Johne's Disease Risk Assessment & Management Plan for Beef 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 document 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 beef herds

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

Collecting this information will provide important information to consider when drafting Johne's management plan. Listed here are the herd's performance-limiting health issues and/or the level of concern that the owner has for them. Many of the potential health and production problems listed below may already be 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
1= OK, low incidence, not considered problem
2= Moderate incidence, may need attention
3= Significant incidence, unsatisfactory, needs attention

Suckling-Calf Health and Disease				
Pre-wean mortality (Last 12 mos.)				
Calf vigor	(satisfactory / unsatisfactory)			
Calf growth	(satisfactory / unsatisfactory)			
Scours	U	1	2	3
Pneumonia	U	1	2	3
Other	U	1	2	3
Weaned Heifer and Bull Health and Disease				
Growth	(satisfactory / unsatisfactory)			
Heifer age at 1st calving (months)				
Breeding soundness (bulls)	(satisfactory / unsatisfactory)			
Breeding program (heifers)	(satisfactory / unsatisfactory)			
Pneumonia	U	1	2	3
Parasitism	U	1	2	3
Other	U	1	2	3
Periparturient Disease in Cows and 1st Calf Heifers				
Grass tetany	U	1	2	3
Retained placenta	U	1	2	3
Dystocia / Trauma	U	1	2	3
Prolapse (specify)	U	1	2	3
Other	U	1	2	3

Culling Information and Incidence				
Overall cull rate				
Cull rate in 1st calf heifers				
Due to age	U	1	2	3
Open	U	1	2	3
Due to injury	U	1	2	3
Low calf-weaning weight	U	1	2	3
Complications from dystocia	U	1	2	3
Other	U	1	2	3
Infectious Disease				
Calves weaned as % of bred cows and heifers				
Bred but open cows and heifers or abortions / year				
Johne's	U	1	2	3
Bovine Virus Diarrhea	U	1	2	3
Clostridial infection	U	1	2	3
Campylobacteriosis	U	1	2	3
Trichomoniasis	U	1	2	3
Other	U	1	2	3
Reproduction Performance				
Heat detection (If applicable)				
Conception rate (If applicable)				
Pregnancy rate				
Natural service / Artificial Insemination (circle choice)				
Other related concerns				

Herd Information, Owner Goals and Biosecurity Issues

Herd owner (or herd code)_____**Date**_____
Herd veterinarian _____ **Phone** _____

General Herd Information	
Key farm management (decision-makers, key employees)	
Current herd inventory Breed _____ Cows _____ 1st Calf Heifers _____ Bred Heifers _____ Unbred heifers _____ Bulls _____ Yearling Bulls _____ **Total head** _____	
In addition to beef cattle, what other animals do you raise?	
Farm or Ranch Goals and Some Biosecurity Questions	
Do you plan to be raising beef cattle in five years?	
Describe short and long-term goals or priorities for the enterprise. Consider herd size, health and performance, facilities, business / employee management, family goals, environmental Issues, markets, Beef Quality, or other.	
Short-term (this year)	**Long term-(3-5 years)**
What are your current herd performance values? (For example weaning weight, % pregnant, etc.)	Herd performance goals
What are your top five overall concerns for your operation?	
Herd health concerns you are addressing or plan to address	
Management concerns or facilities issues you are addressing or plan to address	
List how you obtain replacements (e.g., home raised, market, single owner, etc.)	List planned changes for obtaining replacements
If animals are raised elsewhere and return to the ranch, describe how their biosecurity is maintained.	
List how you obtain herd additions (E.g., dealer, market, single owner, 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 and 1st calf heifers	
Outline vaccination routine for retained yearling heifers and bulls	
Outline vaccination routine for calves	

Herd Risk Assessment, History and Prevalence of Johne's Disease

How long has the herd been here?_____

How was it assembled? _____

What percent of the current herd was born on the premises?_____ % purchased?_____

What percent of the herd was born here, but raised elsewhere? _____

Were those animals commingled with animals from other locations? Yes No

When was the 1st clinical case of Johne's diagnosed or suspected (year)?_____

Age and source (home raised or purchased) of 1st case? _____

What was the youngest case (age, date, source)? _____

List clinical cases beginning with most recent (use another sheet if needed)

ID	Date	Approx. Age	Home raised or from outside	Offspring ID still in herd

Record information from the last 12 months

Information Category	1st calf	2nd calf	3+ calf	Total	% of herd
Clinical Johne's cases, e.g., chronic diarrhea or chronic weight loss					
Cattle culled last 12 mo.					
Johne's cases as % of cows culled					
Number animals with positive ELISA results					
Number animals with positive fecal cultures					

Introduction of new cattle

Group	No. last 12 mo.	JD status of seller herd Test negative unknown, etc.	No. 2-5 yrs ago	JD status of seller herd Test negative unknown, etc.
Cows				
Heifers				
Bulls				
Total				

Estimate the prevalence of Johne's disease in herd

[Low Moderate High]

Place an X on line above where you estimate herd prevalence might be.

