Practical Biosecurity and Biocontainment on the Ranch

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Preventive Health Strategies
Proactive thinking about animal health

Priorities, Goals, Decisions

Systems approaches

Animal stewardship
Herd approaches
Role for individual animal care
Begin With the End in Mind

- % calf crop – number calves weaned divided by number cows exposed
- Pounds weaned per exposed cow
- Price/pound
- Cost of production
Epidemic (disease) curve

Day After Feed Yard Arrival
% of Total Head
Control
WeanVAC
OHP

OHP = other health protocols

Cattle in preconditioning programs were at 4X less likely need treatment.

Morbidity rates of beef steer calves at two health assessment intervals and for the entire feeding period.
Risk considerations for designing plans to control targeted diseases in individual cattle operations

• **Risk Assessment**
  • Are animals exposed or infected now or how likely are they to become exposed in the future?
  • Do these risks need to be addressed?

• **Risk Tolerance/Risk Aversion**
  • What is my tolerance to health risks?
  • How much risk am I willing to take?
Reduced risk for disease, control or elimination of disease

Biosecurity – the outcome of all actions used to prevent disease agent entry into a unit of interest.

Biocontainment – the outcome of all actions resulting in control of a disease agent in a unit of interest.
Increase Immunity

Eliminate Agent

Prevent Transmission

Biosecurity

Biocontainment

Increase Immunity

Eliminate Agent

Prevent Transmission

Biosecurity

Biocontainment

Disease control could be improved by better addressing epidemiologic triad

- Immunity has received most attention in outbreaks and prevention plans
- Factors addressing exposure tend to be ignored
- Limited success of health programs

Thomson, JU, Proceedings Am Assoc Bov Pract 308-14, 1997
Health Risks Associated with Introduction of New Cattle into Herds
These bulls are genetically superior and possess excellent quality characteristics. Is there a downside to purchasing one or more of these bulls?
This cow has Johne’s disease

- Chronic diarrhea
- Contagious
- Leads to Death
- Possible link to Crohn’s disease in humans
- Other cattle in herd (including calves) are carriers
Is there a downside to purchasing one or more of these bulls IF THEY ORIGINATED FROM THE SAME HERD AS THE COW?
Is there a downside to purchasing this heifer or 100 like her?

#624 BVD PI Non-Symptomatic Heifer
This is a PI BVD Calf

BUT......

Offspring of a purchased replacement heifer
This Ranch............

- Calved these replacement heifers separate from the resident herd.
- Tested calves and then dams of positive calves.
- Positives were culled before commingling with resident herd.
- Resident herd (as part of existing health program) and new arrivals were vaccinated.
This Ranch

• Bottom line…..BVD was not introduced into the herd even though PI animals resulted from the purchase.

• Spent about $150 on tests that potentially saved thousands over the next years.
Persistent Infection - Routes

**Acute infection** - pregnant female exposed to NCP BVDV

Persistently infected female giving birth

Persistently infected calf

$93\%$

$7\%$

$1\frac{1}{2}-4+ \text{ months gestation}$

# Reproductive effect of acute BVD around time of insemination

<table>
<thead>
<tr>
<th></th>
<th>Conception Rate</th>
<th>Pregnancy Rate</th>
<th>Calving Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 d after insemination</td>
<td>77 d after insemination</td>
<td>275 d after insemination</td>
</tr>
<tr>
<td><strong>Controls</strong> that did not become infected during pregnancy</td>
<td>79% (11 of 14)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>79% (11 of 14)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>71% (10 of 14)*</td>
</tr>
<tr>
<td><strong>Group 1</strong> infected by contact with PI cow and calf 4 days after insemination</td>
<td>60% (9 of 15)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>33% (5 of 15)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>33% (5 of 15)</td>
</tr>
<tr>
<td><strong>Group 2</strong> infected intranasally 9 days before insemination</td>
<td>44% (8 of 18)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>39% (7 of 18)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>39% (7 of 18)</td>
</tr>
</tbody>
</table>

* one control heifer aborted between d 77 and d 107, not associated with BVD.

a,b: p=0.25  
c: all p<0.05

McGowan et al Vet Rec (1993) 133, 39-
Introducing New Animals Into a Herd

Biosecurity Considerations

• Reduce risk for disease agent transfer from new arrivals to resident herd
• Reduce risk for disease agent transfer from resident herd to new arrivals

• It goes both ways.
Calf Diarrhea

- Introducing cattle during calving increases risk for scours
- Most cattle carry 1 or more scours agents
What risk is present for Trichomoniasis?

