



Do I Mass Medicate Incoming Cattle?

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Introduction:

- Bovine respiratory disease (BRD) is the primary cause of stocker cattle sickness and death losses the first 45 days after arrival

How Does Stocker Cattle Health Improve?

- Decreased Sickness (prevention)
- Decreased Case Fatality Rate (CFR)
Improved detection, improved treatment efficacy
- Decreased Death Loss
Improved morbidity and/or improved CFR
- Decreased Treatment Cost
- Decreased Negative Growth and Carcass Effect of Disease

Metaphylaxis

- The timely mass medication of an entire group of animals to eliminate or minimize an expected outbreak of disease

Drugs Approved for Metaphylaxis

- | | |
|--|--|
| <ul style="list-style-type: none">• Injectable<ul style="list-style-type: none">▪ Micotil®▪ Nuflo®▪ Tetradure®▪ Excede®▪ Draxxin® | <ul style="list-style-type: none">• Feed Grade<ul style="list-style-type: none">▪ Chlortetracycline (CTC)▪ Oxytetracycline (OTC) |
|--|--|

Never Use for Metaphylaxis !!

- Gentamicin (18 mo. withdrawal)
- Injectable Neomycin (18 mo. withdrawal)
- Enrofloxacin (Batril®)

Questions to Ask About Metaphylaxis

From Dr. Dee Griffin – UN, Great Plains Vet Education Center

1. What is the likelihood that the group of cattle will have a high rate of respiratory disease?

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• Based on the combination of factors that increase risk for BRD

- Weather – heat and cold stress
- Environment – dust or mud
- Resent weaning
- Commingling cattle from multiple sources
- Age / Weight
- Time in transit – dehydration, exhaustion
- Surgery – castration / dehorning

Affect immunity and/or germ load

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• Minimize time in transit

• Handle with care at arrival

- Minimize stress
- Minimize noise – yelling, motors, etc.
- Minimize use of hot shots and dogs
- Minimize time spent standing on concrete

Stress increases cortisol levels, which decreases the efficacy of vaccines and increases BRD risk

2. Are there any management techniques other than metaphylaxis that will reduce the pending BRD outbreak to a manageable level?

- Minimize time in transit
- Handle with care at arrival
- Provide shade and windbreaks - new cattle are susceptible to weather stress
- Provide bedding in cold or muddy conditions
- In hot weather, process cattle before it reaches 80 °F
- Vaccinate at arrival with modified live vaccines (4-way)

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- Antibiotic metaphylaxis will have no effect on viral BRD pathogens (IBR, BVD, BRSV, etc.)
- Metaphylaxis may decrease the normal load of *Mannheimia (Pasteurella)* organisms in the upper respiratory tract
- Metaphylaxis may allow for improved timing of BRD treatment by treating cattle before they show signs of illness
 - Cattle are prey animals – and it has been to their advantage to hide signs of illness from carnivores

3. Will metaphylaxis prevent or reduce the BRD sickness and death loss?

- Most published research trials show health benefits associated with metaphylaxis
 - 20-44% reduction in cattle treated for BRD
 - 0-24% reduced number of dead cattle
- Most published research trials show improvement in growth performance due to reduced negative effect of BRD

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4. Will the reduction in suffering due to BRD be great enough to offset the cost of metaphylaxis?

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- Spreadsheet (Microsoft® Excel) model to simultaneously run profit / loss statements for the same set of cattle managed with two proportions of BRD morbidity.

