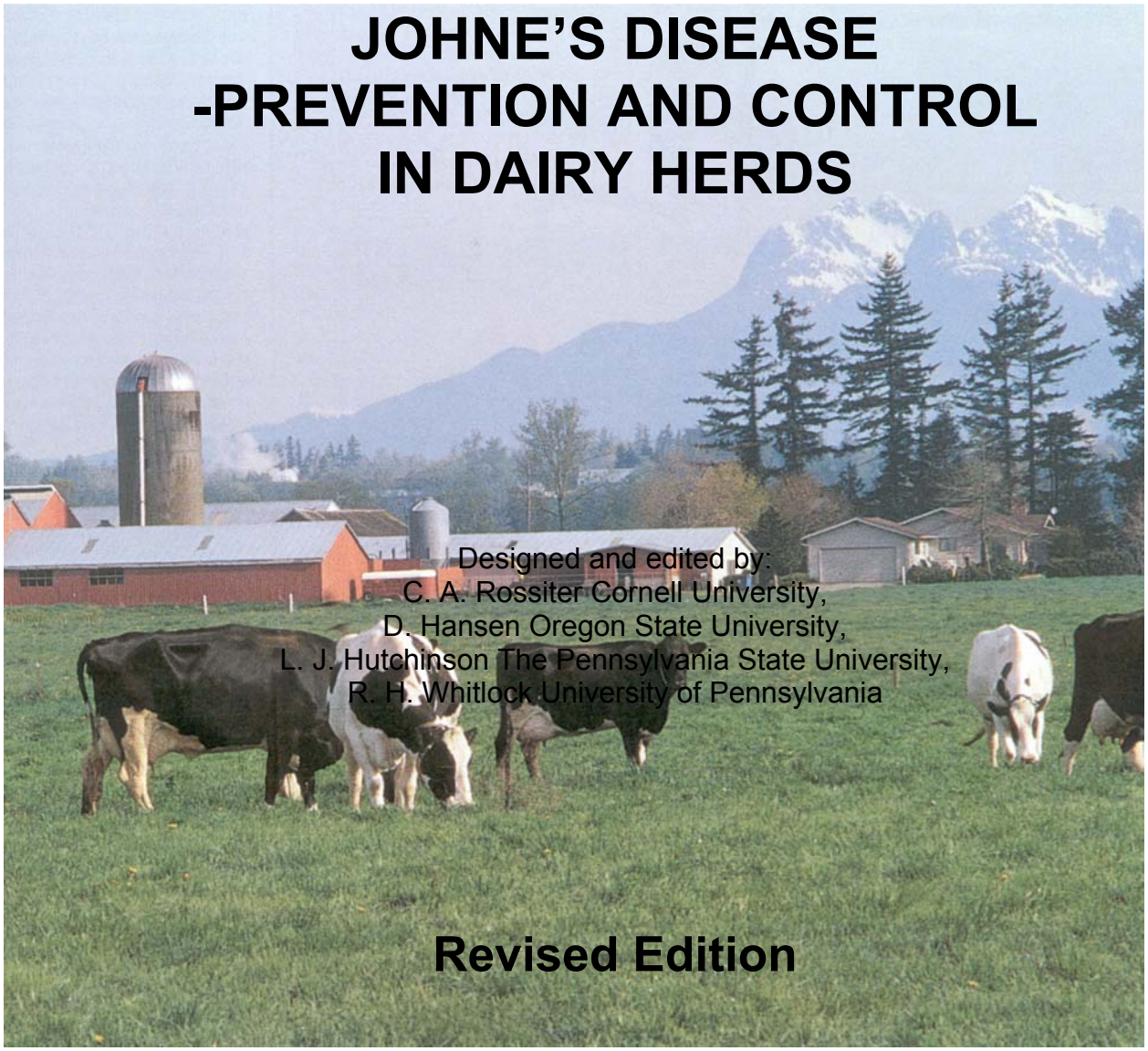
JOHNE'S DISEASE -PREVENTION AND CONTROL IN DAIRY HERDS



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Revised Edition

Manual for Herd Plan Development

Manual Contents

Herd Information and Johne's History pages A-1 and A-2

Designed for collecting complete herd information in a way that will help organize problem-solving and establish a baseline of information that can be used to develop a herd plan.

