



Newsletter

AMERICAN ASSOCIATION OF BOVINE PRACTITIONERS

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THE PRESIDENT'S MESSAGE

The Tug

“When one tugs at a single thing in nature, he finds it attached to the rest of the world.”

This quote is a paraphrase from a statement by John Muir in the book *My First Summer in the Sierra*, published in 1911. Muir was an early advocate for preservation of wilderness in the United States and was considered the “Father of the National Parks.”

This quote focuses on our treatment of the environment and how when we manipulate (or tug on) something in nature, it has a “collateral” or “domino” effect. I used this quote recently in a presentation to describe our ranch’s holistic philosophy of trying to apply a systems approach to manage the cattle and the land in harmony with nature and conservation of range resources.

When you give some thought to that quote and think about how we are all connected to our environment and each other, it creates images of other comparisons in our modern internet-connected world of social media and instant news. What we do in our practices and on our farms and ranches not only affects perceptions and attitudes locally, but globally. When we give an injection of an antibiotic, it is literally connected to the rest of the world. Good or bad, each product we administer and each procedure we perform on an animal is attached to the rest of the world.

My personal philosophy, whether it be ranching, veterinary medicine or any situation that involves application of technology, is to always consider the potential for collateral damage. Technology is then used strategically, when the potential good outweighs the bad, according to our current body of knowledge. When antibiotics are necessary in livestock, it is generally a direct result of a failure somewhere in the production system. It does not mean the failure occurred at that operation, but it occurred somewhere in the value chain. Does this mean we are wrong to use antibiotics because of our own or someone else’s mismanagement? No, we must respond to the immediate situation and need for medical intervention. However, a concurrent attempt to address the underlying cause is the most rewarding part of our veterinary education

and experience. Diagnosing an individual animal and/or herd problem and having the opportunity to diagnose and address the root cause is the essence of sound veterinary medical training and application.



When we practice judicious use of antimicrobials, there are fewer “tugs” in nature. When we treat cattle humanely and lead others to do the same, there are fewer tugs that lead to negative images and opinions about animal agriculture.

The Beef Quality Assurance movement that really began in the late 1980s, gathered steam in the 1990s and is now fully mainstream

in cattle circles, is an example of how a tug was recognized and minimized. Many AABP members, such as Dr. Bob Smith and Dr. Dee Griffin, were pioneers and have been leaders in this endeavor. Prior to the late 1980s very little was ever mentioned about the damage caused by injections into lean meat tissue, particularly into the top butt region. Attitudes had to change from “giving a cow a shot” in the easiest spot accessible, to moving injections in front of the shoulder. Although a quality concern as opposed to a health issue, these injections were reducing the satisfaction of consumers’ beef experience (and were attached to the rest of the world), not merely injections into cattle for treatment.

The *AABP Guideline on Implementing Antimicrobial Stewardship Plans* states the following: “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.” Antimicrobial stewardship is a good example of minimizing the tug, both real and perceived. While writing this newsletter, McDonald’s announced their new antibiotic policy for beef. This policy purports to seek a reduction in the overall use of antibiotics important to human health. When McDonalds speaks, it’s more of a yank than a tug.

I know of no others doing more to preserve our environment, conserve range resources and improve water quality than the vast number of ranchers and farmers in North America. Livestock veterinarians are a major source

of expertise regarding the use of antimicrobials and the adoption of antimicrobial stewardship practices. As we continue to advance the goal of helping to feed over nine billion people by 2050, and concurrently protect the environment and maintain a safe and wholesome food supply, bovine veterinarians will continue to be leaders in this monumental task.

As cattle veterinarians and agriculturalists, we are responsible for helping to feed the world, while caring for the animals that produce food and encouraging land stewardship, and the world looks to us with high expectations. Like it or not, we exist in a glass house. Everything we do, from the use of antimicrobials to stockmanship practices, are attached to the rest of the world. When you think about this, we've been given an awesome responsibility to help feed the world and care for God's creatures and creation. Would you want it any other way?

