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Johne's Disease Risk Assessment & Management Plan for Dairy Herds.



Acknowledgements:

This form is an adaptation from previous editions of the *Johne's Disease Planning for Prevention and Control of Dairy Herds - Manual for Veterinarians* that was used to complete risk assessments and develop management plans to prevent or control Johne's disease in cattle herds for the Voluntary Bovine Johne's Control Program. The original documents were designed, edited and reviewed by members of the USAHA Risk Assessment, Herd Management and Education Standards Task Force for the Voluntary Bovine Johne's Control Program.

Johne's disease risk assessments and management plans for dairy herds

Current Herd Health Status and Concerns (Filling out this page is optional)

Collecting this information will provide information that is important to consider when implementing the elements of the Johne's disease prevention or control plan. This format is designed to show the farm's performance-limiting health issues and the level of concern that the owner has for them. Many of the health and production problems brought to light by information on this page may be already addressed by the owner. The final Johne's management plan should blend in with these current performance-limiting health issues and concerns.

Fill in requested information, circle choice or specify the incidence (or level of concern for problem) by checking your choice (U, 1, 2 or 3) in the box next to listed disease.

U= unknown incidence or problem

2= Moderate incidence, may be need attention

1= OK, low incidence, not a current problem

3= Significant incidence, unsatisfactory, needs attention

Calf Feeding Practices				
Avg. hrs. to 1 st colostrum				
Amount 1 st colostrum fed				
Colostrum source (Individual / Pooled)				
Total no. colostrum feedings				
Feed unpasteurized milk, pasteurized milk, milk replacer (circle choices)				
Calf Disease Incidence or Level of Concern				
Pre-wean mortality (Last 12 mos.)				
Calf vigor (satisfactory / unsatisfactory)				
Calf growth (satisfactory / unsatisfactory)				
Protocol for keeping feed and feeding equipment sanitary				
Scours	U	1	2	3
Pneumonia	U	1	2	3
Other	U	1	2	3
Heifer Disease Incidence or Level of Concern				
Heifer growth (poor / good)				
Age at freshening (months)				
Breeding program (satisfactory / unsatisfactory)				
Pneumonia	U	1	2	3
Digital dermatitis	U	1	2	3
Coccidiosis	U	1	2	3
Reproduction Program				
Heat detection rate				
Conception rate				
Pregnancy rate				
Herd average DIM				
Abortions / yr (% herd)				
Embryonic loss				
Method of insemination				
Milk Quality and Udder Health				
Bulk tank SCC				
Bacteria count / SPC				
Number mastitis cases per month				
Recent culture and sensitivity results				

Lameness incidence or level of concern				
% of cows with obvious lameness				
Foot trimming schedule				
Digital dermatitis	U	1	2	3
Laminitis	U	1	2	3
Abscesses	U	1	2	3
Foot Rot	U	1	2	3
Other	U	1	2	3

Infectious Dis. Incidence				
Johne's	U	1	2	3
Salmonellosis	U	1	2	3
Neosporosis	U	1	2	3
BVD	U	1	2	3
Respiratory disease	U	1	2	3
BLV	U	1	2	3
Clostridial disease	U	1	2	3
Leptospirosis	U	1	2	3
Other	U	1	2	3

Culling Incidence				
Cull Rate % last 6 months				
< 60 DIM	U	1	2	3
Deaths	U	1	2	3
Mastitis	U	1	2	3
Reproduction	U	1	2	3
Lameness	U	1	2	3
Low production	U	1	2	3
Other	U	1	2	3

Metabolic Dis. Incidence (fresh cows)				
Milk fever	U	1	2	3
Retained placentas	U	1	2	3
Ketosis	U	1	2	3
Mastitis	U	1	2	3
Metritis	U	1	2	3
DAs	U	1	2	3
Acidosis	U	1	2	3
Stillborn / dystocia cases	U	1	2	3
Other	U	1	2	3

Herd information, owner goals and biosecurity issues

Farm owner (or herd code) _____ Date _____
 Herd Veterinarian _____ Phone _____

General Herd Information			
Key farm management (decision-makers, key employees)			
Dairy Herd inventory:			
Breed _____	Lactating cows/heifers _____	Dry cows _____	Total cows _____
Bred heifers _____	Growing heifers _____	Bulls _____	Total head _____
In addition to dairy cattle, what other animals do you raise?			