Prevalence and Risk Assessment Checklist B-3 through B-4

This section is based on what is known about Johne's disease transmission. You will be guided through steps that will help to develop estimates of herd specific prevalence and risks that can be used for prioritizing management changes.

Risk summary and testing decisions C-5

Risk summary can be used for prioritizing management changes. Use and interpretation of diagnostic tests requires an understanding of the characteristics and limitations of each test, as well as strategies of optimal use of tests. Completion of this section will aid in making feasible and economic decisions regarding use of tests for Johne's disease control or elimination.

Prevention /Control Procedures and Plan, D-7 through D-11

This document focuses on management recommendations for specific groups of animals, outlines objectives and procedures and provides for herd specific plans.

Appendix A.

A detailed description of risk factors and a quantitative score for each category

Johne's Disease Prevention or Control **Date:_____**

HERD INFORMATION AND JOHNE'S HISTORY

Farm Name_____

Owner(s) Name_____

Address_____

_____

Phone(____)_____Fax(____)_____

E-mail_____

Herd Veterinarian_____

Key farm management (decision-makers, key employees)_____

_____

Other animal enterprises_____

Herd size:	Milk cows	_____	Bred Heifers	_____
	Heifer calves	_____	Bulls	_____
	Total	_____		

Herd goals (include future herd size)

Next 2 years_____

_____

3 to 5 years_____

_____

_____

Do you plan to be in dairy farming in 10 years? _____

Current and future source(s) of herd replacements_____

_____

Current herd performance_____

Performance goals_____

_____

Herd health concerns you are addressing or plan to address_____

_____

Management concerns you are addressing or plan to address_____

_____

Herd History for Johne's Disease (JD):

First diagnosed case of Johne's in your herd:

Year?_____ Source of animal (home raised or purchased)_____

Clinical cases in the past.

ID	Date	Approx. Age	Source	Offspring ID still in herd

Youngest clinical case (age, date, source)_____

Recent Herd History

Johne's Tally	1st lact	2nd lact	3+ lact	Total	Percent of herd
Clinical Johne's cases					
Animals culled last year					
Johne's cases as percent of culls					
Johne's-test positives					

Introduction of new cattle

Group	Number last 12 months	Source	Number previous **5 years** (not last year)	Source
Milk cows				
Bred heifers				
Heifer calves				
Bulls				
Total				

PREVALENCE AND RISK

Prevalence is percentage of infected animals in the herd at any one point in time. Prevalence can be estimated by testing all adult animals or, to get a rough estimate to apply the interpretative information that follows. Neither of these methods will be exact but they can used to measure, a beginning point, status of a prevention plan or progress made in a control program. Having an estimate of the prevalence may help clarify some management priorities.

Scoring Johne's Herd Prevalence from the Herd History

Low, Score 1 or 2

- no culture confirmed clinical cases (i.e., > 4 yr old animals (raised or purchased)
- clinical cases 1 % or less of herd /year/ on average for several years
- management history includes low risks for spread, i.e., good hygiene in calving areas, minimal contact between calves and adult animals or their manure.