Dr. Glenn Rogers

FUTURE MEETINGS

American Association of Bovine Practitioners

2019	St. Louis	September 12 – 14
2020	Louisville	September 24 – 26
2021	Minneapolis	September 23 – 25
2022	Long Beach	September 22 – 24
2023	Milwaukee	September 21 – 23
2024	Columbus	September 12 – 14

AABP Recent Veterinary Graduate Conference

2019	Columbus	February 7 – 9
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World Association for Buiatrics

2020	Madrid, Spain	September 13 – 18
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DISCLAIMER

The AABP does not take responsibility for information contained in or accuracy of the abstracts published in this newsletter.



ACTIVITIES AND ADVOCACY

The following are activities AABP leadership has been involved in for the benefit of members and the industry:

- AVMA Food Animal Directors Meeting (AABP, AASV, AAAP and AVMA), Schaumburg, Ill. – Executive Vice President



AABP NEWS

Last Chance to Register!

2019 AABP Recent Veterinary Graduate Conference

The second AABP Recent Veterinary Graduate Conference, targeted for those veterinarians who have graduated between 2011 and 2018, will take place Feb. 7-9, 2019, in Columbus, Ohio. Registration is open!

The theme, “Break Through to Excellence”, was developed to offer newer graduates information and skills to improve their practice offerings. New to this conference will be three preconference seminars on Feb. 7 including breeding soundness exams, practice valuation and DairyComp 305. The scientific sessions on Feb. 8-9 will include general, beef and dairy sessions, featuring topics for improving skills in clinical practice and business management.

Find out more and register under the Conference tab (login required) at www.aabp.org, by **Jan. 16, 2019**.

Seeking AABP Junior Delegates

The AABP Student Delegate program recognizes veterinary student leaders throughout North America and the Caribbean. The program provides crucial early exposure to leadership and service opportunities within AABP that will carry over into early practice for these future veterinarians. The AABP Student Delegate program is a three-year program for a veterinary student at each veterinary school starting in the junior year, continuing through their senior year, and finishing with their first year out of veterinary school.

As a junior delegate, the student is assigned to an AABP committee to become familiar with committee functions, the organization and have networking opportunities with other members. Junior and senior delegates receive a \$500 stipend to attend the AABP Annual Conference. The recently graduated delegate in his/her third year of the program receives complimentary registration to the AABP Annual Conference.

Each veterinary school may have one junior delegate, one senior delegate and one recent graduate delegate each year. The intent of the AABP Student Delegate program is that a single student from each school begins the program as a third-year student and continues in this role for the three years of the program. Once the junior delegate has been selected and has attended the AABP Annual Conference as junior delegate, no substitutions will be allowed.

For new junior delegates in 2019, your school's junior delegate will graduate in the class of 2021. Delegates must be AABP student members (not just a member of your student chapter). If your delegate is not a current member, he/she can join at <http://aabp.org/store/paydues.asp>.

Senior delegates (last year's junior delegate) and faculty reps can send their junior delegate's name to gwren@aabp.org.

Selecting AABP Vice President Candidates

One of our most valued opportunities is to choose our future leaders. We have recently elected Dr. Pat Gorden to take office as AABP vice president in September of 2019. AABP now begins the process of electing the vice president who will assume the office in 2020. Members will have until January 31, 2019 to submit nominations for this very important job.

AABP needs the potential candidate's name, contact information (email and cell phone), beef/dairy/mixed, AABP leadership experience, awards and name of person submitting the nomination. **All candidates should be previously contacted and agree to serve if selected for the ballot.**

The vice president takes office for four years serving on the AABP Executive Committee as vice president, president-elect, president then past-president. A more complete description of candidacy guidelines (http://aabp.org/Members/Documents/AABP_Candidacy_Guidelines.pdf) and executive committee duties (http://aabp.org/Members/Documents/Executive_Committee_Duties%20-%20v2017.pdf) can be found on the AABP website under the Member Center tab, Governance section.

Once members have nominated candidates **by January 31, 2019**, the Nomination Committee will review their qualifications and submit two or three candidates to the AABP Board of Directors for approval of the ballot at the spring board meeting. The candidates will be introduced at the AABP Annual Conference in St. Louis and voting will take place electronically soon thereafter.