Owner Goals and Some Biosecurity Questions	
Do you plan to be dairy farming in 5 years?	
Describe short and long-term owner goals or priorities for the farm. Some examples to consider are herd size, animal health and performance, facilities, business/employee management, family goals, environmental issues, markets, milk quality, beef quality or other.	
Short-term (this year)	Long-term (3-5 years)
Current milk/cow/day or year (lbs.)	Milk/cow/day or year goal (lbs.)
Current % BF	% BF goal
Current % Protein	% Protein goal
What are your top five overall concerns for your operation?	
What herd health improvements you are making or plan to make?	
What management concerns and/or facilities issues you are addressing or plan to address?	
List how you obtain replacements (e.g., home raised, dealer, market, single dairy, etc.)	List planned changes for obtaining replacements
If replacements are born at farm and raised elsewhere, describe how their biosecurity is maintained.	
List how you obtain herd additions (e.g., home raised, dealer, market, single dairy, etc.)	What health prerequisites do you require for herd additions?
How are cows identified?	How are their calves identified as theirs?
Outline vaccination routine for cows	
Outline vaccination routine for bred heifers	
Outline vaccination routine for young stock	

Risk Assessment Scores (based on visual observation of each environment and owner responses)

Estimate the risk for fecal/oral and colostrum/milk disease spread, or gap in farm’s biosecurity, for each management practice. Follow the logical order. **Observe Proper Biosecurity!** Note how current management conditions differ from past. Ideally producer & veterinarian score risks independently. Then compare & discuss relative importance in development of management plan. See Step 4 in the instructions for guidelines to completing area risk assessments.

A. Calving Area Risk Factors (Place an X in the box to the right of the management practice that most closely signifies the risk for that item.)	0.	1 V.	2. Low	3.	4.	5 Mod	6.	7.	8. High	9.	10. V. High	Notes / Current vs. Past	
1. Multiple animal use [Single pen → Dense crowded group]													
2. Manure build-up risk for calf ingestion [Clean dry → Dirty wet]													
3. Area also used for sick cows [Never → Always]													
4. Presence of JD clinicals / suspects [Never → Always]													
5. Manure soiled udders / legs [Never → Always]													
6. Calves born in other cow areas [Never → Always]													
7. Time calves stay with dam [<30 minutes → >24 hours]													
8. Calves nurse dam [Never → Most or all]													

Maximum score = 80. Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk for spreading Johne’s in the calving area: **Very Low Low Moderate High Very High** (Circle choice)

B. Pre-Weaned Heifer Risk Factors	0.	1. V. low	2. Low	3.	4.	5. Mod.	6.	7.	8. High	9.	10. V. High	Notes / Current vs. Past	
1. Fed pooled colostrum [Never or JD negative → High risk cows]													
2. Fed colostrum from individual cow to several calves [As 1. above]													
3. Fed unpasteurized pooled milk [JD negative cows → High risk cows]													
4. Possible manure contamination of colostrum or milk:at harvest, utensils, traffic or people [None any source → Frequent many sources]													
5. Possible manure contamination of calf feed or water: by cows, traffic splatter, equipment or people [As 4. above]													
6. Direct cow contact or potential manure contamination of calf pen by cows, traffic splatter, equipment or people [As 4. above]													

Maximum Score is 60. Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk for spreading Johne’s in pre-weaned calves: **Very Low Low Moderate High Very High** (Circle choice)

C. Post-Weaned Heifer Risk Factors	0.	1. V Low	2.	3.	4. Mod.	5.	6.	7. V High	Notes / Current vs. Past
	1. Direct cow contact or pen contamination with cows' manure [None → Always]								
2. Possible manure contamination of feed: refused cow ration, stored feed, equipment, cows, traffic splatter, people or runoff [Never → Frequently]									
3. Potential for contamination of supplied or natural water: shared with cows, traffic splatter, runoff or people [Never → Frequently]									
4. Share pasture with cows [Never → Frequently]									
5. Manure spread on forage and fed same season [Never → Frequently]									

Maximum Score is 35. Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk for spreading Johne's in post weaned heifers: **Very Low** **Low** **Moderate** **High** **Very High** (Circle choice)

D. Bred Heifer Risk Factors	0.	1. V Low	2.	3. Mod	4.	5. V High	Notes / Current vs. Past
	1. Direct cow contact or pen contamination with cows' manure. [None → Always]						
2. Possible manure contamination of feed: refused cow ration, stored feed, equipment, cows, traffic splatter, people or runoff. [Never → Frequently]							
3. Possible manure contamination of water sources: shared with cows, by cows, traffic splatter, runoff or people. [Never → Frequently]							
4. Share pasture with cows [Never → Frequently]							
5. Manure spread on forage and fed same season. [Never → Frequently]							

Maximum Score is 25. Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk for spreading Johne's in bred heifers: **Very Low** **Low** **Moderate** **High** **Very High** (Circle choice)