Great calves, great cows, great bull, great grass
New Herd Introductions
Immunity Aspects

- Immunity is variable between herds as well as individual animals
  - Natural exposure
  - Vaccination programs range from excellent to nonexistent
- Immune suppression occurs from herd conditions, transportation, social interactions, etc.
  - Includes resident herd and new animals
Vaccination

- Reduce risk of known exposure
- Reduce risk if exposure occurs

- Vaccination protocols to reduce risk
  - Cost:Benefit
  - Overall herd management plan/disease control plans
  - Productivity response and catastrophic risk management
New Herd Introductions
Management Considerations

• Do not commingle for at least 3 illness free weeks
• Do not commingle during calving season
  • Consider calving pregnant new arrivals separate from resident herd.
• Use vaccination to reduce risk
• Virgin bulls
New Herd Introductions
Management Considerations

• Plan for testing new arrivals (prior to or on arrival) to minimize risk- set goals-examples……

  • Test for BVD PI status (including offspring of pregnant cattle-calve separate from resident herd)
  • Bovine Leukemia
  • Johnes Disease (testing new arrivals may not be the best animals to consider)
  • Other

• Introduce only virgin bulls
• Introduce only animals from “high health” sources
  • What is a “high health” source?
Neonatal enteritis (calf scours) prevention with the Sandhills System
D. Smith, D. Grotelueschen, T. Knott, S. Ensley

Applied Biosecurity and Biocontainment
What should our goals be?

- Herd level prevention
  - Eliminate morbidity
  - Eliminate mortality
- Avoid costs
  - Treatment
  - Labor
  - Reduced production losses
- Optimized performance

![Graph showing MED COST PER CALF over years 2004 to 2007 for commercial 1, seedstock, and commercial 2.](image)

Source: Dr. John Groves, Elton, MO
Effect of Calf Scours on Weaning Weight

• **19 pound weaning weight advantage** to calves not treated for scours over those requiring treatment.
• Annual scour incidence range 13-64%
• Average annual scour incidence 35%, average annual death loss 1%
• Northern Agric. Res. Center, Havre, MT
Risk Factors Affecting Diarrhea Incidence

Research Results

- Introducing animals during calving season
- Calving heifers and cows in same calving area
- Feeding heifers and cows together
Risk Factors Affecting Diarrhea Incidence

Research Results

• Extended calving season
• Calving more heifers in relation to cows
• High animal density
Immunity

Antibodies from colostrum

Active immune response

Passive

Acquired

Age
Immunity

Window of vulnerability

Passive

Age

Acquired
Immunity
Window of vulnerability
Scours
Exposure

Age
Age specificity of calf scours

- Population at-risk for scours: calves 1-3 weeks of age

Also at-risk for shedding scours agents

Frequency histogram: age of calves at death

<table>
<thead>
<tr>
<th>Age at death (days)</th>
<th>Count</th>
</tr>
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<tbody>
<tr>
<td>0-5</td>
<td>0</td>
</tr>
<tr>
<td>6-10</td>
<td>15</td>
</tr>
<tr>
<td>11-15</td>
<td>20</td>
</tr>
<tr>
<td>16-20</td>
<td>5</td>
</tr>
<tr>
<td>21-25</td>
<td>5</td>
</tr>
<tr>
<td>26+</td>
<td>25</td>
</tr>
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Multiplier Effect

Cows are shedders
Calves are multipliers
Later born calves are more likely to die from scours.

Proportion of the calves born each week that eventually died from neonatal diarrhea

Key Risks and Interventions to Reduce Exposure

• **RISK:** Environmental buildup of scours agents over time in calving area
  - **INTERVENTION:** Planned move of pregnant animals prior to environment becoming high risk for exposure.

• **RISK:** Older calves shed lots of scours agents to younger calves
  - **INTERVENTION:** Age segregation of calves.
Sandhills Calving System

Cattle Flow

Lot 1

Move pregnant cows in.

Calve 2 weeks

first calf born

Leave pairs

Lot 2

Leave pairs

Move pregnant Cows.

Calve 1 week.