Moderate to Moderate High, Score 3 or 4

- occasional clinical cases in raised animals, generally older (i.e., > 4 years)
- clinical cases are 2 to 5% of herd/year/average over past several years
- number of cases increasing, and/or cases are younger in age (i.e., < 3 years)
- occasional clinical cases in acquired animals
- management history includes some risks for spread in the past: i.e., overcrowding, poor colostrum management, some contact between calves and adult animals, manure contamination of feed or water

High to Very High, Score 5 or 6

- frequent clinical cases or groups of cases in raised animals
- clinical cases are > 6% of herd/year average over several
- progressive pattern - prevalence has increased rapidly: increasing number of cases/year over several years; decreasing age of cases; several cases in 2 year old or younger
- significant cost associated with animals culled for Johne's, and or increased cull rate
- cases may be occurring in acquired animals as well
- several risks for spread existed in the past: i.e. poor hygiene in calving area, calves nursed cows, regular contact of young stock with mature animals, manure contamination of feed or water.

Place an X at estimated herd prevalence

Johne's Disease Control—Risk Assessment Checklist for Dairy Herds

Estimate the degree of risk for each item under Risk Factor. The highest risk = the maximum risk score, the lowest risk = 0. Enter YOUR risk estimate in the Herd Risk column. **See Appendix A for suggested risk descriptions.** Use comment section to note differences from current to past situations.

Risk Factor	Max. risk	Herd risk	Comment on current situation	Comment of past situation
1.Calving area: Multiple animal use	10			
Manure build up	10			
Calves born in cow areas	10			
Calving area also used for sick cows	10			
JD clinicals/suspects in area	10			
Newborns stay with cows after birth	10			
Calves nurse cows	10			
Manure soiling of calving-cow udders	10			
Risk Total: Calving Area	80			
2. Pre-weaned calves: Fed pooled colostrum/multiple cows	10			
Fed pooled milk	10			
Calves have direct cow contact	10			
Calves housed near cows	10			
Potential for contamination of milk, feed, water or pen with cow manure	10			
Risk Total : Pre-weaned calves	50			
3. Post-weaned calves: Direct contact with cows manure	5			
Potential for contamination of milk, feed, water or pen with cow manure	5			
Share feed, water, pen with cows	5			
Share pasture with cows	5			
Manure spread on pasture and grazed same season	5			
Contamination of feed equipment	5			
Risk Total: Post-weaned calves	30			
4. Bred heifers: Direct contact with cows manure	4			
Potential for contamination of feed, water or housing with cow manure	4			
Share feed, water, pen with cows	4			
Share pasture with cows	4			
Manure spread on pasture and grazed same season	4			
Contamination of feed equipment	4			
Risk Total: Bred heifers	24			
5. Cows: Contamination of feed or water	4			
Manure contamination of storage feed or feed equipment	4			
Manure spread on pasture and grazed same season				
Access to manure storage areas	4			
Risk Total: Cows	16			
Total	200			

Herd Risk Assessment Summary

Herd Risk Areas	Risk Total Score
Calving area	
Pre-weaned calves	
Weaned calves/heifers	
Bred heifers	
Cows	
Total	

Copy totals from each category onto the Herd Risk Assessment Summary table. Summary scores may be used to help set priorities for areas that need most attention. Usually immediate action should be taken in areas with the highest score.

Choosing a Testing Strategy - Issues to consider

1. **Develop a management plan before developing a testing strategy**. Testing strategy should compliment management plans.

2. **Decide on how test results will be used**
   a. Making these decisions will aid in selecting appropriate test(s) and in defining your overall strategy for a prevention/control plan.
   b. Examples include; estimating the prevalence, identify most infectious for culling or managing, lower risk for transmission within herd, etc.

3. **Decide on the level of action that fits overall goals for controlling Johne's.**
   a. **Minimally aggressive**: primarily preventive management; maintain a low prevalence herd; prevent from getting worse; unknown status herd/Johne's-free herd; minimize risk if JD infection is present.
   b. **Moderately aggressive**: preventive management plus testing and culling; reduce spread; prevalence; clinical disease; premise contamination.
   c. **Very aggressive**: thorough preventive management; repeated herd test with cull and management of positives; reduce prevalence; rate of spread; clinical disease to zero; eliminate in minimal time

What would it cost to test your herd?

