Field Experiences with Whisper... Extension of Stockmanship Antibiotic Stewardship

A new diagnostic audio technology that will change the way you see BRD...
CHALLENGE!

UNDERSTAND THE ANIMALS YOU WORK WITH AT A HIGHER LEVEL
Low Stress Handling Skills*

• Create emotional wellness
• Result in ease of animal handling
• Allow cattle to express true state of health
• Allows cattle to be healthy, perform and express exuberance
Caregiver Goals

- Greet New Arrivals - Relocation Stress
- Demonstrate Communication Skills
- Encourage Health Status Honesty
- Recognize Abnormalities
- Allow Immune Function
- Enhance Water and Feed Intake Levels
- Encourage Rest and Recuperation
Predator Prey Instinct

- PREY ANIMALS.....CONCEAL WEAKNESS
Sick Cattle Management Goals

• **Timely detection**
• **Cattle pulled, volunteer to leave pen and quietly walk into chute, stand to be examined and treated, then quietly exit the chute and go to the bunk and tank**
Significance of Whisper in the feedlot...

• BRD (bovine respiratory disease) is the **#1 cause** of *morbidity* and *mortality* in feedlot cattle.
  – 75% of morbidity & 50% of mortality (Edwards, 1996; Smith 1998)

• Despite improved vaccines & antimicrobials, **BRD rates have been increasing** (Loneragan et al., 2001; Babcock et al., 2006)

• Feedlot cattle that received 1, 2, or 3 treatments for BRD returned **$40.64, $58.35, & $291.93 less** respectively than untreated animals (Fulton et al. 2002)
• Lung lesions found at slaughter are not correlated with treatment history
• 40% of calves treated for BRD showed lung lesions, while 42% of calves that had not been diagnosed with BRD showed lung lesions at slaughter
  – Bryant et al., Bovine Practitioner, May 1999
• Current observation abilities don’t allow accurate assessment of health
Feedlot BRD diagnostic variability...

• Pulmonary lesions were present at slaughter in 68% of steers that were not treated for BRD (Wittum et al., 1996).

• Thompson et al. 2006 - 42.8% of all animals had lung lesions at slaughter with 69.5% having never been treated for BRD.

• Noffsinger and Locatelli in 2004 noted that due to predator/prey behaviors cattle often mask clinical signs of illness (weakness).

• “...recent evidence suggests that non-clinical BRD is also common and results in lost production” (Bryant et al. 1999)
Significance of Whisper in the feedlot...

- Whisper brings a new & objective technology to BRD diagnosis, evaluation and management.
- Currently we have no *practical & objective* diagnostic tools for BRD diagnosis & evaluation.
  - Rectal temperature = “undifferentiated fever”.
  - X-rays, ultrasound, MRI, etc. not practical or feasible in commercial setting
- Historically we have had little solid data by which decisions have been made and protocols designed.
“Our current methods of disease diagnosis are not adequate for evaluating management changes or product efficacy if we are interested in understanding the cost effectiveness of our decisions.”

DART

• Depression
• Appetite
• Respiratory nature
• Temperature
Significance of Whisper in the feedlot...

- Clinical ID of cattle with BRD has not proven accurate...*

- Great variation in ability to correctly pull & diagnose sick animals...

- Sick animal identification, treatment protocols & other interventions have historically been very subjective...

*G.C. Duff & M.L. Galyean; BOARD-INVITED REVIEW: Recent advances in management of highly stressed, newly received feedlot cattle; J ANIM SCI, March 2007, vol.85 no 3, pgs 823-840
#2160

6:30 A.M.
68 degrees ambient temp
T = 106.2 LS 1
#2157
Temp. 105.5
LS 5
Prudent antibiotic use

• Do these cattle deserve the same antibiotic treatment?
Conventional Lung Score Treatment Response
## Gaseous exchange and basal metabolic requirements

<table>
<thead>
<tr>
<th>Species</th>
<th>Basal O2 consumption (ml/min/kg)</th>
<th>Total O2 consumption (ml/min)</th>
<th>Total alveolar surface area (Sq. M)</th>
<th>Total surface area/total O2 consumption (Sq. M/ ml O2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAT</td>
<td>510</td>
<td>1326</td>
<td>7.3</td>
<td>0.0054</td>
</tr>
<tr>
<td>DOG</td>
<td>379</td>
<td>6064</td>
<td>46.5</td>
<td>0.0078</td>
</tr>
<tr>
<td>GOAT</td>
<td>365</td>
<td>11680</td>
<td>96.0</td>
<td>0.0082</td>
</tr>
<tr>
<td>MAN</td>
<td>221</td>
<td>12133</td>
<td>63.0</td>
<td>0.0051</td>
</tr>
<tr>
<td>HORSE</td>
<td>127</td>
<td>49403</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>OX</td>
<td>255</td>
<td>124950</td>
<td>316.0</td>
<td>0.0025</td>
</tr>
</tbody>
</table>
### Physiology of the bovine respiratory system