E. Cow and Bull Risk Factors	0.	1. Low	2.	3	4. High
1. Possible manure contamination of feed: when fed or stored, by equipment, traffic splatter, runoff or people [Never → Frequently]					
2. Possible manure contamination of water: by cows, traffic splatter, runoff or people [Never → Frequently]					
3. Direct access to accumulated or stored manure [Never → Frequently]					
4. Manure spread on forage and fed the same season [Never → Frequently]					

Maximum Score is 16. Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk for spreading Johnes among cows: **Low** **Moderate** **High** (Circle choice)

F. Sources of Additions and Replacements	Number of Animals					Comments
	1-5	6-12	13-20	21-50	>50	
1. Get additions or replacements from Level 2-4 Status Herd	0	2	4	6	8	
2. From low risk herds, Level 1 or pre-tested herds	10	11	12	13	14	
3. From single source non-tested or non-program herds	20	22	23	26	28	
4. From multiple sources non-tested or non-program herds or markets	30	34	36	38	40	

(Circle the square in each row that reflects management in the past 12 months. Include E.T. recipients and bulls)

Maximum Score allowed is 60 (If score is >60 place 60 in space). Your herd score is _____. Consider the impact of JD prevalence on ability to reduce risks.

Estimate the risk of bringing in Johnes from herd additions/replacements: **Very Low** **Low** **Moderate** **High** **Very High** (Circle choice)

Risk Assessment Summary	Risk Factor Areas	Maximum Score	Your Herd Score	Each Area Herd Score / Each Area Max Score (%)	Each Area Herd Score / Your Total Herd Score (%)
Completing this Table is optional. However, calculating the herd scores for each area as a percent of the area's maximum score and as a percent of the herd's total score will highlight the top risk areas to address in the farm plan.	Calving area	80			
	Pre-weaned heifers	60			
	Post-Weaned heifers	35			
	Bred heifers	25			
	Cows and bulls	16			
	Additions/Replacements	60			
	Total	276			

List the risk factors of most importance identified by assessment

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Building the elements of the testing strategy for Johne's management plan. See Step 5 in the instructions for guidelines.

1. What is the testing scheme expected to accomplish and how will it help reach plan objectives?
2. What test (s) will be used?
3. Who will be tested?
4. When?
5. What decision (s) will be made on results? Consider higher vs. lower risk 'test-positive' cattle.

Assembling the Johne's Disease Management Plan

See Step 6, in the instructions for guidelines.

Issues to integrate include:

1. The owner's Johne's management plan objectives (e.g., find out if JD is present, eliminate the infection from herd, prevent introduction into herd, establish official test-negative or low risk status).
2. List planned management changes for each area or management group brought to light by the risk assessment. If there are no changes planned for a specific area or group, simply list current herd management procedures.
3. Be certain to coordinate Johne's management procedures in this plan with other health / management objectives already in place. It may serve as an incentive for owners with low risk herds thinking of seeking official status. Especially note where these other objectives and health concerns will benefit from the Johne's management efforts that are outlined in the plan, (e.g., lower calf mortality or morbidity, healthier fresh cows, etc.). See Step 7, in the instructions for guidelines.
4. Before signing off on this management plan, be certain the overall strategy is comprehensive and effective enough to meet management goals. The plan should take current JD prevalence estimate into account for setting realistic goals. Proposed actions should be practical and feasible to implement and they may be applied in phases. Procedures should integrate with available resources and other farm management priorities. See Step 8, in the instructions.

Johne's Management Plan

What are the objectives of the herd plan? Determine status of herd Prevent JD introduction into herd Prevent further spread

Establish test negative status Reduce the infection in herd Other _____

Management practice to reduce identified risks for Johne's disease in this herd	How does practice benefit and/or integrate with existing health / management objectives	Priority Lo, M, or Hi	Person(s) in charge
Testing strategy			

Name of Johne's certified veterinarian or animal health official that completed risk assessment and herd plan

Signature _____ Phone Number _____

Instructions for Johne's disease risk assessments and management plans for dairy herds

The purpose of this document is to assist and guide veterinarians and their cattle producer clients with the development and implementation of a standard Johne's Management Plan. A comprehensive herd plan that is directed specifically at reducing or eliminating identified risks for the introduction and/or spread of Johne's disease and other fecal-oral transmitted diseases. In addition, implementation of management practices directed against Johne's disease will enhance the overall biosecurity of the herd. They can reduce the risk for other fecal-oral transmitted pathogens that have significant impact on cattle health and performance.

The action steps in this document present a standard and systematic method for completing a risk assessment and developing a management plan. The process will lead to a number of management choices that can be employed to reduce identified risks.