| Profit and Loss Statement | | Profit and Loss Statement - Alternate Morbidity | |
|--|------------|--|------------|
| Please Answer All of the Following Questions (Per Head Basis) | | | |
| Price paid per pound (\$) | \$1,000.00 | Price paid per pound (\$) | \$1,000.00 |
| Purchase weight (Lbs.) | 500.00 | Purchase weight (Lbs.) | 500.00 |
| Trucking cost - arrival (\$) | \$0.00 | Trucking cost - arrival (\$) | \$0.00 |
| Hired labor cost per head (\$) | \$10.00 | Hired labor cost per head (\$) | \$10.00 |
| Annual Interest Rate (i.e. 10) | 8.00% | Annual Interest Rate (i.e. 10) | 8.00% |
| Price paid per ton of diet, as fed (\$) | \$125.00 | Price paid per ton of diet, as fed (\$) | \$125.00 |
| Pounds of diet fed daily, as fed | 30.00 | Pounds of diet fed daily, as fed | 30.00 |
| Days owned | 180.00 | Days owned | 180.00 |
| Yardspace per day (\$) | \$0.50 | Yardspace per day (\$) | \$0.50 |
| Processing/product cost (\$) | \$5.00 | Processing/product cost (\$) | \$5.00 |
| Morbidity Percentage (%) | 0.00% | Alternate Morbidity Percentage (%) | 27.00% |
| Case Fatality Rate (CFR) | 10.00% | Case Fatality Rate (CFR) | 10.00% |
| Re-pull rate | 0.00% | Re-pull rate | 35.00% |
| Chronic percentage (default=1/4 death rate) | 0.75% | Chronic percentage - Alternate morbidity | 0.68% |
| Price received at sale (\$/Lbs.) | \$0.8500 | Price received at sale (\$/Lbs.) | \$0.8500 |
| ADG healthy cattle | 3.50% | ADG healthy cattle | 3.50% |
| ADG cattle pulled once for BRD (% lower than healthy) | 5.000% | ADG cattle pulled once for BRD (% lower than healthy) | 5.000% |
| ADG cattle pulled 2 or more times for BRD (% lower than healthy) | 15.000% | ADG cattle pulled 2 or more times for BRD (% lower than healthy) | 15.000% |
| ADG chronic cattle (% lower than healthy) | 30.000% | ADG chronic cattle (% lower than healthy) | 30.000% |
| Sales or commission fees and trucking to harvest per he | \$1.00 | Sales or commission fees and trucking to harvest per he | \$1.00 |
| Decreased return for chronic compared to non average | \$150.00 | Decreased return for chronic compared to non average | \$150.00 |
| Given the Above Variables | | Given the Above Variables | |
| Number sold in primary market | 98.29% | Number sold in primary market - Alternate Morbidity Rate | 98.63% |
| Liveweight Sold | 1051.92 | Liveweight Sold - Alternate Morbidity Rate | 1053.39 |
| Mortality Percentage | 3.00% | Mortality Percentage - Alternate Morbidity Rate | 2.70% |
| ADG | 3.06% | ADG - Alternate Morbidity | 3.07% |
| Treatment cost | \$5.96 | Treatment cost - Alternate Morbidity Rate | \$5.97 |
| Return to ownership and management | -\$90.46 | Return to ownership and management with Alternate Mo | -\$88.52 |

Difference in return between two options = **\$3.94**

Results – metaphylaxis (stocker):

- The most important variables related to determining economic return for prevention:
 - Price received at sale
 - ADG of healthy cattle
 - Case Fatality Rate
 - Cost of BRD treatment (minimal importance)
 - Cost of feed (minimal importance)

An increase in sale price, ADG for healthy cattle, and Case Fatality Rate all provide increased dollars available for prevention

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------|---|
| | |
| | |
| | |
| | |
| | |

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------------------------|---|
| Increase price received at sale 10% | + 9.72% |
| | |
| | |
| | |
| | |

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------------------------|---|
| Increase price received at sale 10% | + 9.72% |
| Increase ADG of healthy cattle 10% | + 6.65% |
| | |
| | |
| | |

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------------------------|---|
| Increase price received at sale 10% | + 9.72% |
| Increase ADG of healthy cattle 10% | + 6.65% |
| Increase CFR 10% | + 5.3% |
| | |
| | |

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------------------------|---|
| Increase price received at sale 10% | + 9.72% |
| Increase ADG of healthy cattle 10% | + 6.65% |
| Increase CFR 10% | + 5.3% |
| Increase cost of BRD Tx 10% | + 1.55% |
| | |