If you have any questions about submitting potential candidates or the nomination process, please contact me at hvcow@bright.net and Dr. Fred Gingrich at fred@aabp.org.

Dr. Mark Hardesty
AABP Nomination Committee Chairman
AABP District 4 Director

Honor Roll Membership

Are you at least 70 years of age and have been an AABP member for 25 or more years? If so, you may be eligible for honor roll membership in the AABP.

All honor roll nominees must be approved by the Board of Directors. If approved, an honor roll member retains his or her full membership benefits without continued payment of yearly dues. Honor roll members also receive complimentary registration at the annual conference.

If you meet the above criteria and would like to be considered for honor roll membership, please contact the AABP Headquarters at 800-COW-AABP, or email fred@aabp.org.



DEADLINE REMINDERS

CALL FOR AABP ABSTRACTS Research Summaries and Scientific Poster Sessions 52nd AABP Annual Conference September 12-14, 2019, St. Louis, Mo.

The 52nd AABP Annual Conference will feature scientific sessions focused on cutting-edge research that is directly applicable to the health, welfare and productivity of cattle and food and environmental safety associated with cattle production. These sessions allow researchers from around the world to disseminate state-of-the-art information to bovine practitioners to improve the cattle industry.

Research projects having direct application to bovine practitioners are being solicited for presentation at the Oral and Scientific Poster Sessions for the 2019 Annual Conference. Project summaries focused on all areas of bovine health, welfare and production are welcome, including pharmacology, epidemiology, medicine, surgery, economic analysis, pathology, preharvest food and environmental safety, diagnostics, and health monitoring. Projects should have relevance to bovine practitioners and may be broadly applicable to the cattle industry, or more specifically applicable to the beef or dairy industry.

Oral presentations made by graduate students in the AABP Research Summaries will be eligible to compete in the AABP Graduate Student Research Summary Presentation competition. The top three presenters from the graduate student competition will receive cash awards.

To be considered for the AABP Research Summaries (either the oral or poster sessions) and publication in the Annual Conference proceedings, your abstract must be submitted electronically **by April 15, 2019**. Submission site will open January 3. For more information and to submit an abstract, go to www.aabp.org and select the Conference link at the top of the page, then click on the Abstract Submission link located in the submenu.

If you have questions about the Research Summaries program, contact Dr. Edouard Timsit (eftimsit@ucalgary.ca) or Dr. Chris Chase (christopher.chase@sdsu.edu).

CALL FOR AASRP ABSTRACTS Small Ruminant Research Summaries AASRP Meeting at 52nd AABP Annual Conference September 13, 2019, St. Louis, Mo.

The 52nd AABP Annual Conference will feature a scientific session focused on small ruminant research applicable to the health, welfare and productivity of goats, sheep, camelids or farmed deer. Research projects having direct application to small ruminant practitioners are being sought for the Oral Session on Friday, Sept. 13. Each presentation should be limited to 15 minutes. Faculty, graduate students,

practitioners or veterinary students are urged to share information with practitioners.

Project summaries focused on all areas of small ruminant health, welfare and production are welcome including pharmacology, epidemiology, medicine, surgery, economic analysis, pathology, preharvest food and environmental safety, diagnostics, and health monitoring. Projects should have relevance to practitioners and may be broadly applicable or more specifically applicable.

A \$1,000 cash prize will be awarded to the winning oral presentation if there are at least three graduate student oral presentations in the AASRP session.

Abstract submissions for the Small Ruminant Research Summaries session must be submitted electronically to AABP by **April 15, 2019** for consideration. Submission site will open Jan. 3. For more information and to submit an abstract, go to www.aabp.org and select the Conference link, then Research Summaries-AASRP for the Abstract Submission link located in the submenu.

If you have questions about the AASRP research summaries program, contact Dr. Fred Gingrich (fred@aabp.org) or Dr. Patty Schark (pschark@clemson.edu).