The actual content of a final plan is a decision for the owner and veterinarian responsible for the health and production of the herd. However, it should support the owner's goals for the farm, address the impact of Johne's and other disease risks, as determined by the assessment, and contain an outline for a testing scheme.

To be successful, the plan should take all health and management priorities or concerns into account and Johne's control practices should blend with ongoing biosecurity efforts. The efficacy of the plan will depend on the returns the owner expects from their effort and what is realistically achievable with current management and resources. All of these factors must be considered to craft an effective and feasible plan.

Action steps for developing the plan

The following action steps are recommended for assessing an operation and developing a standard comprehensive management plan.

Action 1. Collect information on current herd health status and production.

See page 1 in guidelines booklet for essential information and data collection.

This information is optional for the Management and Herd Classification Elements of the VBJDCP

Collecting and considering the information about a herd's current health status and owner's concerns is optional but it is highly recommended for the following reasons.

1. It will enhance the veterinarian's understanding of the operation.
2. It provides the veterinarian an opportunity to remark on the potential impact of subclinical and clinical JD infections on the incidence of other herd diseases (e.g., Metritis, foot rot, etc).
3. It offers the veterinarian an opportunity to tie certain management practices, included in the plan, to the concerns discovered in this step when completing form 8.
4. The information is important to consider before writing the herd plan as some of the herd's performance limiting health issues may be principal to the sustainability of the business.

Action 2 Collect herd information, owner goals and biosecurity data.

See page 2 in guidelines booklet for essential questions and data collection.

This information is needed for the Management and Herd Classification Elements of the VBJDCP

This action step is to collect basic information about the herd, available human resources and some biosecurity practices. It also encourages the producer to articulate major goals for their operation, such as changes in; herd size or facilities, management, environmental issues, product quality, etc. Goals dictate what is important to the owner and influence future commitment to any management plan. Biosecurity questions may reveal practices that can be addressed in the final plan to maintain or enhance herd protection from disease.

Action 3. Begin the risk assessment.

See page 3 in the guidelines booklet for essential questions and data collection.

This information is needed for the Management and Herd Classification Elements of the VBJDCP

The risk assessment begins by collecting information about the herd's experience with and potential exposure to Johne's disease. This data could provide useful benchmarks from which to consider the potential impact of Johne's disease on business profitability and to evaluate potential changes and progress over time. The quality of the information available can range from accurate written records to vague memory recall. An assessor will need to take data quality into account when applying it to the operation and plan. The initial visit can focus on the big picture, i.e., there have been recent JD cases, and fill in specific details like animal ID, exact date and age as needed at a later time.

Estimating a current prevalence of Johne's disease is part of the assessment and is basic to herd test result interpretation. The estimate can be made based on the data collected on page 3. A crude estimate can be obtained by using historical data coupled with the criteria outlined in the boxes below the prevalence line on page 3. This will lead to categorizing the herd infection as Low, Moderate or High. If available, whole-herd testing would provide a more accurate estimate.

Action 4. Assessing risks for transmitting Johne's among specific animal groups.

See pages 4 - 6 for essential risk factors and risk score values. **This information is needed for the Management and Herd Classification Elements of the VBJDCP**

This is a basic requirement for the management herd testing elements of the Program. The object is to conduct an assessment of the management practices or conditions that promote the risk for spread of Johne's and other fecal-oral transmitted pathogens. Pages 4 through 6 list potential risk factors in major management areas starting with the maternity area and progressing to herd additions. The listed management practices or risk factors are believed to promote fecal-oral transmission of pathogens in particular, but other infections may be transmitted by the same management conditions. Assessors should consider all factors in each management area. Scoring risks is a subjective process that is based on the observer's experience and knowledge of disease transmission and Johne's epidemiology.

The intended procedure is for both veterinarian and producer to score the risk for each factor listed in each management area independently. Then discuss results and reach agreement on values. Mutual agreement on the importance of potential risk factors will help establish priorities for the management plan. Identifying each management area's risks and the overall area's estimated risk for transmitting Johne's is an important step in designing a herd plan that is effective and realistic to implement.

Please note that the maximum scores for the specific animal-environments have been weighted from the youngest age group to oldest. This weighted score is artificial but intentional. Since the young are more susceptible to infection the authors wanted the raw score in those areas to be markedly higher than raw scores for older animals. Suggested guidelines for scoring are provided in the tables below.

To better understand the degree of Johne's infection in the current mature herd, it is also important to recognize where current management conditions have changed from the past. For example, if maternity management has changed in the last two years, mature cows that recently developed clinical disease or tested positive were likely raised under different management circumstances, with potentially different exposures.