<table>
<thead>
<tr>
<th></th>
<th>Cow</th>
<th>Horse</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen Consumption</td>
<td>124,950</td>
<td>49,403</td>
<td>250%</td>
</tr>
<tr>
<td>(ml/min)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lung Volume</td>
<td>12,400</td>
<td>42,000</td>
<td>30%</td>
</tr>
<tr>
<td>(ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Species</td>
<td>Total Lung Volume (ml)</td>
<td>Tidal Volume (ml)</td>
<td>% Basal Use</td>
</tr>
<tr>
<td>---------</td>
<td>------------------------</td>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>CAT</td>
<td>340</td>
<td>25.5</td>
<td>7.5</td>
</tr>
<tr>
<td>DOG</td>
<td>1790</td>
<td>251</td>
<td>14</td>
</tr>
<tr>
<td>GOAT</td>
<td>4000</td>
<td>310</td>
<td>7.8</td>
</tr>
<tr>
<td>MAN</td>
<td>4930</td>
<td>544</td>
<td>11</td>
</tr>
<tr>
<td>HORSE</td>
<td>42000</td>
<td>6000</td>
<td>14.3</td>
</tr>
<tr>
<td>OX</td>
<td>12400</td>
<td>3600</td>
<td>29</td>
</tr>
</tbody>
</table>
• Computer assisted - electronic stethoscope.
• Evaluates lung sounds & reports findings based on a scale of 1-5.
• 8 seconds required to obtain a respiratory assessment.
• Utilizes a patented proprietary algorithm.
Welcome to the WhisperRx application

To view a saved recording select 'Open Recording' from the 'File' menu.

To begin recording:
1. Plug a WhisperRx into this computer's USB port.
2. Turn on stethoscope.
3. Place stethoscope on the animal as indicated in the drawing.
4. Press the record button.
Normal - Lung Score 1

- Little to no pathophysiological signs
- No permanent lung tissue damage
- Antibiotic therapy may not be justified
Moderate Acute - Lung Score 3

- Some pathophysiological symptoms
- Weight gaining ability compromised
- Aggressive antibiotic therapy necessary for full recovery with no permanent damage
Severe Acute – Lung Score 4

- Pathophysiological signs definitely visible
- Lung Tissue quickly deteriorating
- Weight gaining ability severely hampered (not permanent)
- Immediate, aggressive antibiotic therapy necessary just to minimize permanent damage
Case for Accurate Auscultation & Evaluation...

Findings... data...
Correlation data set

- 3,063 first time BRD pulls for temperature
- 3,112 first time BRD pulls for manual LS
- One feedlot
- Same time period
## BRD Case Fatalities by Animal Temperature

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>Case Fatality Rate</th>
<th># of Dead</th>
<th>Total Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>100.5°</td>
<td>6.7%</td>
<td>6</td>
<td>75</td>
</tr>
<tr>
<td>101°</td>
<td>10.0%</td>
<td>9</td>
<td>87</td>
</tr>
<tr>
<td>101.5°</td>
<td>7.9%</td>
<td>11</td>
<td>139</td>
</tr>
<tr>
<td>102°</td>
<td>5.0%</td>
<td>6</td>
<td>119</td>
</tr>
<tr>
<td>102.5°</td>
<td>7.7%</td>
<td>16</td>
<td>196</td>
</tr>
<tr>
<td>103°</td>
<td>8.6%</td>
<td>15</td>
<td>174</td>
</tr>
<tr>
<td>103.5°</td>
<td>7.6%</td>
<td>21</td>
<td>264</td>
</tr>
<tr>
<td>104°</td>
<td>4.2%</td>
<td>12</td>
<td>283</td>
</tr>
<tr>
<td>104.5°</td>
<td>6.6%</td>
<td>26</td>
<td>393</td>
</tr>
<tr>
<td>105°</td>
<td>5.6%</td>
<td>19</td>
<td>337</td>
</tr>
<tr>
<td>105.5°</td>
<td>5.7%</td>
<td>21</td>
<td>351</td>
</tr>
<tr>
<td>106°</td>
<td>6.0%</td>
<td>15</td>
<td>234</td>
</tr>
<tr>
<td>106.5°</td>
<td>6.7%</td>
<td>13</td>
<td>193</td>
</tr>
<tr>
<td>107°</td>
<td>7.9%</td>
<td>8</td>
<td>101</td>
</tr>
<tr>
<td>107.5°</td>
<td>14.0%</td>
<td>12</td>
<td>83</td>
</tr>
<tr>
<td>108°</td>
<td>13.0%</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>108.5°</td>
<td>18.0%</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td><strong>Overall</strong></td>
<td><strong>7.0%</strong></td>
<td><strong>215</strong></td>
<td><strong>3,063</strong></td>
</tr>
</tbody>
</table>
## BRD Case Fatalities by Lung Score