Call for Abstracts Student Case Presentation Competition AABP 52nd Annual Conference

The AABP Program Committee seeks abstract submissions for the Student Research/Clinical Case Presentation Competition to be held Thursday, September 12, 2019, at the 52nd AABP Annual Conference in St. Louis, Mo.

The purpose of the competition is to promote student interest in the AABP, encourage development of investigative and communicative skills, and allow veterinary students to actively participate in the annual meeting program. Students at any level in their veterinary program, as well as those who have graduated within six months prior to the competition, are eligible. Graduates should try to ensure that prospective employer(s) will allow meeting attendance.

All submissions for the 2019 Student Case Presentation Competition should be submitted online at www.aabp.org/students/case by **February 28, 2019**.

Abstracts for submission will be limited to 250-300 words. All required information can be submitted via the website; receipt of submissions will be confirmed by email. Ten presentations will be selected. Notification will be made by March 31, so that adequate time is available for travel and class/clinic coverage arrangements. Further instructions will follow for those selected.

Presentations will fall into the categories of either Research Reports or Clinical Case Reports, however, research projects should not be part of a graduate program. Students enrolled in masters or doctoral graduate programs should submit their abstracts to the Research Summaries portion of the program. Clinical cases submitted should be practical and representative of those most likely to be encountered with some frequency by recent graduates.

Clinical cases observed on externships at private veterinary practices as well as in academic settings are encouraged. The research entries should be applied in nature and directly undertaken by the presenter. Submissions which adhere to these guidelines will receive higher rankings during the selection process. In 2019, AABP will provide \$500 in travel stipends to the selected presenters.

Contestants will be judged on the quality of their case investigation or research and their presentation. Three or four awards will be made, according to the number of entries in each of the two categories, Research and Clinical Case. For a category involving four or fewer entries, one award of \$1,500 will be provided. For a category involving five or more entries, a first place award of \$1,500 and a second place award of \$750 will be presented.

No more than one student may be involved with the submission or presentation of a case or research project, therefore abstracts submitted with multiple names of presenters will not be considered. Please contact your AABP faculty representative for more information and for assistance in preparing your abstract. You may also contact Dr. Keelan Lewis keelanrosea@gmail.com or Dr. Fred Gingrich at fred@aabp.org, or 800-269-2227 for questions. We look forward to receiving your submissions and appreciate your participation in the program.



AABP COMMITTEE REPORTS

Understanding Depreciation and Amortization

In the AABP Next Generation Veterinary Practice Analysis Workshops, we have participants transfer information from their practice's financial data for the last three years into an Excel spreadsheet so that we can calculate various metrics and apply managerial accounting principles to the data. The goal is to determine the actual values of a practice's various cash flow streams.

One of the calculations built into the spreadsheet is that it adds depreciation and amortization expenses (as defined by the IRS) to pre-tax operating income to arrive at a cash flow (proxy) for that segment of the business. Questions almost always arise about this calculation.

Depreciation and amortization are challenges to recent graduates as they do not represent real cash flow. Depreciation and amortization are non-cash transactions, permitted by the IRS, that allow a company to write off an asset's value over time.

Items amortized for tax and accounting purposes are intangible in most cases and may include items such as geological and geophysical expenses incurred in oil and natural gas exploration and certain intangibles such as patents, copyrights and trademarks. In some cases goodwill is an amortized expense. Amortization is used far less commonly in veterinary medicine than in many other businesses.

Depreciation is used much more frequently than amortization in veterinary practice accounting. Depreciation

shows up on veterinary tax returns because veterinary practices are more likely to purchase tangible items as trucks, and digital radiograph machines than patents. In the case of depreciation, the assets are tangible and their purchase represents a substantial amount of cash. Not all purchases of tangibles require depreciation. Items such as cleaning supplies are used in a short time, often less than a year, and do not represent significant expenditures. These are simply expensed in the year they are purchased. However a digital radiograph machine is a much larger expense, will last for a number of years, and may require borrowing to purchase.

The actual depreciation schedule varies depending on issues such as the purchase price, the expected lifespan of the purchase, and should be arrived at by your tax accountant.