Descriptive guidelines for scoring risk factors dairy cows

Calving Area Since calves are the most susceptible to infection, the score values are higher for risk factors in this area. Risk factors for the maternity or calving area should be assessed for the potential of a new born to ingest manure or MAP from mature cattle. Considerations include ground and pen surfaces, contaminated udders and teats, suckling colostrum from an infected cow or manure contamination on calf's body surfaces.

Risk Factors	Scoring guidelines
Is the area used for more than one calving cow at a time?	Lowest risk = single pen use (0-1). Moderate risk = general maternity area with moderate cow density (4-6). High risk = very crowded maternity area used by all cows (8-10).
Does manure build-up in the calving area posing a risk for calf ingestion?	Lowest risk = area always clean and dry (0-1). Moderate risk = area has little manure visible to area more manure-free than manure contaminated (4-6). High risk = area is more manure contaminated than manure-free to extensive manure contamination (8-10)
Are calves born in other areas that hold cows, i.e., outside of calving area?	Lowest risk = almost never occurs (0-1). Moderate risk = occurs 15% to 25% of all calvings (4-6). High risk = occurs more than 40% of the time (8-10)
Are sick cows kept in the calving area?	Lowest risk = almost never (0-1). Moderate risk = hospital pen adjacent to maternity area (4-6). Highest risk = sick cows are in maternity area (8-10).
Are high risk/JD clinical and suspects in calving area?	Lowest risk = almost never (0-1). Moderate risk = low risk suspects in maternity area (4-6). Highest risk = high risk / JD clinicals are in maternity area (8-10).
Do calves stay with their dams for >60 minutes?	Lowest risk = almost never (0-1). Moderate risk = most calves stay 1-4 hrs (4-6). Highest risk = most calves stay more than 6 hrs (8-10).
Are calves allowed to nurse their dams?	Lowest risk = almost never (0-1). Moderate risk = most calves stay 1-4 hrs (4-6). Highest risk = most calves stay more than 6 hrs (8-10).
Are calving cow's udders soiled with manure?	Lowest risk = 90% of udders are clipped, clean and dry (0-1). Moderate risk = moderate amount of manure on udders of 20% - 40% of cows (4-6). Highest risk = udders are manure covered on a majority of cows (8-10).

Pre-weaned calf group Since calves are the most susceptible to infection, the score values remain high for risk factors in this group. Risk factors for this group should be assessed for the potential of a calf to ingest manure or MAP from mature cattle. Considerations include ground and pen surfaces and potential contaminated colostrum, milk, water or feed. Consider all sources for potential manure contamination including, colostrum or milk from infected cows, accidental contamination of any colostrum, milk, feed or pen surfaces from mature cattle, utensils, equipment, traffic splatter or people.

Risk Factor	Scoring guidelines
Is colostrum pooled from multiple cows and fed to calves?	Lowest risk = never done or only from cows with several negative JD tests (0-1). Moderate risk = from cows with single negative JD test or from low risk group (4-6). Highest risk would be from cows with unknown JD status in an infected herd (8-10).
Is colostrum fed from individual cows to calves?	Lowest risk = from dams to their own calves (0-1). Moderate risk = colostrum from single cow with negative JD test fed to several calves (4-6). Highest risk = from cows with unknown JD status fed to several calves (8-10).
Is unpasteurized milk pooled and fed to calves?	Lowest risk = from low risk cows (several neg. tests) (0-1). Moderate risk = from cows with one negative JD test (4-6). Highest risk = from cows with unknown JD status in an infected herd (8-10).
Can calf's colostrum and/or milk be contaminated with cow manure any time?	Lowest risk would be never to rarely (0-1). Moderate risk = occasionally from a few sources (4-6). Highest risk = frequently from many sources (8-10).
Can calf's feed or water be contaminated with cow manure any time?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (4-6). Highest risk = frequently from many sources (8-10).
Are calves able to come in contact with cows or cow manure in their housing?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (4-6). Highest risk = frequently or always (8-10).

Post weaned heifer group The age of this group may extend to 16 months. The score values are less than younger calves but higher than bred heifers or cows. Risk factors for this group should also be assessed for the potential of a calf to ingest manure or MAP from mature cattle. Considerations include ground and pen surfaces, water or feed. Consider all sources for potential contamination including, manure runoff from cow herd, being fed refused feed from cows, sharing pasture or water with mature cattle, accidental contamination of any feed, water or pen surfaces from mature cattle, equipment, traffic splatter or people.

Risk Factor	Scoring guidelines
Do heifers have contact with cows or their manure?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3-5). Highest risk = frequently from many sources (6-7).
Is it possible for manure from cows to contaminate the feed?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3-5). Highest risk = frequently from many sources (6-7).
Is it possible for manure from cows to contaminate heifer water sources?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3-5). Highest risk = frequently from many sources (6-7).
Do heifers share pasture with mature cattle?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3-5). Highest risk = frequently or always (6-7).
Is manure spread on pasture then used by or fed to heifers?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3-5). Highest risk = frequently or always (6-7).

