

New decision-making tool for Johne's

By Maureen Hanson

A new system using likelihood ratios could give you the information you need to make confident culling decisions and manage Johne's out of your herd.

Learning that nearly half of the herd tests positive for Johne's disease would devastate any dairy producer. But Harvey and Jackie Menn are glad they found out when they did. The registered Jersey

breeders from Norwalk, Wis., knew something was amiss in their 70-cow herd. "We built a new free-stall barn in 1999 and were calving a lot of heifers and trying to grow the herd, but we were culling cows left and right," says Harvey.

"Looking at our herd on paper, we should have been doing much better."

When the research project of a biology student at Viterbo University in LaCrosse, Wis., revealed the widespread prevalence of Johne's disease —

confirmed by fecal testing — in the summer of 2001, the Menns realized why herd performance was dragging. They also knew they had to take action quickly. They turned to University of Wisconsin researcher and leading Johne's disease specialist Mike Collins for help.

Collins had just finalized plans for a trial to evaluate the merits of a new Johne's decision-making protocol that he had developed. In January 2002, the Menns and nine other Wisconsin herds enrolled in the program. Here's what they have learned so far.

Test driving a new system Collins' new protocol makes Johne's culling decisions more strategic. The numeric results from a quick and relatively inexpensive blood test provide the information needed to make culling decisions with confidence.

"Over time, we've learned a lot about the capabilities and limitations of the diagnostic technologies we currently have

Which one has Johne's disease? You can't tell by looking at them and until now you weren't sure how best to manage cows that tested positive.



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available,” says Collins. “This system makes use of that knowledge to help producers most effectively and affordably work to eliminate Johne’s.”

The protocol uses results from the ELISA blood test kit, manufactured by IDEXX Laboratories. While the ELISA test rarely misidentifies a non-infected animal as Johne’s-positive (infected), on average it only picks up about half of the truly positive cows. Collins determined through previous research that the odds of the test detecting Johne’s-positive cows go up as the test result number, called the S/P value, also goes up.

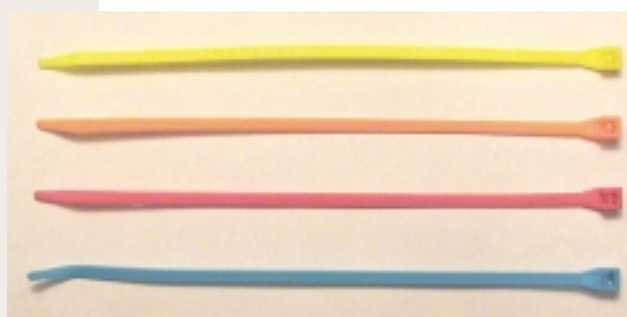
For example, in a cow with an S/P value of 0.25 (the manufacturer’s recommended cutoff value for a Johne’s-positive diagnosis), the odds are approximately 16:1 that she has Johne’s disease. When the S/P value jumps to 0.50, the odds of infection increase to 43:1. These figures are called “likelihood ratios.”

Collins used the likelihood ratios to develop a simple decision-making format. Only cows with positive and strong-positive ELISA results are recommended for culling. Those are the most severely affected animals. They also are the ones most likely to break with clinical Johne’s symptoms and excrete high loads of the Johne’s-causing organism in their milk and feces. That makes their prompt removal from the herd essential to control the spread of infection.

“Low-positive,” or “suspect” cows with lower ELISA readings have their



Wisconsin producer Mark Breunig uses plastic, color-coded electrical zip ties to identify the Johne’s status of all animals that test positive. For example, employees know that all cows with a red tag are “strong-positives” that should not be bred back and will be culled.



own set of marching orders. While allowed to stay in the herd, they must be managed carefully. And if their S/P values climb during their next lactation, they will be culled. (For details on how to make management decisions based on the S/P values, please see “How to use the new Johne’s decision strategy” on page 44.)

Results show promise
The decision-making program has created order among chaos for Sheboygan Falls, Wis., dairyman Mark Breunig. His herd is one of 10 enrolled in the evaluation trial. Breunig believes that Johne’s disease entered his commercial Holstein herd when he expanded from 50 to

400 cows in 1995.

Although every cow in the herd had been tested for Johne’s each of the past three years, the dairyman says the likelihood ratio system has helped him sort through the results and make good decisions.