Depreciation and amortization are justified in different ways. If you and your accountant utilize these expense categories, there will tend to be a leveling of business income and subsequent tax obligations. For example, if you purchased two trucks in the same year for \$70,000 and expensed them, the income for that year would be very small resulting in a very low tax payment. However in the next two-to-five years the tax obligation would be elevated even though you were getting as much of the useful life out of the trucks in those years as you were in year one when you received the full tax benefit of the truck purchases. The solution to leveling the tax obligation is to depreciate over six years.

Another way of looking at this is if you have to borrow funds to purchase the trucks, you and your accountant may want to tie the depreciation expense to the principal payments of the loan. This allows for a logical relationship between the two issues.

Others look at depreciation as a means of saving and planning for future purchases. The logic is that if you show a depreciation expense (a non-cash transaction) on a truck, for example, for \$7,000 over five years, if you save the \$7000 each of the years, at the end of five years you will have \$35,000 to replace the old truck and start a new depreciation (non-cash transaction stream). In reality, this seldom occurs.

Regardless of the way you rationalize depreciation, it is easy to see the impact it may have on your actual cash flow, your taxable income, your tax obligation and why in the application of managerial accounting principles, the depreciation value is added back into pre-tax operating income to arrive at a cash flow (proxy).

Understanding the effects of depreciation and amortization is important to tax planning and may be even more important to us as we apply managerial accounting principles as a part of our strategic planning process for 2019.

Have a prosperous 2019!

Submitted by the AABP
Veterinary Practice Sustainability Committee



GENERAL INFORMATION

AABP and Vetstream Partnership

The AABP Board of Directors is pleased to offer another benefit to AABP members. Vetstream is an online educational resource that has recently released Vetlexicon bovis, a clinical information resource about the veterinary care of cattle for bovine practitioners. Vetstream provides peer-reviewed digital knowledge, websites, continuing professional development, client handouts, e-books, videos and periodic newsletters on subjects and topics of interest to bovine practitioners.

AABP members can enjoy a free 30-day trial to Vetlexicon bovis. After the 30-day trial, AABP members receive a 20% discount to any Vetlexicon subscription (bovis, canis, felis, equis). Vetstream also offers practice management resources. An additional benefit to AABP is that 10% of all subscription revenue generated from AABP members will be donated to the AABP Foundation by Vetstream.

Find out more about Vetstream and Vetlexicon bovis at <https://www.vetstream.com/home>. To view other AABP member benefits, visit the Member Center tab on the AABP website at www.aabp.org.

AABP Member Benefits with ADSA[®]

Through the American Dairy Science Association's (ADSA[®]) Global Partnership program, all AABP members have the opportunity to become ADSA e-members at half the cost (\$55) of ADSA professional membership. As an ADSA e-member you will receive:

- Electronic access to all full text articles of the *Journal of Dairy Science*[®] (JDS), back to 1917. The JDS is the leading general dairy research journal in the world and also one of the top "Food Science and Technology" journals. The JDS readership represents education, industry, and government agencies in more than 70 countries with interests in biochemistry, breeding, economics, engineering, environment, food science, genetics, microbiology, nutrition, pathology, physiology, processing, public health, quality assurance and sanitation.
- Access to a treasure trove of Joint Annual Meeting symposia (synchronized recordings from 2003-2015) as well as most symposia from the 2017 Annual Meeting.
- Access to searchable ADSA annual meeting abstracts from 2017, 2018 and 1935-1997, with more added each year, plus Joint Annual Meeting abstracts for 1998-2016, as well as ADSA divisional meeting abstracts.
- The opportunity to purchase the *Large Dairy Herd Management* (3rd ed., e-book) at the ADSA member rate (a \$70 savings). Visit <http://ldhm.adsa.org/> for more information.

- The opportunity to purchase 2018 ADSA Annual Meeting recorded symposia at ADSA member rates (a savings of up to \$120). Purchase recorded symposia at <https://www.adsa.org/2018/recordings/>. If you haven't subscribed yet, click on the "Buy Now" button and purchase the sessions of interest to you.