Bred heifer group This group of cattle are usually over 12 months of age and are believed to be substantially less susceptible to Johne's than newborn calves. The score values are less than younger calves but slightly higher than cows. Risk factors for this group should also be assessed for the potential of a heifer to ingest manure or MAP from mature cattle.

Considerations include ground and pen surfaces, water or feed. Consider all sources for potential contamination including, manure runoff from cow herd, being fed refused feed from cows, sharing pasture or water with mature cattle, accidental contamination of any feed, water or pen surfaces from mature cattle, equipment, traffic splatter or people.

Risk Factor	Scoring guidelines
Do heifers have contact with cows or their manure?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3). Highest risk = frequently from many sources (5).
Is it possible for manure from cows to contaminate the feed?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3). Highest risk = frequently from many sources (5).
Is it possible for manure from cows to contaminate the water used by heifers?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3). Highest risk = frequently from many sources (5).
Do heifers share pasture with mature cattle?	Lowest risk = never to rarely (0-1). Moderate risk = be occasionally (3). Highest risk = frequently or always (5).
Is manure spread on pasture then used by or fed to heifers?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3). Highest risk = frequently or always (5).

Cow group Even though cattle over 24 months of age are believed to be less susceptible to JD, infected cattle may shed MAP and other pathogens in their feces and add significantly to the overall pathogen load in their environment. One of the primary objectives of a management plan is to reduce the pathogen load in the environment. Risk factors for this group should be assessed for the potential of a cow to ingest significant amounts of MAP from the environment over time. Considerations include water or feed. Consider all sources for potential contamination including accidental contamination of any feed, water from other mature cattle, equipment, traffic splatter or people.

Risk Factor	Scoring guidelines
Is it possible for feed to be contaminated with manure?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (2-3). Highest risk = frequently or always from many sources (4).
Is manure contamination of the water possible?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (2-3). Highest risk = frequently or always from many sources (4).
Do cows have access to accumulated or stored manure?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (2-3). Highest risk = frequently or always (4).
Is manure spread on pasture and grazed or harvested the same season?	Lowest risk would be never to rarely (0-1). Moderate risk would be occasionally (2-3). Highest risk would be frequently or always (4).

Additions and replacement group Animals acquired from outside sources may pose a significant risk for many diseases including Johne's. Preventing entrance of pathogens into a herd is a primary biosecurity objective of the management plan. The maximum score for this risk is high because of its potential to introduce a new or maintain an existing pathogen load in the herd. The assessment is based on the number of animals that enter the herd or farm location. The assessment for this operation policy is found on page 6 of the guidelines booklet.

The final step is to list the most important factors identified by the assessment. By listing them it will help prioritize which should be included in the management plan.

Action 5. Build the elements of a testing strategy

See page 7 in guidelines booklet for essential questions and data collection.

This information is needed for the Management and optional for the Herd Classification Elements of the VBJDCP

Testing strategy Tests for Johne's disease are tools and must work within a management plan to be useful. Thus, producer and veterinarian should develop and begin implementing the management strategy before doing much testing. Testing without a plan and an understanding of how to use results can cause confusion and waste time and money. The key elements to consider in choosing a strategy are listed below. Collecting the information on page 7 on the guidelines booklet will help clarify how testing will be used to enhance management efforts and accomplish goals of this specific farm plan. *Decide how to handle the following issues before testing.*

1. What is the testing scheme expected to accomplish, how it will help achieve farm and plan objectives?
 - a. Common objectives for initial testing schemes include; finding out if infection is present or revealing the infection status in risk-groups of interest.
 - b. Common objectives for more advanced schemes include; timely identification of infected animals to manage or cull, screen a herd to determine risk for purchasing replacements, more thorough assessment of prevalence and/or herd status.
 - c. Consider the ethical and liability implications in case a positive diagnosis is made.

2. What cattle will be tested and when?
 - a. Testing should be timed for immediate management (control) decisions.
 - b. Useful initial testing strategies might include:
 - i. Target groups – Cattle at higher risk of being exposed or infected, of interest for management decisions, Johne's suspects, acquired cattle or exposed offspring.
 - ii. 30 (or more) older cattle at random to assess herd risk.
 - c. Useful testing strategies for control might include:
 - i. Test different animals in subgroups at a regular interval so that all productive cattle are tested over a time period (1 yr). For example, every month test cows in a specific gestation time period, i.e. 120-150 days pregnant. Results are ready for critical management decisions at dry off, calving, breeding etc.
 - ii. Whole herd or statistical sample - if urgency to know herd status.

