [www.isirv.org/site/index.php/upcoming-event/9-events/139-2nd-isirv-international-symposium-on-neglected-influenza-viruses](http://www.isirv.org/site/index.php/upcoming-event/9-events/139-2nd-isirv-international-symposium-on-neglected-influenza-viruses)
- March 25-27, 2013 Progressive Dairy Operators (PDO) Triennial Dairy Symposium—Making Profitable Dairy Management Decisions, DoubleTree by Hilton Hotel, Toronto, Ontario. [www.pdo-ontario.ca/symposium/index.html](http://www.pdo-ontario.ca/symposium/index.html)
- May 20-22, 2013 2013 International PRRS Symposium, China National Conference Center, Beijing, China [www.prrsymposium.org](http://www.prrsymposium.org)
- May 22-24, 2013 5th European Symposium of Porcine Health Management and Pig Veterinary Society 50th Anniversary Meeting, Edinburgh International Conference Centre (EICC), Edinburgh, Scotland. [www.esphm2013.org](http://www.esphm2013.org)
- June 5-7, 2013 World Pork Expo, Iowa State Fairgrounds, Des Moines, Iowa. [www.worldpork.org](http://www.worldpork.org)
- June 25-27, 2013 Precision Dairy Conference and Expo, Mayo Civic Center, Rochester, Minnesota. <http://precisiondairy.umn.edu/index.htm>
- July 10-13, 2013 65th Canadian Veterinary Medical Association Convention—Best Medicine Practices—Timely Topics, Victoria Conference Centre, Victoria, British Columbia. <http://canadianveterinarians.net/professional-convention.aspx>
- June 8-11, 2014 23rd International Pig Veterinary Society Congress, Moon Palace Golf & Spa Resort, Cancun, Mexico. [www.ipvs2014.org](http://www.ipvs2014.org)



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Comments: .....

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**Deadline for next issue: February 22, 2013**



Ministry of Agriculture,  
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