Consider number, age and timeframe of clinical cases for estimating prevalence of Johne's in the herd.

You may also use information from boxes below to help estimate herd prevalence.

Low	Moderate	High
No or rare clinical cases Clinical only in purchased animals ~< 5% test prevalence mostly in older animals Excellent management and sanitation	Few clinical cases in home-reared animals Recent history of 2-5% clinicals/year ~6-19% test prevalence mixed group Management allowed for some contact of weaned young stock with manure or older animals	Frequently in home-reared animals Increasing clinical cases Decreasing age of clinicals ~> 20% test prevalence mixed group Severe risks exist for contact of young stock with manure of mature animals

Risk Assessment Scores (based on visual observation of each environment and investigation of policy).
Estimate the risk for fecal/oral and colostrum/milk disease spread, or gap in farm's biosecurity, for each management practice. Note how current management conditions differ from past. Ideally, producer & veterinarian score risks independently. Then compare & discuss relative importance in development of management plans. See Step 4 in the 'How to Do' handbook, pages 2 - 3 and 6 – 7 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. Low	2. Low	3.	4.	5 Moderate	6.	7.	8. High	9.	10. V. High	**Notes / Current vs. Past**
1. Multiple animal use [Single use pen → Very crowded calving area]												
2. Manure build-up risk for calf ingestion [Clean dry → Dirty wet]												
3. Manure soiled udders / legs [Never → Always]												
4. Presence of JD clinicals or suspects here [Never → Always]												

Maximum score is 40. 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. Nursing Calf 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. Cow/calf pairs kept with JD clinical or suspect animals [Never → Frequently]												
2. Manure build up risk for calf ingestion [Clean dry → High manure load]												
3. Possible manure contamination of water by cows, traffic splatter, equipment or people. [Never → Frequently]												
4. Possible manure contamination of feed by cows, traffic splatter, equipment or people. [Never → Frequently]												
5. Sick calves exposed to sick cows [Never → Frequently]												

Maximum Score is 50. 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. Weaned Heifers and Bull Calves Risk Factors	0.	1. V Low	2.	3.	4. Mod.	5.	6.	7. V High	Notes / Current vs. Past
1. Direct contact with cows or their manure [Never → Frequently]									
2. Possible manure contamination of feed: stored feed, equipment, from cows, traffic splatter, people or runoff [Never → Frequently]									
3. Potential for contamination of water: shared with cows, traffic splatter, runoff or people [Never → Frequently]									
4. Share pasture with cows/bulls [Never → Frequently]									
5. Manure spread on forage grazed/harvested same season [As #4. above]									

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 and Yearling Bull Risk Factors	0.	1. V Low	2.	3. Mod	4.	5. V High	Notes / Current vs. Past
1. Direct contact with cows or their manure [Never → Frequently]							
2. Possible manure contamination of feed: 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/bulls [Never → Frequently]							
5. Manure spread on forage grazed/harvested same season [As #4. above]							

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** *(Circles choice)*

E. Cow and Bull Risk Factors	0.	1. Low	2.	3.	4. High	Notes / Current vs. Past
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, people [Never → Frequently]						
3. Direct access to accumulated or stored manure [Never → Frequently]						
4. Manure spread on forage grazed or harvested the same season [As #3. above]						

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

Estimate the likely risk for spreading Johne's 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	24	26	28	
4. From multiple sources non-tested, 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 ET recipients and leased bulls.)
Maximum Score allowed is 60 (If >60 only place 60 points in space). Your herd score is_____. Consider the impact of JD prevalence as above.