“Before, with just a positive or negative ELISA test, it was hard to know what to do,” says Breunig. “We probably culled more heavily than we needed to before we had this program because we had no way of prioritizing among the positive results.”

The chart on page 42 shows the test results and management outcomes in Breunig’s 400-cow herd when it was initially enrolled in the trial. At the *continued on page 42*

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Mark Breunig, Sheboygan Falls, Wis.

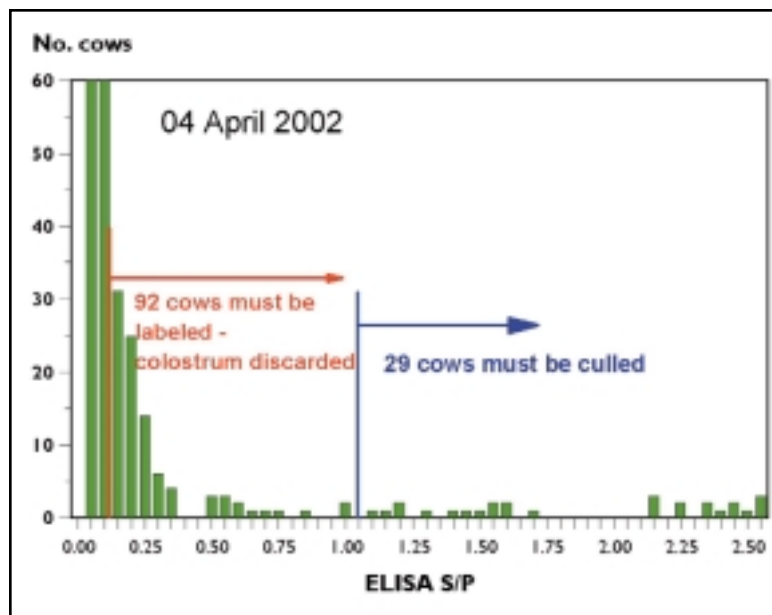
beginning of the study, every cow was tested, regardless of lactation stage. About one-third of the herd — 121 cows — showed an ELISA S/P value of 0.25 or higher. But only 29 showed “strong-positive” results and were culled at the end of their lactations.

Now, Breunig uses his computer record-keeping program to regularly generate lists of cows at 200-plus days in milk, and draws blood for ELISA tests in batches of about 50 at a time. “With every round of tests, we’re getting fewer strong positives, and we haven’t had a cow break with clinical Johne’s for more than a year,” he reports.

Across the state, the Menns are experiencing similar triumphs. They currently milk only two positive and six suspect cows. “The two ‘positive’ cows are in good body condition, healthy-looking and milking well, and we’re glad to have the chance to milk them a few more months,” says Jackie. “But if anything changes, we’ll know why, and we’ll cull them.”

That’s one of the big advantages of the program. Producers know which animals absolutely must be culled right away, and they can confidently keep other test-positive cows and milk them a little longer.

Breunig says identifying each cow according to her Johne’s status — which he does with color-coded plastic electrical strips attached to their ear tags — helps keep everyone on his dairy informed. Employees know that they must calve suspect cows in a separate pen and discard their colostrum. And, if they see a “strong-posi-



MIKE COLLINS, UNIVERSITY OF WISCONSIN

The chart at left shows the test results from the initial herd testing for Johne’s disease at Mark Breunig’s dairy in Sheboygan Falls, Wis. Although 121 cows out of 400 tested positive for the disease, the S/P values revealed that only 29 were strong-positives which should be culled at the end of their lactations

tive” cow in heat, they don’t breed her.

Basic management still needed
Collins warns that using the ELISA criteria does not replace the other basic management steps required to stop the spread of Johne’s disease, including:

- Prompt removal of the calf from the cow.
- Feeding 4 quarts of high-quality colostrum (or high-quality colostrum replacer) within six hours of birth.
- Feeding pasteurized milk or milk replacer before weaning.
- Hygienic heifer management, which includes feed and water that is free of fecal contamination.

This is just another tool for producers to use in the battle against Johne’s disease. “Perfect tests for this disease either do not exist or are too expensive and take too long to be practical,” says Collins. “But using this quantitative strategy should help producers make the best possible deci-

sions as they work their way out of the disease.”