Results – Metaphylaxis (stocker):
All other example variables remaining static

| Variable in Model | Change in \$ Available for BRD Prevention |
|-------------------------------------|---|
| Increase price received at sale 10% | + 9.72% |
| Increase ADG of healthy cattle 10% | + 6.65% |
| Increase CFR 10% | + 5.3% |
| Increase cost of BRD Tx 10% | + 1.55% |
| Increase feed cost 10% | + 1.29% |

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- Few studies have been published
- Based on current information, it does not appear that metaphylaxis decreases effectiveness of the same drug used as first-line therapy

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- The FDA and CDC are very interested in the affects that animal drugs have on human pathogens such as *Salmonella* sp.
- Based on current information, it does not appear that metaphylaxis affects resistance patterns for human pathogens
- Expect increase scrutiny for all livestock uses of antibiotics – and increased regulation

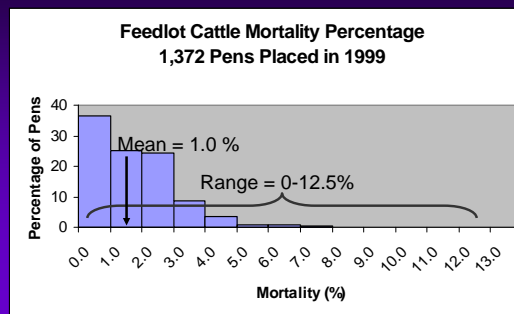
Goal of Metaphylaxis:

- To reduce the chance of a “wreck” due to respiratory disease

Or

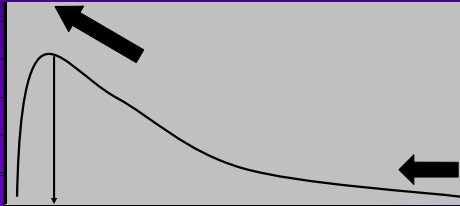
- Reduce how negative a “wreck” is economically

Distributions of Interest to Beef Veterinarians



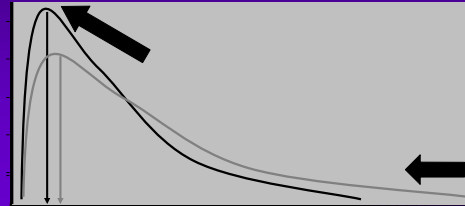
Improving the System

- If correction affects only some groups:
i.e. only affects poor performers



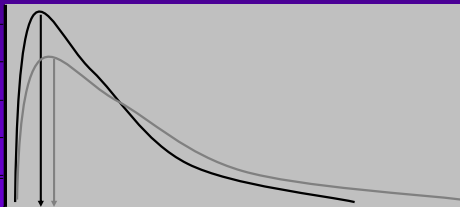
Improving the System

- If correction affects only some groups:
i.e. only affects poor performers
Variation is reduced (less poor performance)



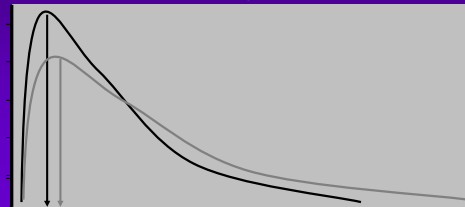
Improving the System

- If correction affects only some groups:
i.e. only affects poor performers
Variation is reduced (less poor performance)
Mean is improved because low-end performance is reduced



Improving the System

- If correction affects only some groups:
i.e. only affects poor performers
Variation is reduced (less poor performance)
Mean is improved because low-end performance is reduced
Is risk reduction rather than performance enhancement



Summary

- Evaluation of strategies to change stocker cattle health is influenced by both biologic (ADG) and non-biologic factors (cattle price)
- Evaluation of strategies to change sickness and death loss risk (i.e. metaphylaxis) requires a different perspective than evaluation of other biologic attributes of feedlot production



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Some biologic distributions are
not “Bell-Shaped”
Usually skewed to the right

