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College of Veterinary Medicine

VETERINARY CONTINUING EDUCATION



ST. PAUL, MINNESOTA  
UNITED STATES OF MINNESOTA

## Update on Johne's Projects

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### The Johne's Disease Information Source website

(<http://www.cvm.umn.edu/dairycenter/johnes/index.html>) is accessible via the College of Veterinary Medicine's home page (<http://www.cvm.umn.edu/>) by clicking on the button labeled "Centers", following the link "Center for Dairy Health, Management and Food Quality" and clicking the button labeled "Johne's Disease."

The Johne's Disease Information Source website acts as a portal to numerous pages of information specific to the study being conducted by the Department of Clinical and Population Sciences at the University of Minnesota. In addition, links to pages outside the University of Minnesota system that provide additional information relating to Johne's disease are available. Although the structure and primary assets of the site are already in place, the site itself will continue to be developed and expanded as new information and resources become available.

Currently, the primary assets of the Johne's Disease Information Source website are:

- **FAQ for MN:** A collection of questions and answers that are of most immediate concern to prospective users of the site. In many instances, the best answer for a given question is provided in the "Info Sheets" section of the website. In these cases a link to the appropriate info sheet is provided.
- **Info Sheets:** A growing library of documents providing specific technical information about the department's study of Johne's disease, recommendations for preventative measures, and information about the disease itself. This collection currently incorporates numerous tables, graphs, charts and interactive calculators. A good example of the type of information available via this page is the collection of documents pertaining to the interpretation of ELISA and fecal culture test results and calculation of true prevalence.
- **Risk Assessments:** This page provides easy access to the Dairy and Beef Cattle Risk Assessment forms. The forms are available in the two most popular and standardized formats for the Internet, Adobe Acrobat Reader (.pdf) and Microsoft Word for Office (.doc). These formats allow the user to easily download, view and print the documents and guarantee the department complete control over the look, format and availability of the documents in their most recent versions.

The following additions to the website are currently in development:

- **Demonstration Herds:** An interactive presentation of the various Johne's disease study demonstration herds, including the risk assessment and herd plan, test results summary, clinical disease and culling information, pictures of the animals and maps of the facilities.

This section of the site will focus on providing the user with as much information about the herd without the user actually having to visit the farm.

## Interpreting Johne's ELISA tests in dairy cattle

### Interpretation at the individual cow level

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1. Sensitivity (% of infected cattle that test positive), is dependent on stage of Johne's disease in cow (Sweeney et al, 1995)
  - 15% for light shedders
  - 75% for heavy shedders
  - 87% for clinical shedders
2. ELISA sensitivity relative to fecal culture (Whitlock, 1999) depends upon population of cows sampled. For example, for a 400 cow dairy with 15% fecal culture prevalence:

| Category               | % of infected cows | Number of cows | ELISA sensitivity | Number of infected cows detected  |
|------------------------|--------------------|----------------|-------------------|-----------------------------------|
| Heavy shedders (3+,4+) | 20%                | 12             | 75%               | 9                                 |
| Moderate shedders (2+) | 10%                | 6              | 50%               | 3                                 |
| Light shedders (1+)    | 70%                | 42             | 15%               | 6                                 |
| Overall                | 100%               | 60             |                   | 18 = 30% of culture positive cows |

3. Specificity (% of uninfected cows which test negative)
  - 99% (Sweeney, 1995), a few false positive cows occur
4. How do the results of the ELISA relate to disease transmission?
  - Not fully understood. However, the higher the ELISA S/P value, the higher the probability of infection.
5. Remember that when you receive results back from ELISA testing, you don't know the true infection status of the cows, only the test results. Interpretation of the results depends upon the **prevalence of Johne's disease** in the herd.

Below is an example of how to interpret ELISA results for a 100-cow herd with 10 cows testing positive for Johne's disease. For most herds, the estimated test sensitivity and specificity is 30% and 98% respectively. In the chart below, the false positives are calculated to be 38% and the false negatives to be 7%.