All AABP members are eligible to subscribe to S-PAC at the ADSA member rate (a \$75 savings). Subscribers have access to a searchable database of well over 630 proceedings that come from more than 60 of the top animal-related conferences from around the world. New proceedings and conferences are added frequently. Veterinarians may find S-PAC especially valuable for the wealth of nutrition information included now, with more added on a regular basis. Details are available at <http://spac.adsa.org/>.

To become an ADSA e-member, visit https://secure.fass.org/join_ADSA_emembership.asp. If you do not already have an account, create one and return to the above URL. Log in and follow membership instructions. Use ADSA e-member promotion code AABP128. To subscribe to S-PAC, the promotion code is: AABPmember. ADSA asks that you refrain from sharing these codes outside of the AABP membership. If you have additional questions about ADSA, S-PAC or e-membership, please contact Ken Olson, PhD, at keolson@prodigy.net.



REGULATORY NEWS AND NOTES

FDA Announces Request for Revisions to Labels of Dewormers for Livestock and Horses

The Food and Drug Administration's (FDA) Center for Veterinary Medicine has requested that animal drug companies voluntarily revise the labels of drugs intended to treat certain internal parasites in livestock and horses to add information about antiparasitic resistance. This is a result of work with veterinary parasitology experts and the animal health community to find ways to maintain the effectiveness of these drugs.

FDA also posted a letter to veterinarians and updated its existing antiparasitic resistance webpage at <https://www.fda.gov/AnimalVeterinary/SafetyHealth/ucm350360.htm>.

Antiparasitic resistance is particularly concerning in grazing animals, including cattle. The new labeling information for dewormers focuses on how to properly incorporate these products into an overall parasite control program and how to slow down the development of antiparasitic resistance. Slowing the development of resistance extends the effectiveness of dewormers and better protects animal health in the long term.



BEEF

J Wildlife Dis
Vol. 54, No. 3, pp. 460-470

July 2018

Cattle (*Bos taurus*) Resist Chronic Wasting Disease Following Oral Inoculation Challenge or Ten Years' Natural Exposure in Contaminated Environments

E. Williams*, D. O'Toole, M. Miller, T. Kreeger, J. Jewell

We conducted a 10-yr study to establish whether chronic wasting disease (CWD) was readily transmissible to domestic cattle (*Bos taurus*) following oral inoculation or by cohousing cattle with captive cervids in outdoor research facilities where CWD was enzootic. Calves (n=12) were challenged orally on one occasion using brain homogenate derived from CWD-infected mule deer (*Odocoileus hemionus*). Five uninoculated cattle served as unchallenged controls. Two other groups of cattle (n=10-11/group) were housed outdoors for 10 yr in captive cervid research facilities. The environmentally challenged cattle were exposed to CWD-associated prions through common paddocks, feed, and water and via direct daily contact with known and potentially infected mule deer or wapiti (*Cervus canadensis*) throughout the decade-long study period. None of the exposed cattle developed neurologic disease during the study. We euthanized cattle surviving to 10 yr postchallenge and examined all for lesions or disease-associated prion protein (PrP^d) by histopathology, immunohistochemistry, and western immunoblot analysis of central nervous system and lymphoid tissue. None had evidence of PrP^d accumulation. We conclude that the risks of CWD transmission to cattle following oral inoculation or after prolonged exposure to contaminated environments are low.

* Wyoming State Veterinary Laboratory, Department of Veterinary Sciences, University of Wyoming, 1174 Snowy Range Road, Laramie, Wyoming 82070

J Food Protection
Vol. 81, No. 12, pp. 2007-2018

December 2018

Similar Levels of Antimicrobial Resistance in U.S. Food Service Ground Beef Products With and Without a "Raised Without Antibiotics" Claim