Test choice	Herd	Partial herd / groups	Selected individuals
Serology			
Fecal culture			
Serology plus fecal confirmation positives			
Serology and fecal culture			

Johne's Disease Control—Management Procedures and Plan This section is designed to assist in the development of a farm-specific plan to manage or prevent Johne's disease. See pages D-8 and D-9 for suggested management practices to consider.

List Management Procedure	Person responsible
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

Suggested Management Procedures to include in Farm Plan

Completion of this section will provide the basis for a comprehensive farm plan that addresses all areas of risk for disease.

1. Calving area:

a. Management objective: keep it clean and dry.
b. Suggestions for achieving objectives:
   1. For inside area: use area for calving only; use single-animal pens; assure adequate size area; remove manure and bedding after each use; always have adequate bedding.
   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.

2. Pre-weaned calves:

a. Management objectives are: avoid feeding infected colostrum/milk and to prevent contact with other infectious materials.
b. Suggested procedures: use colostrum from known JD-free cows; feed 4 qts. colostrum within 6 hours; feed milk replacer rather than milk in JD herds; prevent manure contamination of feed and water; house calves in separate facility/location from cows, minimize manure transfer from cows to calves (feed calves first, separate equipment, clean boots, etc.).

3. Post-weaned calves

a. Management objectives for this area are to prevent exposure to infective animals and manure and to prevent contamination of feed and water.
b. Suggested procedures: house young stock in separate facility; not co-mingle young stock with mature animals and not allow contact with cows or their manure; prevent water drainage from cow areas to young stock areas; do not use common feeding or water for cows and young stock; use separate equipment to handle feed and manure; design and maintain feed and water areas to prevent manure contamination.

4. Bred heifers

a. Management objectives are: prevent exposure to infective animals and manure and to prevent contamination of feed and water and pastures.
b. Suggested procedures: house young stock in separate facility; not co-mingle young stock with mature animals; not allow contact with cows or their manure; prevent water drainage from cow areas to young stock; not use common feeding or water for cows and young stock; use separate equipment for feed and manure; design and maintain feed and water areas to prevent manure contamination; avoid traffic from cow areas to young stock; not put young stock on pastures used by cows; not spread manure on pastures be grazed by young stock in that grazing season.

5. Manure and Animal Risks

a. Management objectives are: minimize contamination of premises.
b. Suggested procedures: keep facilities and premises free of manure build-up; haul and store manure away from feed, water and young animals; restrict access; use tuberculocidal (phenolic or cresylic base) disinfectants after manure is removed.

6. Cows
a. Management objectives are: eliminate high-risk animals; manage test-positive animals
b. Suggested procedures: segregate, test, 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

7. Acquired animals
a. Management objective: not to purchase or bring back Johne's infected animals
b. Suggested procedures: know identity, health history and hygiene of herd(s) of origin; know JD history and JD testing record of herd(s) of origin; avoid buying animals from herd with JD risk higher than your herd; test acquired animals; do not buy or retain test positives; segregate and/or prevent oral/fecal contact with young stock until test status is known.

8. Herd testing
a. Management objectives are: determine presence and/or prevalence of disease; identify infected animals; monitor progress of herd management plan.
b. Suggested procedures: Do baseline herd test to assess prevalence and target control; Test herd regularly to complement and enhance preventive management efforts; Use results appropriately as part of management plan; Test suspects to know status and track clinical cull rate.

9. Records
a. Management objectives are: know baseline or beginning disease status; identify infected animals; to determine costs of disease and/or plan; help monitor progress and compliance with farm plan.
b. Suggested procedures: ID test-positive animals; Record body condition score, salvage value of Johne's culls to track cost of Johne's in herd; Develop management plan Checklist to review monthly; Periodically review and update checklist with herd veterinarian and other herd decision-makers.