3. What decisions will be made on test results?
 - a. Herd level decisions: Establish herd-status or assess prevalence.
 - b. Management or control decisions on individuals:
 - i. Determine high risk and lower risk cattle, often based on multiple test results.
 - ii. Control decisions include: Segregate or cull ASAP, Do not use colostrum, Do not breed, etc.

Action 6. Critical management practices to include in the management plan

See page 7 for essential information to be integrated and page 8 for the plan format.

This information is needed for the Management and Herd Classification Elements of the VBJDCP

Include owner's objectives Below suggests some owner objectives that could be included in the plan. The objectives should reflect owner's goals and the relative impact of Johne's on the herd. *These objectives are the basis for determining the elements of the management plan and whether a testing strategy (and what type) might be desired to meet them.* Short and longer-term objectives, achievable with given management and resources and a realistic time frame, should be considered. They can start simple and be modified with time. They should be measurable, such as reducing the number of clinical cases to 1% within 3 years. The table, "Elements of herd plans for different objectives", at the end of this document has suggestions for least, moderate and most aggressive objectives and plans.

Elements of the Plan Page 8 in the form may be used to outline the plan elements. Management actions are prioritized based on the JD prevalence, risk assessment results, objectives, other health and management priorities and available resources. Recommendations for management practices that will reduce or eliminate the risk for Johne's disease in most areas of production are outlined on the next page. A review of these suggestions should help the process of prioritizing and deciding the specific elements that will be in the herd plan.

A. Calving area

a. *Management objectives: keep it clean and dry.*

b. *Suggested procedures to achieve objectives:*

1. For inside calving areas:

- Use area for calving only.
- Use single-animal pens; assure adequate size area.
- Remove manure and bedding after each use.

2. For outside calving areas:

- Use adequate area and monitor use to minimize mud and manure accumulation.

3. Clip and clean udders before calving and remove calf immediately after birth.

B. Pre-weaned calves

a. *Management objectives: avoid feeding infective colostrum and milk, and prevent contact with infectious material or environments.*

b. *Suggested procedures:*

- Use colostrum from JD-test negative or low risk cows.
- Feed milk replacer rather than unpasteurized milk in JD herds.
- Prevent manure contamination of feed and water.
- Keep calves in separate facility or location from cows.
- Minimize manure transfer from cows to calves - feed calves first, separate equipment, clean boots, etc.

C. Post-weaned calves and bred heifers

a. *Management objectives: prevent exposure to infective animals and manure and prevent contamination of feed and water.*

- b. *Suggested procedures:*
- Keep young stock in separate facility or area.
 - Do not co-mingle or allow direct contact with mature cattle or their manure.
 - Prevent water drainage from cow to young stock areas.
 - Use separate equipment to handle feed and manure.
 - Design and maintain feed and water to prevent manure contamination.
 - Do not feed refused cow rations to this group
 - Avoid traffic from cow areas to young stock.
 - Do not graze on pastures used by cows or where manure has been spread that season

D. Mature Cattle

a. *Management objectives: eliminate high-risk animals; manage test-positive animals to reduce risk of exposing susceptible young stock*

b. *Suggested procedures:*

- Segregate, test, and cull all animals with clinical signs of JD as soon as possible.
- Manage asymptomatic JD test-positive animals to reduce premise contamination.
- Cull when economically feasible.

E. Acquired Animals

a. *Management objectives: not to purchase or bring back Johne's infected cattle*

b. *Suggested procedures:*

- Know identity, health history and hygiene of herd(s) of origin.
- Evaluate Johne's risk in other species besides cattle such as goats and sheep
- Ask for JD history, JD case rate/yr, testing results in herd(s) of origin.
- Avoid buying animals from herd with JD risk higher than your herd.
- Test animals (pre or post-purchase depending on age).
- Do not buy or retain test positive cattle.
- Segregate to prevent oral/fecal contact with young stock until test status is known.

I. Herd Testing

a. *Management objectives: determine presence and/or prevalence of disease; identify infected animals; monitor progress of herd management plan.*

b. *Suggested procedures:*

- Do target testing to determine status.
- Test suspects to know status and track clinical cull rate.
- Accumulate herd test data, assess prevalence, target risk cattle and control efforts.
- Use routine timely testing schemes to provide current results for control management decisions and stimulate Johne's awareness and prevention activity.
- Use results as part of a management plan.

Action 7. List how JD management efforts will be a benefit to and integrate with other health and performance issues.

