Preventing and Controlling Infection in Beef Cattle

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presented to
Presidential Advisory Council for Combating Antibiotic Resistant Bacteria

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Preventing and Controlling Infection in Beef Cattle

- Controlling *infection*? Maybe, to some degree.
- Primary concern is prevention, control/treatment of *disease*
- Which disease process involving an infectious process?

<table>
<thead>
<tr>
<th>Actinobacillus</th>
<th>Popular stomatitis</th>
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</thead>
<tbody>
<tr>
<td>Anaplasmosis</td>
<td>Polioencephalomalacia</td>
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<tr>
<td>Anthrax</td>
<td>Pseudo rabies</td>
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<tr>
<td>Bacillary hemoglobinuria</td>
<td>Rabies</td>
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<tr>
<td>Brucellosis</td>
<td>Thromboembolic meningal encephalomyelitis</td>
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<tr>
<td>Blackleg</td>
<td>Rickettsia</td>
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<tr>
<td>Blue tongue</td>
<td>Salmonellosis</td>
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<tr>
<td>Infectious keratoconjunctivitis</td>
<td>Bovine respiratory disease complex</td>
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<tr>
<td>Bovine viral diarrhea</td>
<td>Mannheimia hemolytica</td>
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<tr>
<td>Diphtheria</td>
<td>Pasterurella multocida</td>
</tr>
<tr>
<td>Clostridial diseases</td>
<td>Histophilus somni</td>
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<tr>
<td>Coccidiosis</td>
<td>Mycoplasma spp.</td>
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<td>Encephalomyelitis</td>
<td>Chlamydia spp.</td>
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<td>Listeriosis</td>
<td>Infectious pododermatitis</td>
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<td></td>
<td>Infectious bovine rhinotracheitis</td>
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<tr>
<td></td>
<td>Parainfluenza</td>
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<td></td>
<td>Adenovirus</td>
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<td></td>
<td>Reovirus</td>
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<td></td>
<td>Enterovirus</td>
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<td></td>
<td>Corona virus</td>
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<td></td>
<td>Bovine respiratory syncytial virus</td>
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<td></td>
<td>Lump jaw</td>
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<td></td>
<td>Wooden tongue</td>
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<tr>
<td></td>
<td>Otitis media</td>
</tr>
</tbody>
</table>

- “What” disease are we going to talk about?
For this discussion we will focus on Bovine Respiratory Disease Syndrome / Complex

- Industry wide (cow calf, stocker, backgrounder, feedyard)
  - responsible for 31% of cattle/calf mortality

- Feedyard
  - 69% to 79% of morbidity
  - 44% to 72% mortality

where? - relative to the feedyard
Bovine Respiratory Disease Syndrome

- Multifactorial causation, some or all factors may come into play
  - Stress
  - Viral insult
  - Compromised immune system
  - Bacterial infection

*Balance between - immunocompetence and infectious pressure*

- Complex allows “commensal” bacteria access from upper respiratory tract to lower respiratory tract.

- End result is *bronchopneumonia*
Bovine Respiratory Disease Syndrome

A. Prevention
   • Immunization
   • Maturation
   • Acclimation

B. Control/treatment
   • Treatment - individuals
   • Control - groups
Bovine Respiratory Disease Syndrome

A. Prevention

1. Immunization – vaccination
   • efficacious vaccine
   • appropriate timing
   • appropriate administration

2. Maturation
   • immunological maturation
   • Allow adequate time for vaccine to induce immunization under more advantageous situation
Bovine Respiratory Disease Syndrome

A. Prevention

3. Acclimation
   • Husbandry, stockmanship
   • Adequate preparation for feedyard environment
   • Avoid long term stressors with too many factors to adapt to
     • weaning
     • transit/travel
     • herd mates, social structure
     • exposure/infection with new microbes
     • new environment
     • diet, feed source
     • water source
     • climate, altitude
Bovine Respiratory Disease Syndrome

B. Control / Treatment

1. Treatment – individual animals

- Case definition – cannot use “textbook” criteria, obviously ill appearing cattle, well into the course of BRD pneumonia, unfavorable response to treatment

- Behavior, attitude, response, nasal character, eyes, respiration, fill, rectal temperature, weight loss (or gain) – determine if BRD or other cause for clinical appearance.

- If febrile or signs indicate BRD, antimicrobial (antibiotic) therapy is indicated
Bovine Respiratory Disease Syndrome

B. Control / Treatment

1. **Treatment** – individual animals,
   
   • Use case definition to determine herd status, BRD status
   • As long as morbidity and subsequent mortality are deemed “manageable” or untroublesome, continue to identify and treat individual cases
   • If cattle are being identified but determine not to be suffering from BRD, look for other causes of the clinical appearance

2. **Control** – group/population
   
   • If morbidity and subsequent mortality (post mortem diagnosis) are such that caretakers cannot physically keep up with the outbreak – group treatment of cattle with antibiotics
Bovine Respiratory Disease Syndrome

B. Control / Treatment

2. Control – group/population

- If morbidity and subsequent mortality (post mortem diagnosis) are such that caretakers cannot physically keep up with the outbreak – group treatment of cattle with antibiotics.

- If cattle arrive with several animals in the group showing advanced signs of BRDC, with several others in the early stages - metaphylactic /group treatment with antibiotics.

- If cattle arrive from a source or situation where the outcome is highly probable that subsequent morbidity and mortality will be excessive - metaphylactic /group treatment with antibiotics.
Bovine Respiratory Disease Syndrome

• Prevention & control of infection – while possible, not probable

  • Prevention and **control** of disease
    • Immunization
    • Maturation
    • Acclimation

  • **Control** and treatment of disease
    • Case definition
    • Antibiotic intervention