<table>
<thead>
<tr>
<th>Lung Score</th>
<th>Case Fatality Rate</th>
<th># of Dead</th>
<th>Total Head</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8.6%</td>
<td>12</td>
<td>139</td>
</tr>
<tr>
<td>2</td>
<td>4.6%</td>
<td>9</td>
<td>174</td>
</tr>
<tr>
<td>3</td>
<td>4.3%</td>
<td>21</td>
<td>488</td>
</tr>
<tr>
<td>4</td>
<td>5.0%</td>
<td>42</td>
<td>837</td>
</tr>
<tr>
<td>5</td>
<td>8.9%</td>
<td>57</td>
<td>639</td>
</tr>
<tr>
<td>6</td>
<td>9.4%</td>
<td>33</td>
<td>350</td>
</tr>
<tr>
<td>7</td>
<td>13.4%</td>
<td>26</td>
<td>194</td>
</tr>
<tr>
<td>8</td>
<td>14.1%</td>
<td>28</td>
<td>198</td>
</tr>
<tr>
<td>9</td>
<td>32.3%</td>
<td>11</td>
<td>31</td>
</tr>
<tr>
<td>10</td>
<td>32.3%</td>
<td>21</td>
<td>62</td>
</tr>
<tr>
<td>Overall</td>
<td>8.4%</td>
<td>260</td>
<td>3,112</td>
</tr>
</tbody>
</table>
### Correlation of BRD Case Fatality and Animal Temperature*

<table>
<thead>
<tr>
<th>Number of Head</th>
<th>Correlation</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,063</td>
<td>6.0%</td>
<td>2.5% - 9.5%</td>
</tr>
</tbody>
</table>

*Pearson Correlation Fisher's Z Transformation: p = .0009

### Correlation of BRD Case Fatality and Lung Score*

<table>
<thead>
<tr>
<th>Number of Head</th>
<th>Correlation</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,112</td>
<td>79.8%</td>
<td>78.5% - 81.1%</td>
</tr>
</tbody>
</table>

*Pearson Correlation Fisher's Z Transformation: p < .0001
Whisper & mortality reduction

Following Whisper® Introduction
Non-Auscultation vs. Auscultation

- Non-Auscultation 5,901
  - 13.07%
  - A 35.1% mortality rate reduction

- Auscultation 18,166
  - 8.48%

Practical Application: This data tells us that 1 animal with BRD can be expected to survive for every 21.8 animals auscultated at their first hospital treatment pull.

Hospital Pull Practices of 24,067 Head
Survey of 116,415 head
BRD Severity
Diagnostic Methods

• 15,411 first time BRD treatments
• Eight feedlots
• 1,399 case fatalities (8.68% CFR)
• Fever – 104.5 or above
BRD Severity Diagnostic Methods

- Total: 1399 deaths, 0% reduction
- No Fever: 608 deaths, 57% reduction
- Whisper LS 1: 210 deaths, 85% reduction
- No Fever and Whisper LS 1: 102 deaths, 93% reduction

Cumulative reduction chart indicating significant decrease in deaths as diagnostic methods are applied.
• Identifies cattle with respiratory disease...
• Provides a lung score which indicates severity, duration, and progression...
• Provides critical information for the implementation of AIF treatment protocols...
• Provides data in the evaluation of treatment protocols and treatment success...
Whisper technology can impact...

• Risk assessment.
  – Secure lung scores upon arrival...
  – Better initial herd health decisions...
  – Advanced warning for potential “wreck” situations.

• May positively impact the quality of cattle supplied...

• Better identification of the truly “high risk” situations...

• Opportunity for quicker identification & intervention of non respiratory illnesses.
Processing with Whisper®

Distribution of Whisper Lung Scores in Processing Intake by Date

1,826 head processed from 01-Apr to 01-May-2013
Management of Sick Cattle

• Aids caregivers in all aspects regarding sick cattle identification, treatment, and hospital pen management.
  – Not all cattle have BRD...
  – Whisper provides insight into treatment success.
    • Example: Lung score 4, four days ago, today the lung score is 2.
  – Better management of hospital pen...
  – Whisper can assist in alerting a treatment failure situation.
Whisper® Scores From Last 7 Days

Score
Application & impact...

• Animal care and wellbeing...
  – Better management of hospital pens & sick cattle...
  – Potential to identify cattle benefitting a “restart”...
  – Enhanced identification & management of “chronics”
  – Critical diagnostic tool for “natural beef” producers...
• Provides additional data to evaluate treatment protocol design and success...
• Potential to improve “pulling” protocols and skill sets... too deep... to late... etc.
Whisper impact summary...

- Respiratory assessment...
- Risk assessment...
- Decision making...
- Clinical outcomes...
- Treatment/protocol analysis...
- Progression of disease...
- Animal care & prudent usage of AIF’s...