HERD HEALTH

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Herd Health Issues 2018
-Food for Thought

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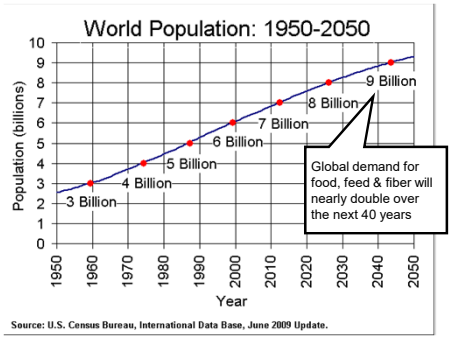
Definition

Stewardship:

Careful and responsible management of something entrusted to one's care (noun, Webster)

Animal Agriculture

Feeding the world by caring for animals through responsible resource management and the prudent use of technology



http://www.census.gov/ipc/www/idb/worldpopgraph.php

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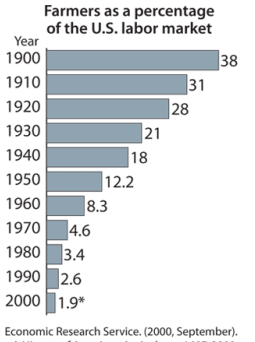

Economic Research Service. (2000, September). A History of American Agriculture, 1607-2000. (ERS-POST-12.) Washington, DC: Author.
* USDA Publication: The 20th Century Transformation of U.S. Agriculture and Farm Policy Electronic Information Bulletin Number 3, June 2005; authors: Carolyn Dimitri, Anne Effland, and Neilson Conklin

Deloitte Food Value Equation Survey 2015

Capitalizing on the shifting consumer food value equation.

- Deloitte Consulting, Food Marketing Institute (FMI), Grocery Manufacturers Association (GMA)
- Survey of 5,000 consumers nationwide
- Interviews of executives from 40 companies—retailers, food & beverage manufacturers, ingredient suppliers, ag producers
- FMI, GMA and Deloitte secondary research

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Deloitte Food Value Equation Survey 2015

Capitalizing on the shifting consumer food value equation.

- Consumer food purchase decisions—then
  - Traditional drivers—taste, price, convenience
  - other factors/drivers had small impact
- Consumer food purchase decisions—now
  - Traditional drivers—taste price convenience
  - Evolving drivers—health & wellness, safety, social impact, experience, transparency (overarching driver)

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Deloitte Food Value Equation Survey 2015

Capitalizing on the shifting consumer food value equation.

The consumer value driver plate

Source: Deloitte Food Value Equation Survey 2015, Deloitte Analysis

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Deloitte Food Value Equation Survey 2015

Capitalizing on the shifting consumer food value equation.

About half of consumers surveyed indicated they weigh Evolving value drivers more heavily than Traditional ones

Source: Deloitte Food Value Equation Survey 2015, Deloitte Analysis

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Summary Points

- Primary purpose of animal agriculture is food production
- Attitudes and perspectives of US and world populations are changing
- Increasing world human population & development requires increased food and fiber supplies
- Global resources are limited
- Production level animal care and use of science and technology offers current and future solutions

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Topics Outline-Brief Comments

- Antimicrobial stewardship
- Nursing Calf/Summer Pneumonia
- Commingling
- Feedlot Mortality and Morbidity
  - Bovine Congestive Heart Failure study update

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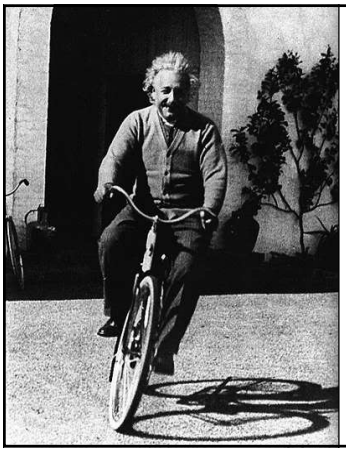

Everything should be as simple as possible, but no simpler.

Einstein

Antimicrobials/Antibiotics

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What drugs cure disease?
Do antimicrobials cure disease?