For Breunig, the combined effort of scrupulous management and more informed culling decisions will help him run his dairy profitably while he works toward his goal of becoming certified Johne’s-free. He looks forward to the day when he can cull more heavily for things like high somatic cell counts and lameness, and doesn’t have to lose cows to Johne’s anymore.

“I only buy cows from certified negative herds now, and I’ll be glad when I can have that kind of added value in my own herd,” adds Breunig.

As registered-cattle producers, the Menns know that eradicating Johne’s disease is essential to their future success.

“We’re not ashamed to admit that we have it and we’re working on it,” says Harvey. It’s not worth it to hide from this disease, and it doesn’t mean you’re a poor manager if you have it in your herd. It’s what you do about it that matters.



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Mike Collins, University of Wisconsin.

When the Menns’ first found out they had Johne’s disease in their herd, they knew they were at a critical juncture. “We were either going out of business, or somehow we would get through it,” says Jackie. “We chose to get through it. Without this program, I’m not sure we would have been able to do that.”

■ *Maureen Hanson is a freelance writer from La Porte City, Iowa.*

How to use the new Johne's decision strategy

By Maureen Hanson

University of Wisconsin Johne's disease re-researcher Mike Collins has developed a new decision-making protocol using ELISA S/P values and based on likelihood ratios. It was developed to help dairy producers minimize premature culling of productive cows, while efficiently removing the most severely affected animals that spread the disease.

The system uses the numeric results from the ELISA test to classify animals as negative, suspect, weak positive, positive and strong positive. Based on those test results, Collins has rated the likelihood that animals are indeed infected and established a plan of action for animals in each category that will help limit disease spread. It can be used in any herd that has at least one case of Johne's disease, confirmed by fecal-culture results, in a home-raised animal.

For those herds, Collins suggests the following steps:

1. Use the ELISA blood test by IDEXX Laboratories on every animal during every lactation.
2. Conduct the test

between 200 and 305 days in milk. Do not test right at dry-off, as the investment and residue risk related to dry-cow therapies can complicate the picture.

3. Follow the suggested actions steps for cows that fall into each of the categories based on their ELISA S/P levels:

■ Negative

(S/P < 0.10) – Keep for another lactation. Retest between 200 and 305 days in milk during the next lactation. Colostrum is safe to feed, and surplus milk can be fed to other calves.

■ Suspect

(S/P 0.10 – 0.25) – Keep in the herd but DO NOT use colostrum. Calve in isolated maternity facilities. Breed back and retest between days 200 and 305 of next lactation.

■ Weak positive

(S/P 0.25 – 0.40) – Keep in the herd but DO NOT use colostrum. Calve in isolated maternity facilities. Consider Johne's status when making culling decisions and/or considering whether to breed back. If bred back, monitor closely for clinical

Johne's Testing Center Serology Test Results

University of Wisconsin
School of Veterinary Medicine
2015 Lincoln Dr. West Rm 4250
Madison, WI 53706-1102



Accession # 33813

Test Performed: ELISA
Species: Dairy
Sample Type: Serum/Plasma
Number: 13
Date Received: 6/28/2002
Date Completed: 7/1/2002
Lab Comments: none seen

Veterinarian:

Owner:

FAX:

Tube #:	Animal ID:	Result:	S/P Ratio:
1	67	Negative	0.05
2	67	Negative	0.04
3	75	Suspect	0.1
4	91	Negative	0.05
5	122	Negative	0.08
6	140	Strong Positive	2.79
7	148	Strong Positive	1.25
8	156	Negative	0.06
9	258	Suspect	0.21
10	484	Negative	0.06
11	427	Negative	0.05
12	446	Negative	0.05
13	486	Positive	0.42

cal Johne's symptoms and cull if any symptoms appear. Retest between 200 and 305 days of next lactation.

■ Positive

(S/P 0.40 – 1.00) – Cull at the end of her current lactation unless an unusual circumstance dictates keeping temporarily. Do not dry treat unless kept through calving. If kept until calving, calve in isolated maternity facilities and

DO NOT use colostrum. Do not breed back.

■ Strong positive

(S/P > 1.00) – Do not dry treat. Cull at dry off.

Maureen Hanson is a freelance writer from La Porte City, Iowa.

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