Estimate the likely risk from herd additions/replacements: **Very Low** **Low** **Moderate** **High** **Very High** *(Circle Choice)*

Risk Assessment Summary **Completing this table is optional** However, calculating the herd score 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 management plan.	Risk Factor Areas	Maximum Score	Your Herd Score	Each Area Herd Score / Each Area Max Score (%)	Each Area Herd Score / Your Total Herd Score (%)
	Calving area	40			
	Pre-weaned calves	50			
	Post-weaned calves	35			
	Yearling bulls and bred heifers	25			
	Cows and bulls	16			
	Additions/Replacements	60			
	Total	**226**			

List the risk factors of most importance identified by assessment

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

1. What is the testing scheme expected to accomplish; how it will help achieve herd 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

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, pages 10 and 11, in the 'How to Do' handbook 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 management priorities. See Step 8, page 12, in the 'How to Do' handbook for guidelines.

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 who completed this risk assessment and management plan

Signature _____ Phone Number_____

Instructions for Risk Assessments and Management Plans for Johne's Disease

The purpose of this handbook is to assist and guide veterinarians and their cattle producer clients with the development and implementation of a standard Johne's risk assessment and management plan. It is a comprehensive process directed specifically at reducing or eliminating identified risks for the introduction and/or spread of Johne's disease and other fecal-oral and colostrum-milk 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 pathogens that have significant impact on cattle health and performance.

The step-wise process presented in this handbook 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 their management and resource capabilities. All of these factors must be considered to craft an effective and feasible plan.

Steps for developing the plan

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

Step 1. Collect information on current herd health status and production. See page 1. **This step 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. When drafting the Johne's management plan, information collected in this step offers the veterinarian an opportunity to tie certain management practices, directed at controlling or preventing Johne's, back to address some of the owner concerns and existing practices discovered by filling out page 1 in the guideline handbook.
4. Current herd health information is important to consider before writing the herd plan because some of the herd's performance limiting health issues may be principal to the sustainability of the business.

Step 2. Collect herd information, owner goals and biosecurity data. See page 2 for essential questions and data collection. **This step should be completed for the Management and Herd Classification Elements of the VBJDCP.**

This step is to collect basic information about the herd inventory, 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.

Step 3. Begin the risk assessment - Collect history and estimate Johne's prevalence. See page 3 for essential questions and data collection. **This step should be completed for the Management Element and Herd Classification Elements of the VBJDCP.**

The risk assessment begins by collecting information about the herd's history 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 changes and progress over time. The quality of the information available can range from accurate written records to vague personal recall. An assessor will need to take the quality factor into account when applying information to the operation and plan. The initial visit can focus on the big picture, i.e., note recent JD cases and fill in specific details like animal ID, exact date of onset and age at a later time.

Estimating a current prevalence of Johne's disease is a vital part of the assessment. It is basic to prioritizing risks to be included in the management plan and to interpreting Johne's test results in this specific herd. If available, whole-herd test results provide a reasonably accurate estimate. If test results are not available, a crude estimate is obtained by coupling historical data with the criteria outlined in the boxes below the prevalence line on the bottom of page 3 in the dairy and beef handbooks. This will help to categorize the herd prevalence within a range from low to very high.

Step 4. Assess risks for transmitting Johne's among specific animal groups.
See pages 4 - 6 for essential risk factors and risk score values. **This step should be completed for the Management and Herd Classification Elements of the VBJDCP.**

This is a basic requirement for the management and 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 and colostrum-milk transmitted pathogens. Potential risk factors for the major management areas are listed on pages 4 through 6. They begin with the maternity area and follow a calf's development to bred heifer. They also assess disease risk from

herd additions. The listed management practices or risk factors are believed to promote fecal-oral and colostrum-milk 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. As knowledge and experience increase so does the thoroughness of an assessment.

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 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 for beef herds

A. 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 newborn to ingest manure or *Mycobacterium avium* ss *paratuberculosis* (MAP) from mature cattle. Considerations include ground and pen surfaces, contaminated udders and teats, suckling 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 calving area (corral or pasture) with moderate cow concentration were calves are born (4-6). Highest risk = heavy cow concentration where calves are born (8-10).
Does manure build-up in the calving area pose a risk for calf ingestion?	Lowest risk = area always clean and dry (0-1). Moderate risk = area has fair amount of manure visible but more manure-free than manure-contaminated (4-6). Highest risk = area is more manure-covered than manure-free to extensive manure contamination (8-10).
Are calving cow's udders soiled with manure?	Lowest risk = 90% of udders are 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).
Are high risk / JD clinical and suspects in calving area?	Lowest risk = almost never (0-1). Moderate risk = low risk suspects in calving area (4-6). Highest risk = high risk / JD clinicals are in calving area (8-10).