This information is needed for the Management and Herd Testing Elements

Management efforts against Johne's disease are often doubly justified because they can be coordinated with and targeted to produce results or improvements in other herd health or management priority areas. Plan how to capitalize on practices that also increase commitment to and return on the producer's overall biosecurity efforts. Some dairy herd examples might be:

Calving Area,

- Removing calves immediately might improve labor observations and decrease dystocia cases.
- Removing calves immediately will reduce the risk of other fecal-oral pathogens.
- Improving sanitation in the calving area will reduce the risk for some environmental mastogens.

Pre-weaned Calves,

- Feeding pasteurized milk may improve calf weight gains and decrease morbidity rates.

Cows,

- More attention given to calving cows to protect calves might also reduce the risk for periparturient diseases in cows. More frequent observations of cows and heifers in or near labor may lead to early detection of signs of periparturient diseases.

Action 8. Reality check! Is the plan appropriate? Plan to monitor it

This action should be completed for the Management and Herd Testing Elements

As the plan outline comes together make sure to perform a reality check, to confirm that there is agreement on the elements and how they will be implemented. It is expected to evolve with time. An appropriate plan should pass the following criteria.

- a. Strategy should be comprehensive and effective enough to meet management goals.
- b. Plan should take current JD prevalence estimate into account for setting realistic goals.
- c. It should be practical and feasible to implement. (It may be implemented in phases.)
- d. Integrated with other farm management priorities and available resources.
- e. Is in line with farm's short and long term business objectives.

Plans help change the way things are done and must be monitored on a regular basis. Agree to routinely review and evaluate the plan, identify problems and adjust as needed. i.e.,

- a. Evaluate implementation and effectiveness on a timely and regular basis, i.e. monthly, seasonal checklist reviewed by team and veterinarian.
- b. Identify areas "not working"; re-evaluate and modify as appropriate.

Elements of herd plans for different objectives

The aggressiveness of the plan depends on farm goals, prevalence, transmission risks, and time frame. Testing strategy depends on herd prevalence, plan objectives and management action capabilities.

Control Plan Components	Aggressiveness of desired objectives for herd plan design		
	Least	Moderate	Most
Suggested Objectives	Preventive Management Initially investigate herd status Minimize existing risks Maintain prevalence Minimize / manage introduced infection	Control Reduce prevalence Reduce clinical disease to <2% Reduce premise contamination	Reduce or Eliminate Achieve low prevalence No clinical disease Eliminate infection Thorough CMP implementation Minimal time to reduce/eliminate
Test choice and strategy	Lower sensitivity, less costly test Initial mature herd screen Partial herd (high risk animals) Monitor clinical suspects	1-2 x/yr >20-24 mos of age Serology w/ selected fecal culture follow-up Test subgroups (>165 D PREG) Whole herd or partial herd Time results to manage risks at calving Test clinical suspects early	1-3 X/yr > 18 -24 mos of age Whole herd regular intervals Multiple tests Maximize sensitivity & specificity Time results to manage risks at calving Test clinical suspects early
Test result use: Cull Manage test-positive animals	Clinical suspects High risk test <i>positives</i> Monitor <i>positives</i> for signs Use as one culling criteria	Clinical suspects immediately Subclinical test <i>positives</i> prioritize by test result and performance criteria Consider culling offspring of clinical dams Identify Segregate or group Do not feed milk or colostrum Do not breed higher risk <i>positives</i>	Clinical suspects immediately, segregate until leave Subclinical <i>positives</i> before advanced disease Consider offspring of test <i>positive</i> dams Consider not raising any replacements until low prevalence Other actions same as moderate but more aggressive
Management	Prevent overcrowded calving areas Clean & dry good sanitation Remove newborn calves ASAP Prevent young stock contact with adults & manure Minimize manure contamination of feed and water, especially for young stock	Keep calving area density low Clean and dry good sanitation Remove newborn calves <u>immediately</u> Separate immature from adults with barriers or buffers Feed low risk colostrum & milk, or milk replacer Eliminate manure contamination of feed, water & equipment used for young stock	Raise all replacements or acquire from low risk source Superior calving management. and sanitation Remove newborn calves immediately Separate young stock from adults completely Feed colostrum from test <i>negative</i> animals to offspring of <i>positives</i> , if raised Feed replacer or milk from <i>negative</i> cows only Eliminate all feed, water & equipment contamination
Coordinate with other management priorities	Improve general management in priority areas: dry cows, calving, heifers, nutrition	Focus management to improve performance in related areas: dry cow nutrition, calving, calves, heifers, mastitis, reproduction, cow comfort	Optimize management to improve performance in related areas: dry cow nutrition, calving, calves, heifers, mastitis, Minimize stress, improve cow comfort