- Kill
- Cleanup
- Replace/Repair
- Return to Function

Source: Dr. Gordon Brumbaugh

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What drugs cure disease?
Do antimicrobials cure disease?

- Kill
- Cleanup
- Replace/Repair
- Return to Function

Other Mechanisms

Respiratory tract healing takes time (~3-6 weeks)

Source: Dr. Gordon Brumbaugh

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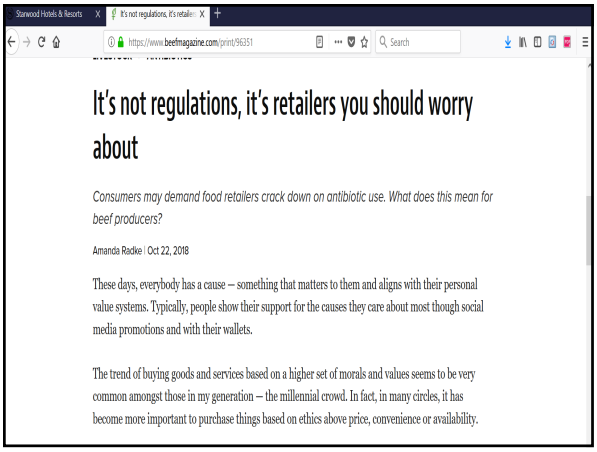

Starwood Hotels & Resorts | It's not regulations, it's retailers | https://www.beefmagazine.com/print/96351 | Search

It's not regulations, it's retailers you should worry about

Consumers may demand food retailers crack down on antibiotic use. What does this mean for beef producers?

Amanda Radke | Oct 22, 2018

These days, everybody has a cause – something that matters to them and aligns with their personal value systems. Typically, people show their support for the causes they care about most though social media promotions and with their wallets.

The trend of buying goods and services based on a higher set of morals and values seems to be very common amongst those in my generation – the millennial crowd. In fact, in many circles, it has become more important to purchase things based on ethics above price, convenience or availability.

Antimicrobial Stewardship

- Primary concern is development of antimicrobial resistance impacting effectiveness in treating human diseases
- Stewardship of antimicrobials
  - Assumed or actual: Need for an antimicrobial represents production/economic loss
  - Systems approaches to reducing need/use
  - Re-examining need for antimicrobial use
    - A breach in the system?
  - Use appropriately

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DEFINITION OF ANTIMICROBIAL STEWARDSHIP

Antimicrobial stewardship is the commitment to reducing the need for antimicrobial drugs by preventing infectious disease in cattle, and when antimicrobial drugs are needed, a commitment that antimicrobials are used appropriately to optimize health and minimize selection for antimicrobial resistance.

http://aabp.org/resources/AABP_Guidelines/AntimicrobialStewardship-7.27.17.pdf
Accessed 11/4/2018

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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

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Dargatz, et al Vet CI FoodAn 18 (2002) 1-5.
Smith, Vet CI Food An 18:1(2002) 157-175.

Nursing Calf Respiratory Disease

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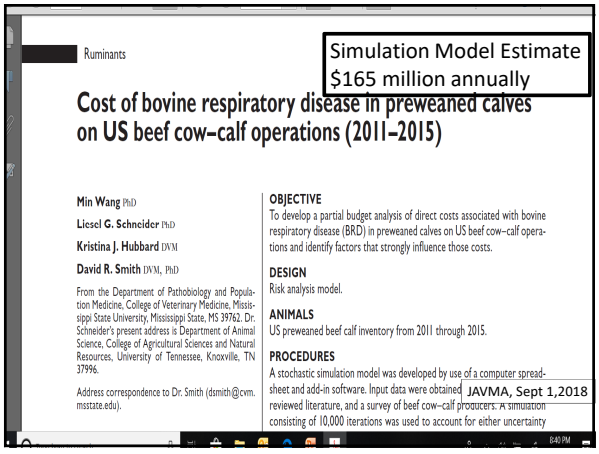


Ruminants

Simulation Model Estimate
$165 million annually

Cost of bovine respiratory disease in preweaned calves on US beef cow–calf operations (2011–2015)

Min Wang PhD
Liesel G. Schneider PhD
Kristina J. Hubbard DVM
David R. Smith DVM, PhD

From the Department of Pathobiology and Population Medicine, College of Veterinary Medicine, Mississippi State University, Mississippi State, MS 39762. Dr. Schneider's present address is Department of Animal Science, College of Agricultural Sciences and Natural Resources, University of Tennessee, Knoxville, TN 37996.