Lot 3

Leave pairs

Lot 4

Leave pairs

Lot 5

Finish calving
Trees & Building

Move In March 1

Move In March 14

Move In March 21

Move In March 28

Leave pairs

Leave pairs

Leave pairs

Move in March 21

Move in March 7

Move in March 21

Move in March 28

Yearling Pasture

Winter Pasture

Summer Pasture 1

Summer Pasture 2

H

W

Y

Yearling Pasture

Winter Pasture

Summer Pasture 1

Summer Pasture 2

Bldgs

Old Field

S. of House

Old Bull Pasture

Yearling Pasture

Develop a plan

600 A.

300 A.

200 A.

150 A.

60 A.

400 A.

640 A.

Trees

Northwest

Northeast

640 A.

125 A.

75 A.

640 A.

125 A.

75 A.

640 A.

125 A.

75 A.

640 A.

125 A.

75 A.
Welcome to TRICH CONSULT

Trich CONSULT was designed to aid cattle producer and veterinarians in creating Trichomoniasis control, prevention and eradication strategies that are specific to individual herds. From this site you can access reference articles for Trich CONSULT and additional resources related to Trich.

Frequently Asked Questions

Click here for the answers.
Trich CONSULT Team

- Kristin Clothier, DVM, PhD (UC-Davis)
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Trichomoniasis Control/Prevention

• Herds infected
• Herds not infected
Trich CONSULT

The following report records your answers and the responses that were given.

Yes, there is an active Trich infection in my herd.

Trich can have a devastating effect on the reproductive success of your herd. Let's work on a plan to eliminate Trich from your herd and keep it out.

Yes, all bulls potentially exposed to Trich will be sold to slaughter or managed according to an appropriate test and cull strategy.

This is a wise choice. Infected bulls carry and spread Trich for life without showing any symptoms. Removing infected bulls, you are making it possible to eliminate the disease from your herd. There are a few more steps needed to eliminate Trich and minimize the chances of your herd becoming re-infected.

No, I will not cull all cows that do not give birth to a healthy calf prior to the next breeding season.

This is a risky decision. Any cows that do not give birth to a healthy calf prior to the next breeding season may be infected with Trich and can spread the disease to uninfected bulls. Special management of these cows will be necessary in order to prevent spreading Trich to your bull battery during the next breeding season. This special management includes maintaining them as a separate breeding herd and possibly vaccinating them for Trich. If you have changed your mind about keeping these cows, please click on the...
BVD CONSULT:
HERD SPECIFIC BVD CONTROL FOR COW/CALF OPERATIONS

Dale Grotelueschen, DVM, MS
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Clay Center, Nebraska
Bovine viral diarrhea virus (BVDV) is directly and indirectly responsible for a broad range of clinical and subclinical effects in beef and dairy operations.
Persistent Infection - Routes

Acute infection - pregnant female exposed to NCP BVDV

Persistently infected female giving birth

Persistently infected calf

1½-4+ months gestation

93%

7%

BVD Cow-Calf Herd Distribution

• PIs tend to occur in clustered patterns
  • Many herds have 0% PIs
  • Some affected herds may have >10% PIs
• Likely fewer than 10% of herds nationally contain PI calves
BVD Control - Rationale

• Vaccination
  - critical role in control, eradication and risk reduction
  - does not prevent all PI
  - reduces PI risk

• Herd-level control strategies are needed to meet goals

Brock, Proc Detect & Cont BVDV Inf, p 7, 2002
BVD Prevention and Control Plan

• Not “One Size Fits All”

• Must be customized to type of cattle, management and operational constraints
  • Positive vs. negative herd status
  • High-risk vs. low-risk activities / management
  • Risk-averse vs. risk-taking individual
  • Appropriate surveillance and control varies
  • Ability to make management adjustments varies
  • Is best determined with the assistance of a veterinarian involved with the management of the ranch
Goals of BVD Control in Herds

Remember ----

It is just as important to KEEP BVD OUT of uninfected herds as it is to ELIMINATE it from infected herds.
Fundamental Components of BVD Control Plans

- **Surveillance** - BVD presence Y/N
- **Biosecurity** - Prevent BVD entry
  - Especially new herd additions, effective contacts
- **Biocontainment** - Control/eliminate
  - When needed
- **Targeted vaccination** - Prevent PI calves
  - In the event exposure occurs

Thank You!

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