B. Nursing calf 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 potentially contaminated water or feed. Consider all sources for potential manure contamination, including accidental contamination from mature cattle, traffic spatter or people.

Risk Factor	Scoring guidelines
Are cow/calf pairs pastured with JD clinical or suspect cattle?	Lowest risk = never or rarely (0-1). Moderate risk = occasionally. Highest risk = frequently (8-10).
Does manure build up in the pasture posing a risk for calf ingestion?	Lowest risk = area always clean and dry (0-1). Moderate risk = area has little manure visible to area about 60% manure-free (4-6). Highest risk = area is < 50% manure-free to extensive manure contamination (8-10).
Can calf's water be contaminated with cow / bull 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).
Can calf's feed be contaminated with cow / bull manure any time?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (4-6). Highest risk = frequently or always (8-10).
Are sick calves kept with or near sick cows?	Lowest risk = almost never (0-1). Moderate risk = sick calf pen adjacent to sick cow pen (4-6). Highest risk = sick calves are penned with sick cows (8-10).

C. Weaned calves group The age of this group may extend to 16 months. The score values are less than younger calves but, higher than bred heifers, yearling bulls 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.

Risk Factor	Scoring guidelines
Do weaned calves have contact with mature cattle 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 mature cattle 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 mature cattle to contaminate 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 or young bulls 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 forage then fed to heifers or young bulls?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3-5). Highest risk = frequently or always (6-7).

D. Bred heifer and yearling bull group This group of cattle is usually over 12 months of age and is 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 yearling animal to ingest manure or MAP from mature cattle. Factors include ground and pen surfaces, water or feed. Other sources for potential contamination, include manure runoff from cow herd, 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 or yearling bull have contact with mature cattle 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 mature cattle 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 mature cattle to contaminate the water used by bred heifers or yearling bulls?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally from a few sources (3). Highest risk = frequently from many sources (5).
Do bred heifers or yearling bulls share pasture with mature cattle any time?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3). Highest risk = frequently or always (5).
Is manure spread on forage then fed to bred heifers or yearling bulls?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (3). Highest risk = frequently or always (5).

E. 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 forage and grazed or fed the same season?	Lowest risk = never to rarely (0-1). Moderate risk = occasionally (2-3). Highest risk = frequently or always (4).

F. 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 source and number of animals that enter the herd or location. The assessment for this operation policy is found on page 6 of the beef handbook.

Summarize risk assessment and list most important factors A summary table is provided in the beef handbook, page 6 for convenience and assistance in comparing risk scores between different management areas of risk. Filling it out is optional. The final step in the risk assessment is to list the most important factors identified by the assessment. Space is provided on page 7 of the beef handbook. Listing them by importance will help prioritize those to include in the final plan.

Step 5. Build the elements of a testing strategy.
See page 7 for essential questions and data collection. **This step needed for the Management Element but is 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 in the dairy and beef handbook will help clarify how testing will be used to enhance management efforts and accomplish goals of the plan.

Decide how to handle the following issues before testing.

1. What is the testing scheme expected to accomplish and how will it help achieve farm and plan objectives?
    a. A common objective for initial testing is finding out if Johne's is in the herd.
    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 and 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, i.e., cattle at higher risk of being exposed or infected, beef cattle between 3 and 6 years old, Johne's suspects, acquired cattle, etc.
        ii. 30 (or more) older cattle at random to assess herd risk.
    c. Useful strategies for control might include a whole herd or statistical sample at preg-check time or dairy cattle as they reach 150-160 days pregnant. Results are ready for critical management decisions at calving or breeding time.
3. What decisions will be made based on test results?
    a. Herd level decisions such as 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 breed, etc.

Step 6. Select critical management practices to include in the management plan See page 7 for information to be included and page 8 for plan format.
This step should be completed for the Management and Herd Classification Elements of the VBJDCP.

Include owner's objectives 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: determine status of herd, establish test negative status, reduce the number of animals that have positive tests in the herd, 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 this document may be used to write out 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 below and on the next page. A review of these suggestions should help the process of prioritizing and deciding specific elements to include in the herd plan. Management applying specifically to dairy or beef herds is noted.

A. Calving area

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

b. *Suggested procedures to achieve objectives:*

1. For inside area:
   - Use area for calving only.
   - Use single-animal pens; assure adequate size area.
   - Always have adequate dry bedding.
   - Remove manure and wet bedding after each use.