A. Vikram, E. Miller, T. Arthur, J. Bosilevac,
T. Wheeler, J. Schmidt*

U.S. ground beef with "raised without antibiotics" (RWA) label claims are perceived as harboring fewer bacteria with antimicrobial resistance (AMR) than are found in conventional (CONV) ground beef with no such label claim. A total of 370 ground beef samples from CONV (n = 191) and RWA (n = 179) production systems were collected over 13 months from three food service suppliers. The following bacteria were cultured: *Escherichia coli*,

tetracycline-resistant (TETr) *E. coli*, third-generation cephalosporin-resistant (3GCr) *E. coli*, *Salmonella enterica*, TETr *S. enterica*, 3GCr *S. enterica*, nalidixic acid-resistant *S. enterica*, *Enterococcus spp.*, erythromycin-resistant *Enterococcus spp.*, TETr *Enterococcus spp.*, *Staphylococcus aureus*, and methicillin-resistant *S. aureus*. TETr *E. coli* was more frequently detected in CONV ground beef (CONV, 54.2%; RWA, 35.2%; $P < 0.01$), but supplier ($P < 0.01$) and production system \times supplier interaction ($P < 0.01$) effects were also significant. Metagenomic DNA was isolated from each sample, and equal amounts of metagenomic DNA were pooled by supplier, month, and production system for 75 pooled samples (38 CONV, 37 RWA). The abundance of *aac(6')-Ie-aph(2'')-Ia*, *aadA1*, *bla_{CMY-2}*, *bla_{CTX-M}*, *bla_{KPC-2}*, *erm(B)*, *mecA*, *tet(A)*, *tet(B)*, and *tet(M)* genes was assessed by quantitative PCR. The *tet(A)* (2.9- \log_2 -fold change, $P = 0.04$) and *tet(B)* (5.6- \log_2 -fold change) ($P = 0.03$) genes were significantly more abundant in RWA ground beef. Phylogenetic analyses revealed that ground beef microbiomes differed more by supplier than by production system. These results were consistent with prior research suggesting antimicrobial use in U.S. beef cattle has minimal impact on the AMR of bacteria found in these products. These results should spur a reevaluation of assumptions regarding the impact of antimicrobial use during U.S. beef production on the AMR of bacteria in ground beef.

* U.S. Department of Agriculture, Agricultural Research Service, Roman L. Hruska U.S. Meat Animal Research Center, Clay Center, Nebraska 68933

Am J Vet Med
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December 2018

Evaluation of Animal-to-animal and Community Contact Structures Determined by a Real-time Location System for Correlation with and Prediction of New Bovine Respiratory Disease Diagnoses in Beef Cattle during the First 28 Days after Feedlot Entry

D. Shane*, J. McLellan, B. White, R. Larson, D. Amrine, M. Sanderson, M. Apley

The objective of this study was to determine whether animal-to-animal and community contact patterns were correlated with and predictive for bovine respiratory disease (BRD) in beef steers during the first 28 days after feedlot entry. Seventy weaned beef steers (mean weight, 248.9 kg) were instrumented with a real-time location system transmitter tag and commingled in a single pen. The location of each calf was continuously monitored. Contact between calves was defined as ≤ 0.5 m between pen coordinates, and the duration that 2 calves were within 0.5 m of each other was calculated daily. Bovine respiratory disease was defined as respiratory tract signs and a rectal temperature $> 40^\circ\text{C}$. Locational data were input into a community detection program to determine daily calf contact and community profiles. The number of BRD cases within each community was determined. A random forest

algorithm was then applied to the data to determine whether contact measures were predictive of BRD. The probability of BRD was positively correlated with the number of seconds a calf spent in contact with calves presumably shedding BRD pathogens and number of calves with BRD within the community on the day being evaluated and the previous 2 days. Diagnostic performance of the random forest algorithm varied, with the positive and negative predictive values generally $< 10\%$ and $> 90\%$, respectively. The results indicated that direct transmission of BRD pathogens likely occurs among feedlot cattle. The relative contribution of animal-to-animal contact to BRD risk remains unknown and warrants further investigation.

*Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66502



DAIRY

New Zealand Vet J
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November 2018

Predicting Intramammary Infection Status at Drying Off Using Indirect Testing of Milk Samples

K Gohary*, S. Mcdougall

The objective of this study was to evaluate the Rapid Mastitis test (RMT, or California Mastitis test) and electrical conductivity (EC) at drying off when used alone or in combination with herd test data (maximum or last herd test somatic cell counts (SCC) before drying off), to define cows or quarters with intramammary infection, using microbiological culture as the gold standard. Quarter-level milk samples ($n=609$) from clinically healthy cows ($n=153$), in three herds in the Waikato region of New Zealand, were tested at drying off using the RMT and EC, and were collected for microbiological culture. The maximum SCC and the SCC at the last herd test of the preceding lactation were determined for each cow. The sensitivity, specificity, and positive and negative predictive values for each test were calculated for different cut-points, using microbiological culture as the gold standard. Receiver operating characteristic curves were generated and the area under the curve (AUC) was calculated for each test. The same parameters were calculated for combinations of two tests in parallel or in series. Infection with any pathogen was detected in 62/153 (40.5%) cows and 99/609 (16.3%) quarters, and with major pathogens in 7/153 (4.6%) cows and 8/609 (1.3%) quarters. When predicting infection with any pathogen at the cow-level, the coefficient of agreement was highest for SCC (< 0.32) and RMT (< 0.28) and lowest for EC (< 0.12); the AUC for RMT and EC when used singly ranged from 0.57–0.69, and in combination with SCC ranged from 0.68–0.75. AUC were similar for tests that used either the last or the maximum SCC. When evaluated singly, RMT and EC had only low to moderate diagnostic utility compared to bacteriological culture. When they were combined with SCC and interpreted in parallel,

the results were improved, but only moderately. For herds that conduct herd testing, a single herd test late in lactation was as predictive of intramammary infection at drying off as multiple herd tests through the lactation. For herds that do not conduct herd testing, RMT has greater utility than EC.

* Cognosco, Anexa FVC, PO Box 21, Morrinsville 3340, New Zealand

J Vet Pharm and Ther
Vol. 41, No. 6, pp. 848-860

December 2018

**Comparative Plasma and Interstitial
Fluid Pharmacokinetics and Tissue Residues of
Ceftiofur Crystalline-free Acid in Cattle with
Induced Coliform Mastitis**

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Ceftiofur (CEF) is a third-generation cephalosporin that is the most widely used antimicrobial in the dairy industry. Currently, violative meat residues in cull dairy cattle are commonly associated with CEF. One potential cause for violative residues is altered pharmacokinetics of the drug due to disease, which could increase the time needed for the residue to deplete. The objectives of this study were (a) to determine the absolute bioavailability of CEF crystalline-free acid (CFA) in healthy versus diseased cows; (b) to compare the plasma and interstitial fluid pharmacokinetics and plasma protein binding of CEF between healthy dairy

cows and those with disease; and (c) to determine the CEF residue profile in tissues of diseased cows. For this trial, disease was induced through intramammary *Escherichia coli* infusion. Following disease induction and CEF CFA administration, for plasma concentrations, there was not a significant effect of treatment ($p = 0.068$), but the treatment-by-time interaction ($p = 0.005$) was significant. There was a significantly greater concentration of CEF in the plasma of the DIS cows at T2 hr ($p = 0.002$), T8 hr ($p < 0.001$), T12 hr ($p = 0.001$), and T16 hr ($p = 0.002$). For PK parameters in plasma, the slope of the terminal phase of the concentration versus time curve was significantly lower ($p = 0.007$), terminal half-life was significantly longer ($p = 0.014$), and apparent volume of distribution during the elimination phase was significantly higher ($p = 0.028$) in the diseased group. There was no difference in plasma protein binding of CEF and interstitial fluid pharmacokinetics. None of the cows had kidney CEF residues above the US tolerance level following observation of the drug's withdrawal period, but one cow with a larger apparent volume of distribution and longer terminal half-life had tissue residues slightly below the tolerance. Whereas these findings do not support the hypothesis that severely ill cows need longer withdrawal times, alterations in the terminal half-life suggest that it is theoretically possible.

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