List other health/ management objectives that will be integrated with and benefit from Johne's preventive efforts

Calving management

Calving area hygiene

Calf raising management

Developing heifers

Nutrition/feed management

Records

Culling strategy

Review plan feasibility and define follow through and accountability methods

Establish a team and achieve a consensus among the members as to the design and implementation of the plan. Plan should be comprehensive to be effective. It should be practical and feasible to implement in order to meet the Johne's control objectives for the farm. Plan should continue to evolve with time.

a. Strategy should be effective enough to meet control goals.
b. Plan should be practical and feasible to implement.
c. Plan designed to fit with management objectives and resources.
d. Should fit with farm's business objectives.

Define a routine for monitoring implementation, evaluating and modifying the Johne's plan on a regular basis, i.e., review plan checklist routinely with veterinarian.

a. Plan to monitor and assess implementation and effectiveness on a regular basis, i.e. seasonal checklist.
b. Plan to evaluate the feedback, i.e. identify and discuss areas "not working" each season/month; define priority and plan for areas needing attention.
c. Assure plan is modified as needed, i.e. seasonal/monthly monitoring information provides basis for determining need and ideas for modification.

Example Farm Management Plans for different levels of aggressiveness

Aggressiveness needed in the Johne's control plan depends on each farm's goals, prevalence, transmission risks, and time frame.

Control program components	Aggressiveness of control plan desired		
	Low	**Moderate**	**High**
Test selection	- can use lower sensitivity, less expensive test		
Test strategy	- initial mature herd screen; or partial herd (high risk animals) - monitor clinical suspects	- 1-2 x/yr >20-24 mos of age - serology, fecal culture; serial or alternating - cull clinical suspects	- 2-3 X/yr > 18 -24 mos of age - multiple tests; maximize sensitivity, specificity - cull clinical suspects
Test result use: ***Culling***	- clinical suspects - high risk test *positives*	- clinical suspects immediately - subclinical test *positives* priority by test result and other problems - consider culling offspring of clinical dams	- clinical suspects immediately, segregate prior to decision - aggressive early culling of subclinical *positives* before infection advances - consider for offspring of test *positive* dams
Manage test positive animals	- monitor *positives* for signs - use for culling criteria	- identify - segregate or group - do not feed milk or colostrum from positives, consider replacer -do not breed higher risk *positives*	- consider not raising replacements until prevalence is reduced - same as for moderate, more aggressively - based on updated test results - separate calving area
Management	- calving area density /hygiene - remove newborn calves - prevent young stock contact with adults and manure - minimize feed and water contamination	- calving area density/hygiene - remove newborn calves immediately - separate young from adults with barrier or separate facility - prevent feed, water, equipment contamination	- superior calving management. and hygiene - remove all newborn calves immediately - separate young stock from adults completely - feed banked colostrum from test *negative* animals to offspring of subclinical *positives*, if raised - feed replacer or milk from *negative* cows only - eliminate feed, water and 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	- improve health and performance in other areas for quicker response; offset effects of Johne's i.e. mastitis, reproduction, nutrition - optimize management, i.e. feeding and nutrition, dry cows and calving, heifers - minimize stress, improve comfort

Appendix A. Suggested descriptions and values for Risk Factors included in the Risk Assessment