**Estimation of true prevalence of Johne's disease using ELISA test results in cattle**

**Herd size =** 100  
**Test sensitivity =** 30% (suggested 30%)  
**Test specificity =** 98% (suggested 98%)

**Number of ELISA test positive cows** 10

=  
**Test (apparent) Prevalence =** 10%

| ELISA test result | True Infection |          |     |
|-------------------|----------------|----------|-----|
|                   | Positive       | Negative |     |
| Positive          | 9              | 1        | 10  |
| Negative          | 20             | 70       | 90  |
|                   | 29             | 71       | 100 |

**Estimated true prevalence = 29%**

**Positive predictive value = 86%** of test positives are infected  
*Expect 14%* of test positive cows will be false positives

**Negative predictive value = 78%** of test negative cows are uninfected  
*Expect 22%* of test negative cows will be false negatives

# Minnesota Johne's Disease Control Program for Dairy Herds

## Risk Assessment Form

Minnesota Board of Animal Health

90 West Plato Boulevard

St. Paul MN 55107

Ph. (651) 296-2942

<http://www.bah.state.mn.us/>

University of Minnesota

College of Veterinary Medicine

435F Animal Science/Vet. Medicine Building

1988 Fitch Avenue

St. Paul MN 55108

FAX: (612) 624-3233

E-mail: [wells023@tc.umn.edu](mailto:wells023@tc.umn.edu)

<http://www.cvm.umn.edu/dairycenter/johnes/>

Adapted from: Rossiter, Hutchinson, Hansen and Whitlock. "Johne's Disease Prevention/Control Plan for Dairy Herds: Manual for Veterinarians. The Bovine Practitioner 33.2 (May 1999). <http://www.usaha.org/hjwg/hjwg.html>

Form completed by: \_\_\_\_\_ Date: \_\_\_\_\_

**A. General Contact Information for the Herd:**

|  |  |                |              |
|--|--|----------------|--------------|
| 1. Farm Name   |  | 2. Premise ID  |              |
| 3. Owner(s) Name   |  |                |              |
| 4. Key Farm Contact/Management Persons (If Different From Owner) |  |                |              |
| 5. Address (Number, Street, Route and/or P.O. Box)               |  |                |              |
| 6. Address, Second Line (If Needed)                              |  | 7. County      |              |
| 8. City or Town  |  | 9. State       | 10. Zip Code |
| 11. Phone<br>( )   |  | 12. FAX<br>( ) |              |
| 13. E-mail address   |  |                |              |

**B. Herd Veterinarian Information:**

|   |  |                |              |
|---|--|----------------|--------------|
| 14. Veterinarian Name                               |  | 15. Vet. Code  |              |
| 16. Veterinarian Clinic Name                        |  |                |              |
| 17. Address (Number, Street, Route and/or P.O. Box) |  |                |              |
| 18. City or Town                                    |  | 19. State      | 20. Zip Code |
| 21. Phone<br>( )                                    |  | 22. FAX<br>( ) |              |
| 23. E-mail address                                  |  |                |              |

**C. General Herd Information**

24. Other Animal Enterprises: \_\_\_\_\_

25. Herd size:

a. Milk Cows: \_\_\_\_\_ b. Bred Heifers: \_\_\_\_\_ c. Heifer Calves: \_\_\_\_\_ d. Bulls: \_\_\_\_\_ e. Total: \_\_\_\_\_

26. Herd goals (include future herd size):

a. Next 2 years: \_\_\_\_\_

b. 3 to 5 years: \_\_\_\_\_

27. Do you plan to be dairy farming in 10 years? \_\_\_\_\_

28. Current & future sources of herd replacements: \_\_\_\_\_
29. Current herd performance (*incl. milk production*): \_\_\_\_\_
30. Herd performance goals: \_\_\_\_\_
31. Herd health concerns you're addressing/plan to address: \_\_\_\_\_
32. Management concerns you're addressing/plan to address: \_\_\_\_\_

**D. Herd History with Regards to Johne's Disease**

33. First diagnosed case of clinical Johne's disease in your herd:  
 a. Year: \_\_\_\_\_ b. Source (Home Raised or Purchased?) \_\_\_\_\_

34. Enter past clinical cases in the following table:

|    | ID | Date | Approx. Age | Source | Offspring ID Still In Herd |
|----|----|------|-------------|--------|----------------------------|
| a. |    |      |             |        |                            |
| b. |    |      |             |        |                            |
| c. |    |      |             |        |                            |
| d. |    |      |             |        |                            |
| e. |    |      |             |        |                            |
| f. |    |      |             |        |                            |

35. Youngest clinical case:  
 a. Age: \_\_\_\_\_ Date: \_\_\_\_\_ c. Source \_\_\_\_\_

Enter information for the last 12 months in the table below:

| Johne's Tally                   | 1st Calf | 2nd Calf | 3+ Calf | Total | % of Herd |
|---------------------------------|----------|----------|---------|-------|-----------|
| 36. Clinical Johne's Cases      |          |          |         |       |           |
| 37. Animals Culled Last Year    |          |          |         |       |           |
| 38. Johne's Cases as % of Culls |          |          |         |       |           |
| 39. Johne's-Test Positives      |          |          |         |       |           |