Address correspondence to Dr. Smith (dsmith@cvm.msstate.edu).

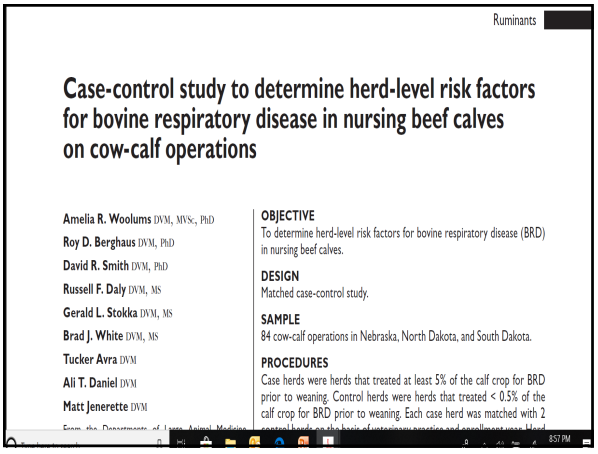
OBJECTIVE
To develop a partial budget analysis of direct costs associated with bovine respiratory disease (BRD) in preweaned calves on US beef cow–calf operations and identify factors that strongly influence those costs.

DESIGN
Risk analysis model.

ANIMALS
US preweaned beef calf inventory from 2011 through 2015.

PROCEDURES
A stochastic simulation model was developed by use of a computer spreadsheet and add-in software. Input data were obtained reviewed literature, and a survey of beef cow–calf producers. A simulation consisting of 10,000 iterations was used to account for either uncertainty

JAVMA, Sept 1,2018



Ruminants

Case-control study to determine herd-level risk factors for bovine respiratory disease in nursing beef calves on cow-calf operations

Amelia R. Woolums DVM, MVSc, PhD
Roy D. Berghaus DVM, PhD
David R. Smith DVM, PhD
Russell F. Daly DVM, MS
Gerald L. Stokka DVM, MS
Brad J. White DVM, MS
Tucker Avra DVM
Ali T. Daniel DVM
Matt Jenerette DVM

OBJECTIVE
To determine herd-level risk factors for bovine respiratory disease (BRD) in nursing beef calves.

DESIGN
Matched case-control study.

SAMPLE
84 cow-calf operations in Nebraska, North Dakota, and South Dakota.

PROCEDURES
Case herds were herds that treated at least 5% of the calf crop for BRD prior to weaning. Control herds were herds that treated < 0.5% of the calf crop for BRD prior to weaning. Each case herd was matched with 2

For consideration
Unintended consequences?

- Herds with 150-499 cows (OR 7.9 times)and 500 or more cows (OR 12 times) over herds with less than 150 cows
- Herds that used intensive grazing (OR 3.3 times greater)
- Herds that used estrus synchronization programs (OR 4.5 times greater)

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Commingling

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Commingling-The Forces At Play

Published December 5, 2014

Effects of commingling beef calves from different sources and weaning protocols during a forty-two-day receiving period on performance and bovine respiratory disease[1,2]

D. L. Step,*[3] C. R. Krehbiel,† H. A. DePra,† J. J. Cranston,† R. W. Fulton,‡ J. G. Kirkpatrick,* D. R. Gill,† M. E. Payton,§ M. A. Montelongo,‡ and A. W. Confer‡

*Department of Veterinary Clinical Sciences, Center for Veterinary Health Sciences; †Department of Animal Science, Division of Agricultural Sciences and Natural Resources; ‡Department of Veterinary Pathobiology, Center for Veterinary Health Sciences; and §Department of Statistics, College of Arts and Sciences, Oklahoma State University, Stillwater 74078