Risk Cat.	Risk Factor	Criteria	Scoring	Risk Category	Risk Factor	Criteria	Scoring
Calving Area	area used for more than one calving cow?	rarely=occurs < 1 out of 10 calvings, occasionally=occurs 1-3 times out of 10 calvings, frequently= occurs 5 or more time per 10 calvings	never=0, rarely=3, occasionally=5 frequently=7, always=10	**Pre-weaned calves**	feed pooled colostrum from multiple cows to calves?	rarely=pooled colostrum fed 1-2 times per year, occasionally=pooled colostrum fed 1-2 time per month, frequently=pooled colostrum fed most of the time	never=0, rarely=3, occasionally=5 frequently=7, always=10
	manure build-up in the calving area?	minimal=manure from 1 animal then cleaned daily, moderate= cleaned weekly, considerable=cleaned monthly, extensive= cleaned < 1x per month	none=0, minimal=3, moderate=5, considerable=7, extensive=10		feed pooled milk from multiple cows to calves?	rarely=pooled milk fed 1-2 times per year, occasionally=pooled milk fed 1-2 time per month, frequently=pooled milk fed most of the time	never=0, rarely=3, occasionally=5 frequently=7, always=10
	calves born in areas that hold cows?	rarely=occurs < 1 out of 10 calvings, occasionally=occurs 1-3 times in 10 calvings, frequently= occurs 5 or more time in 10 calvings	never=0, rarely=3, occasionally=5 frequently=7, always=10		calves have direct contact with adult cows?	rarely=penned separately but get loose less than 1 time per month, occasionally= penned separately but get loose greater than 1 time per month, frequently=penned in same building or area, mixing occurs regularly	never=0, rarely=3, occasionally=5 frequently=7, always=10
	calving area also used for sick cows?	rarely= occurs < 1 time per month, occasionally= occurs 1 to 5 times per month, frequently= occurs > 5 time per month	never=0, rarely=3, occasionally=5, frequently=7, always=10		calves housed near adult cows?	rarely=housed near adults for short periods and no runoff possible, occasionally=housed near adults where runoff is possible but only for short periods of time, frequently=housed next to adults for short periods with runoff	never=0, rarely=3, occasionally=5 frequently=7, always=10
	cows with JD or suspected having JD kept in the calving area?	rarely= occurs < 1 time per month, occasionally= occurs 1 to 5 times per month, frequently= occurs greater than 5 time per month	never=0, rarely=3, occasionally=5, frequently=7, always=10		manure from adult cows contaminates the milk, feed, water or housing area?	rarely= trace amounts of manure visible waterers and feeders cleaned >1x per month, occasionally=manure visible waterers and feeders cleaned <1 x per month, frequently=manure visible, waterers and feeders not cleaned regularly	never=0, rarely=3, occasionally=5 frequently=7, always=10
	newborn calves stay with their dams after birth?	rarely=occurs < 1 out of 10 calvings, occasionally=occurs 1-3 times out of 10 calvings, frequently= occurs 5 or more time per 10 calvings	never=0, rarely=3, occasionally=5, frequently=7, always=10				
	calves allowed to nurse cows?	rarely=occurs < 1 out of 10 calvings, occasionally=occurs 1-3 times in 10 calvings, frequently= occurs >5 times in 10 calvings	never=0, rarely=3, occasionally=5, frequently=7, always=10				
	cow's udders soiled with manure?	minimal= teats clean, moderate on udder; moderate=teats clean, mod. to heavy udder; considerable=small amount on teats and udder covered; extensive= udders caked with manure	none=0, minimal=3, moderate=5, considerable=7 extensive=10				