2. For outside calving areas:
   - Use adequate area and monitor use to minimize mud and manure accumulation.

3. For both: clean udders and bellies after assisted births or whenever possible in beef herds. Clip and clean udders before calving and remove calves immediately in dairy herds.

B. Pre-weaned and nursing calves

a. *Management objectives: avoid contact with infectious material or environments.*

b. *Suggested procedures:*
   - Use colostrum from JD-test negative or low risk cows as applicable to breed.
   - Prevent manure contamination of feed and water.
   - Feed milk replacer or pasteurized milk in dairy herds.
   - Manage pasture to minimize calf exposure to manure-contaminated forage in beef herds.
   - On dairies, keep calves in separate facility or location from cows.
   - On dairies, minimize manure transfer from cows to calves, i.e., feed calves first, separate equipment, clean boots, etc.
   - Minimize manure exposure from JD-suspect cows to calves in beef herds.

C. Weaned heifers and retained yearling bulls

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

b. *Suggested procedures:*
   - Do not co-mingle or allow direct contact with mature cattle or their manure.
   - Prevent manure drainage from cow to young stock areas.
   - Do not use common feeding areas or water sources for cows and young stock.

Use separate equipment to handle feed and manure.
Design and maintain feed and water to prevent manure contamination.
Avoid traffic from cow areas to young stock.
Do not feed refused cow rations to this group.

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 animals with positive JD test to reduce premise contamination.
Cull when economically feasible.
Consider removing offspring from cattle with positive Johne's fecal culture results.

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
Investigate any known JD history, clinical case rate/yr, JD testing results in herd(s) of origin.
Avoid buying animals from herd with JD risk higher than your herd.
Test acquired animals (pre or post-purchase depending on age); integrate into home prevention plan.
Do not buy or retain cattle with positive Johne's fecal culture results.
Segregate and/or prevent contact with young stock until test status is known.

F. 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 high 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.

Step 7. List how JD management efforts will benefit and integrate with other health and performance issues. Include on page 8, in the dairy and beef handbooks.
This step should be completed for the Management and Herd Classification Elements of the VBJDCP.

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 beef herd examples might be:

Calving area

Keeping cattle density in calving area low might improve labor observations, decrease dystocia cases and reduce disease risk for newborn calves.

Moving cow/calf pairs to less crowded area immediately will reduce the risk of newborn calf diseases as well.

Nursing calves

Continuing to monitor and control manure contamination of feed and water for suckling calves will reduce the risk for other calf diseases.

Cows and 1st calf heifers

More frequent observations of 1st calf heifers in or near labor (for quick new-pair removal) allows early detection of periparturient diseases.

Step 8. Do a reality check. Will the plan work? Plan to monitor it.
This step 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 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.

a. Evaluate implementation and effectiveness on a timely and regular basis, i.e. monthly or 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 owner goals, prevalence, transmission risks, and time frame. Testing strategy depends on JD prevalence, plan objectives and management capabilities.

Control Plan components	Level of aggressiveness desired for herd plan design		
	Least aggressive	**Moderately aggressive**	**Most aggressive**
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 (>5 years old) 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 animals w. positive tests***	Clinical suspects High risk animals with *positive* test Monitor for clinical signs Use as one culling criteria	Clinical suspects immediately Prioritize subclinical animals by test result and performance criteria Consider culling offspring of clinical dams Identify Segregate or group Do not breed higher risk animals	Clinical suspects immediately, segregate until leave Subclinical animals before advanced disease Consider offspring of infected dams Consider not raising any replacements until low prevalence Other actions more aggressive than moderate Single animal calving pens
Management in beef herds	Prevent overcrowded calving areas Clean, dry, good sanitation Prevent weaned stock from 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 Separate weaned stock from adults with barriers or buffers Eliminate manure contamination of feed, water & feed equipment used for young stock	Raise all replacements or acquire from low risk source Superior calving management. and sanitation Other management actions same as for moderate but monitored more frequently
Management in dairy herds	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, dry, good sanitation Remove newborn calves immediately 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 Feed colostrum from test-*negative* animals to offspring of test-*positives*, if raised Feed milk replacer or milk from *negative* cows only Other management actions same as but monitored more frequently
Coordinate with other management priorities	Improve general management in priority areas: late gestation cows, calving, heifers, nutrition, etc.	Focus management to improve performance in related areas: pregnant cow nutrition, calving ease, developing heifers and bulls, etc.	Optimize management to improve performance in related areas: pregnant cow nutrition, calving ease, developing heifers and bulls, etc.