Study Design

- 509 Steers
  - MS Market-N=260
  - MO Ranch-N=249
- 2x3+1 Factorial
  - Weaning Management (Abrupt, Wean45, WeanVac45)
  - Commingled or not
  - Auction market calves served as control

Impact of Commingling

Table 5. Effects of calf origin/commingling on morbidity, mortality, and health costs[1]

Item	RANCH	MARKET	COMM	SEM[2]	P > F
Morbidity, %	11.1[a]	41.9[b]	22.6[c]	5.6	<0.001
Treated once, %	7.4[a]	31.9[b]	15.9[a]	4.2	<0.001
Treated twice, %	1.9	4.0	6.1	2.4	0.32
Treated thrice, %	1.8[a]	6.0[b]	0.6[a]	1.6	0.04

Impact of Weaning/Vaccination

Table 6. Effects of weaning management on morbidity, mortality, and health costs[1]

		RANCH				
Item	MARKET	WEAN	WEAN45	WEANVAC45	SEM[2]	P > F
Morbidity, %	41.9[a]	35.1[a]	5.9[b]	9.5[b]	4.2	<0.001
Treated once, %	31.9[a]	22.2[a]	5.0[b]	7.7[b]	3.8	<0.001
Treated twice, %	4.0[ab]	9.2[a]	0.9[b]	1.8[b]	2.2	0.05
Treated thrice, %	6.0[a]	3.7[ab]	0.0[b]	0.0[b]	1.5	0.02

Effects of on-arrival versus delayed modified live virus vaccination on health, performance, and serum infectious bovine rhinotracheitis titers of newly received beef calves[1]

J. T. Richeson,* P. A. Beck,*[2] M. S. Gadberry,* S. A. Gunter,* T. W. Hess,* D. S. Hubbell III,* and C. Jones†

*University of Arkansas, Division of Agriculture, Department of Animal Science, Fayetteville 72701; and †Boehringer-Ingelheim Vetmedica Inc., St Joseph, MO 64501

ABSTRACT: Stress commonly associated with weaning, marketing, and shipment of feeder cattle can temporarily compromise immune function, thereby reducing the effective response to vaccination intended to control bovine respiratory disease (BRD). Two vaccination timing treatments were used to evaluate the effect of timing of a multivalent modified live virus (MLV) titers, and comparisons were made between treatments on a receiving-day basis and an equivalent postvaccination day basis. Daily BW gains were greater ($P \leq 0.05$) for DMLV calves from d 0 to 14 (1.16 vs. 0.88 ± 0.22 kg/d) and from d 0 to 42 (0.75 vs. 0.65 ± 0.09 kg/d). Days to first treatment, total treatment cost, percentage death loss, and pasture ADG after the 42-d receiving

Summary
Getting to Implementation

- Understanding of the system
  - Address current outbreak, prevent new cases in current outbreak, prevention in future years
- Owner/Decision maker engagement in plan
  - Priorities and decision making

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Feedlot mortality and morbidity rates have not improved in spite of technological and other advances

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Bovine Congestive Heart Failure "Brisket Disease"

- The bovine cardiopulmonary system (heart and lungs) is small relative to body mass
- Increased body mass may be surpassing the ability of the cardiopulmonary system to sustain normal function
- Oversimplified?


Image courtesy of Dr. Tom Edwards

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Right-Sided Heart Failure in North American Feedlot Cattle

- Study objectives
  - To evaluate risk of RHF over time and among feedlots
  - To investigate some of the risk factors for RHF
  - To determine how these risk factors affect the time to RHF occurrence

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Neary, Booker, et al, J Vet Intern Med,30:326-334

Right-Sided Heart Failure in North American Feedlot Cattle

- Data from 10 Canadian feedlots for 2000, 2004, 2008, 2012 (1.28 million hd) and 5 US feedlots for 2012 (273,319 hd)
- Categorized at entry: date of entry, age, sex, risk of BRD/UF
- All mortalities were examined post mortem by a veterinarian and primary cause of death recorded.
- Individual records of RHF and digestive deaths (DD) were evaluated. DD served as a competing cause.
- Risk factors evaluated: Treatment for BRD, feedlot entry date, risk of BRD/undifferentiated fever, age at feedlot entry.