Post weaned heifers	heifers have direct contact with adult cows or their manure?	rarely=penned separately but get loose < 1 time per month, occasionally= penned separately but get loose > 1 time per month, frequently=penned in same area, mixing occurs regularly	never=0, rarely=1, occasionally=2 frequently=3, always=5	**Bred heifers**	bred heifers have direct contact with adult cows or their manure?	rarely=penned separately but get loose less than 1 time per month, occasionally= penned separately but get loose greater than 1 time per month, frequently=penned in same area, mixing occurs regularly	never=0, rarely=1, occasionally=2 frequently=3, always=4
	manure from adult cows contaminates the milk, feed, water or housing area?	rarely= trace amounts of manure visible waterers and feeders cleaned >1x per month, occasionally=manure visible waterers and feeders cleaned <1 x per month, frequently=manure visible, waterers and feeders not cleaned regularly	never=0, rarely=1, occasionally=2 frequently=3, always=5		manure from adult cows contaminates the milk, feed, water or housing area of bred heifers	rarely= trace amounts of manure visible waterers and feeders cleaned >1x per month, occasionally=manure visible waterers and feeders cleaned <1 x per month, frequently=manure visible, waterers and feeders not cleaned regularly	never=0, rarely=1, occasionally=2 frequently=3, always=4
	Do post weaned heifers share feed, water or housing with adult cows?	rarely=share feed, water or housing only when necessary or by mistake <1x/month, occasionally=share feed and water or housing between 2-5 X/month, frequently=share feed and water or housing more often than do not share	never=0, rarely=1, occasionally=2 frequently=3 always=5		bred heifers share feed, water or housing with adult cows?	rarely=share feed, water or housing only when necessary or by mistake <1x/month, occasionally=share feed and water or housing between 2-5 X/month, frequently=share feed and water or housing more often than do not share	never=0, rarely=1, occasionally=2 frequently=3, always=4
	post weaned heifers share pasture with adult cows?	rarely= share pasture only when heifers escape, occasionally= share pasture <25% of the time, frequently=share pasture >25% of the time but < 100%	never=0, rarely=1, occasionally=2 frequently=3 always=5		bred heifers share pasture with adult cows?	rarely= share pasture only when heifers escape, occasionally= share pasture <25% of the time, frequently=share pasture >25% of the time but < 100%	never=0, rarely=1, occasionally=2 frequently=3, always=4
	manure spread on pasture and grazed or harvested as hay in the same season?	rarely=manure spread on pasture only when no other option, occasionally=manure spread on pasture and grazed or harvested between 0-2 months after spreading, frequently= manure spread on pasture routinely and grazed or harvested regardless of time since spreading	never=0, rarely=1, occasionally=2 frequently=3 always=5		manure spread on pasture and grazed or harvested as hay in the same season and fed to bred heifers?	rarely=manure spread on pasture only when no other option, occasionally=manure spread on pasture and grazed or harvested between 0-2 months after spreading, frequently= manure spread on pasture routinely and grazed or harvested regardless of time since spreading	never=0, rarely=1, occasionally=2 frequently=3, always=4
	manure contaminates equipment used to feed post weaned heifers?	rarely= trace amounts of manure visible waterers and feeders cleaned >1x per month, occasionally=manure visible waterers and feeders cleaned <1 x per month, frequently=manure visible, waterers and feeders not cleaned regularly	never=0, rarely=1, occasionally=2 frequently=3 always=5		manure contaminates equipment used to feed bred heifers?	rarely= trace amounts of manure, feed equipment cleaned >1x per week, occasionally=manure visible feeding equipment cleaned <1 x per week, frequently=manure visible, feeding equipment not cleaned regularly	none=0, minimal=1, moderate=2, considerable=3, extensive=4

Cows	Does cow manure contaminate feeders or waterers?	rarely= trace amounts of manure visible waterers and feeders cleaned >1x per month, occasionally=manure visible waterers and feeders cleaned <1 x per month, frequently=manure visible, waterers and feeders not cleaned regularly	none=0, minimal=1, moderate=2, considerable=3, extensive=4
	Does adult cow manure contaminate feed storage areas or feeding equipment?	rarely= trace amounts of manure, feed equipment cleaned >1x per week, occasionally=manure visible feeding equipment cleaned <1 x per week, frequently=manure visible, feeding equipment not cleaned regularly	none=0, minimal=1, moderate=2, considerable=3, extensive=4
	Is manure spread on pasture and grazed or harvested as hay in the same season and fed to cows?	rarely=manure spread on pasture only when no other option, occasionally=manure spread on pasture and grazed or harvested between 0-2 months after spreading, frequently= manure spread on pasture routinely and grazed or harvested regardless of time since spreading	never=0, rarely=1, occasionally=2, frequently=3, always=4
	Do adult cows have access to manure storage areas?	rarely=access to manure storage occurs only by mistake <1x/month, occasionally= access to manure storage occurs 2-5X/month, frequently= access to manure storage occurs more often than not	never=0, rarely=1, occasionally=2, frequently=3, always=4