**E. Introduction of New Cattle**

| Group             | Past 12 Months |        | Past 5 years ( <i>not incl. past 1 year</i> ) |        |
|-------------------|----------------|--------|---|--------|
|                   | #              | Source | #   | Source |
| 40. Milk Cows     |                |        |   |        |
| 41. Bred Heifers  |                |        |   |        |
| 42. Heifer calves |                |        |   |        |
| 43. Bulls         |                |        |   |        |
| <b>44. Total</b>  |                |        |   |        |

**F. Johne's Disease Risk Assessment Checklist for Dairy Herds**

| Risk   | Max Risk   | Herd Risk | Current Comment | Past Comment |
|--|------------|-----------|-----------------|--------------|
| <b>45. Calving Area</b>                                      |            |           |                 |              |
| Multiple animal use  | 10         |           |                 |              |
| Manure build-up  | 10         |           |                 |              |
| Calves born in cow areas                                     | 10         |           |                 |              |
| Calving area used for sick cows                              | 10         |           |                 |              |
| JD clinicals/suspects in area                                | 10         |           |                 |              |
| Newborn calves stay with cows after birth                    | 10         |           |                 |              |
| Calves nurse cows  | 10         |           |                 |              |
| Manure soiling of cows (udders)                              | 10         |           |                 |              |
| <b>Risk Sub-Total:</b>                                       | <b>80</b>  |           |                 |              |
| <b>46. Pre-Weaned Calves</b>                                 |            |           |                 |              |
| Fed pooled colostrums  | 10         |           |                 |              |
| Fed pooled milk  | 10         |           |                 |              |
| Calves have direct cow contact                               | 10         |           |                 |              |
| Calves housed near cows                                      | 10         |           |                 |              |
| Potential for contam. of milk/ feed/water/stall w/cow manure | 10         |           |                 |              |
| <b>Risk Sub-Total</b>  | <b>50</b>  |           |                 |              |
| <b>47. Post-Weaned Heifers</b>                               |            |           |                 |              |
| Direct contact with cows/manure                              | 6          |           |                 |              |
| Potential for contam. of milk/ feed/water/stall w/cow manure | 6          |           |                 |              |
| Share feed, water, housing with cows                         | 6          |           |                 |              |
| Share pasture with cows                                      | 6          |           |                 |              |
| Manure spread on pasture and grazed in same season           | 6          |           |                 |              |
| Contamination of feed equipment                              | 6          |           |                 |              |
| <b>Risk Sub-Total</b>  | <b>36</b>  |           |                 |              |
| <b>48. Bred Heifers</b>                                      |            |           |                 |              |
| Direct contact with cows/manure                              | 4          |           |                 |              |
| Potential for contam. Of milk/ feed/water/stall w/cow manure | 4          |           |                 |              |
| Share feed, water, housing with cows                         | 4          |           |                 |              |
| Share pasture with cows                                      | 4          |           |                 |              |
| Manure spread on pasture and grazed in same season           | 4          |           |                 |              |
| Contamination of feed equipment                              | 4          |           |                 |              |
| <b>Risk Sub-Total</b>  | <b>24</b>  |           |                 |              |
| <b>49. Cows</b>  |            |           |                 |              |
| Contamination of feeders, waterers                           | 4          |           |                 |              |
| Manure contamination of feed storage or feed equipment       | 4          |           |                 |              |
| Manure spread on pasture and grazed in same season           | 4          |           |                 |              |
| Access to manure storage areas                               | 4          |           |                 |              |
| <b>Risk Sub-Total</b>  | <b>16</b>  |           |                 |              |
| <b>50. Grand Total</b>                                       | <b>206</b> |           |                 |              |



### G. Management Procedures and Plan

Objectives:

- Keep calving areas clean and dry, and used preferably by only one cow at a time.
- Avoid feeding infective colostrums/milk.
- Prevent exposure to infected animals and their manure.
- Prevent contamination of feed and water (especially that fed to heifers).

Specific Procedures:

| Management Procedure | Person Responsible |
|----------------------|--------------------|
| 51.                  |                    |
| 52.                  |                    |
| 53.                  |                    |
| 54.                  |                    |
| 55.                  |                    |
| 56.                  |                    |
| 57.                  |                    |
| 58.                  |                    |