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Neary, Booker, et al, J Vet Intern Med,30:326-334

Right-Sided Heart Failure in North American Feedlot Cattle

- Results
  - Adjusted risk of RHF doubled from 2000 to 2012 (p=0.003)
    - CA feedlots had ~2/10,000 hd in 2000 & 2004 to ~4/10,000 hd in 2008 & 2012
  - For every 10,000 hd entering US feedlots in 2012, 11 cattle died from RHF.
    - CA feedlots had about half the risk
  - The median time to RHF was 19 weeks
  - Cattle treated for BRD were 3X more likely to die from RHF, and they died earlier in the feeding period

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Neary, Booker, et al, J Vet Intern Med,30:326-334

Right ventricular hypertrophy with heart failure in Holstein heifers at elevation of 1,600 meters

- CO front range heifer raising facility (1,600 m = 5,249 ft)
- Second leading cause of death (first was pneumonia) in heifers <1.5 years of age.
  - Premature sale or death of 55 heifers over a 5 year period (yard population varied from 1,000-4,000 hd)
- Clinical, necropsy and histological findings consistent with brisket disease due to pulmonary hypertension

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Malherbe, et al, JVDI 24(5) 867-877, 2012

Some outbreaks clustered by source (Western Plains Feedlots)

Up to 7% loss observed in single-source groups (lot)

- 40 of 600 (May, 2017)
- 39 of 500 (January, 2018)

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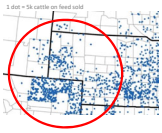
Congestive heart failure in feedlot cattle



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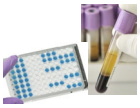
Desired outcomes

- Better understanding of the disease mechanism
  - ➢ Essential for prevention and treatment
- Blood test for diagnosing disease
  - ➢ Identify and manage cattle at risk
- DNA test for causative mutation
  - ➢ Eradicate from breeding stock



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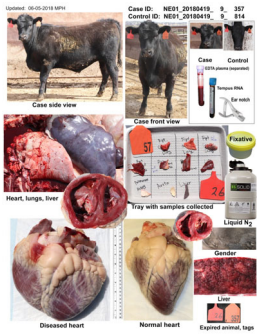
Study design

- 100 matched case-control pairs
  - Four feed yards ~4000 ft
  - Pen riders identify clinical cases

- Differential diagnosis
  - Clinical presentation, necropsy, histopathology
- Preserve tissues
  - DNA, RNA, protein



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What did we see?

Day 1 arrival at feed yard

Day 238 ready for processing

Clinical cases at every stage of the feeding cycle

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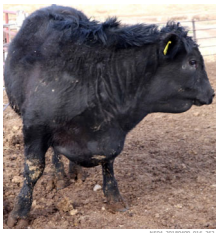
Other clinical signs

Jugular distension



Submandibular edema

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Conclusions

- *Gene (EPAS1)* variants associated with high mountain disease were not associated with feedlot heart failure disease
- A major candidate gene region has been identified
- Candidates for a diagnostic blood test have been identified

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Brisket Project Collaborators

- Do we need to change how we think about some of this?
- Do you have a plan to manage risk for _____?
- Does your health program fit your operation?

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Dr. Dale Grotelueschen's interests include beef health systems management, preventive health planning, diagnostic investigations, also including factors influencing morbidity and mortality, control of bovine viral diarrhea virus, neonatal calf diarrhea, and bovine respiratory disease. He has served as Director of GPVEC since 2013 following service as a managing veterinarian, Beef Cattle Veterinary Operations, Pfizer Animal Health for 12 years, with the University of Nebraska 16 years as professor, Veterinary Extension and Diagnostics and as Director of the Panhandle Veterinary Diagnostic Laboratory, Scottsbluff, Nebraska, and in private veterinary practice for 11 years, mostly in southwest Nebraska. He is active in organized veterinary medicine and the beef industry. He received his DVM from the University of Missouri and MS, Clinical Sciences from Colorado State University. He and his wife, Elizabeth, are parents of 2 grown daughters and reside in Harvard, Nebraska.