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THE PRESIDENT'S MESSAGE

Moving Forward

This week I was able, for the first time, to attend the AABP 2023 Recent Grad Conference in Knoxville, Tenn. On the flight back to Minnesota, I am now reflecting on the meeting and what I learned. The first item of note was that this event, now in its 6th year, achieved a new record with 190 paid attendees, two-thirds of whom graduated in the past three years. This excellent turnout was due to the superb effort of the planning committee to create a balanced program addressing relevant topics of interest to dairy, beef and small ruminant practitioners.

Preconference seminars addressed the topics of practice management, reproductive and thoracic ultrasound, and lameness treatment. Many presentations in the main program focused on enhancing clinical or technical skills, something that newer graduates are keen to develop. But the program also offered many tools needed by participants in order to take the next steps, or move to the next level in their careers. This included personal development, developing and cementing relationships with clients, building and surrounding themselves with functional teams, considerations in starting, buying or managing a practice, or opening the door to develop new service or consulting models as practice builders. In this vein, keynote speaker Dr. Eric Rooker discussed the importance of finding your strengths, and then building teams with other individuals whose possibly different strengths will complement your own.

The importance of getting to know your clients' values, goals and motivations was also a repeated theme, along with the idea of tempering optimism with realism and patience, and understanding that everyone periodically has failures.

The wrap-up speaker, Dr. Tera Rooney Barnhardt, used the analogy of watching the early morning sunrise (something I'm sure we all experience and enjoy) to present the idea of standing in that brief temporal place

where one can simultaneously reflect on having accomplished yesterday's job, while at the same time be looking ahead – sometimes with a bit of trepidation or



even a mild case of imposter syndrome – before sucking up our courage and plunging forward to meet the challenges and opportunities of the new day ahead. All of this is possible when people have the knowledge, tools and support needed, which is, of course, what AABP strives to deliver to its members.

As I watched the interactions between participants and speakers, and as I talked with many of the participants myself, it was clear that the conference atmosphere was entirely one of positive energy, enthusiasm, optimism, and a “can do” attitude. These recent graduates were not just collecting new knowledge and skills that will allow them to succeed today, but were also building on the foundations that will carry them forward, and in particular, building and strengthening the network of friends and colleagues who will support them throughout their careers, and indeed, their lives.

As I reflect upon this, I am filled with optimism for our profession. These recent graduates are the future of our profession and our next leaders. And with what I saw, I am very confident that AABP has a healthy and very bright future ahead. I almost wish that I was back in that place myself (being a recent grad), imagining how the early years of my own career path might have been influenced by the Recent Grad conference...well...almost. 😊 But upon further reflection, I realize that the messages communicated to the participants in this week's conference apply to all of us, regardless of how short- or long-in-the-tooth we may be. The industries we serve are changing rapidly, as are the technologies, tools and science available to our profession.

All of this is to say that there will continue to be an ever-expanding number of exciting opportunities available to bovine veterinarians.

Just as these recent graduates were doing this week, we can all choose to challenge ourselves to learn new things, develop new skills, offer new services, adopt new practice models, and maybe even completely rewrite how we make our livelihoods. And we can remake ourselves in this fashion as many times as we wish throughout our careers and lives. We need only decide to do so. How lucky we are to be a member of this profession!

In July 2013, I had the good fortune to spend two weeks in rural Liberia with the U.S. Veterinarians Without Borders organization, working with ag extension educators and smallholder farmers. There I met a very wise bush farmer and extension educator, Alexander Yallah, who shared with me some very memorable words: "We gather things so that when we come to the river, we can cross it."

I believe his words sum up perfectly what AABP is to our members: It is a purveyor of those "things" that we bovine veterinarians collect – knowledge, skills, and professional and personal networks – which allow us to continue to grow and succeed as we move forward to meet the new challenges and opportunities ahead.

Thanks for everything you do, and have a wonderful spring ahead.

Dr. Sandra Godden

SAVE THE DATE!

American Association of Bovine Practitioners Annual Conference

2023	Milwaukee, Wisconsin	September 21-23
2024	Columbus, Ohio	September 12-14
2025	Omaha, Nebraska	September 11-13

AABP Recent Graduate Conference

2024	Knoxville, Tennessee	February 9-10
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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:

- NCBA Annual Convention, New Orleans – President and Executive Director

- 2023 AABP Recent Graduate Conference, Knoxville, Tenn. – Executive Director, Executive Committee
- NMPF FARM Animal Care Task Force meeting, Lancaster, Pa. AABP members Dr. Pat Gorden, Richard Doak, Karen Jordan (chair), Brandon Treichler, Executive Director

AABP NEWS

AABP Recent Veterinary Graduate Conference Turned "Competence to Confidence"

AABP members who are recent veterinary graduates were inspired to confidence at the 2023 6th Annual AABP Recent



Graduate Conference held Feb. 10-11 in Knoxville, Tenn. In-person attendance was limited to AABP members who

graduated veterinary school eight or fewer years ago. A record high 190 paid attendees were joined by 38 speakers/VIPs, 30 accompanying persons and 24 booths in the trade show. Two-thirds of attendees had graduated within the last three years.

With a theme of "Competence to Confidence" and offering 15.5 RACE-approved CE credits, general, beef and dairy, clinical skills, practice management and small ruminant sessions were offered, in addition to four preconference seminars. Hands-on reproductive ultrasound and thoracic ultrasound preconference seminars were held at the University of Tennessee dairy. The University of Tennessee College of Veterinary Medicine was the site of the lameness treatment protocols seminar. Also offered was a practice management seminar on starting a practice or buying in/buying out.

The program committee, consisting of Dr. Tommy Ware (program chair and AABP Emerging Leader), Dr. Kendra Wells (dairy), Dr. Alex Pop (beef) and Dr. Mike Rohde (beef), matched the demographic of attendees. "With the amazing feedback from the 2022 conference, it was great to have the opportunity to provide some different CE," noted Ware. "The small ruminant talks this year seemed to be a hit! On top of that, the amazing line up for our practice management sessions and preconference seminars allowed conference attendees to explore and learn about the ins and outs of practice ownership."

"We are very happy with the record attendance at the 6th AABP Recent Graduate Conference," said AABP Executive Director Dr. K. Fred Gingrich, II. "The focus on clinically relevant CE for these members is important to not only improve their confidence in bovine practice, but

also to connect them to AABP and the resources our organization has to offer all cattle veterinarians.”

Kicking off the conference program was a keynote by Dr. Eric Rooker, clinic owner and founder of Operators to Owners, and a presentation by Dr. Mark Hilton on developing winning business models. “Recent graduates at this conference have all of the competence in the world or they wouldn’t have become veterinarians in the first place,” said Ware. “However, taking one’s competence and turning it into confidence is a battle that each individual has to fight themselves. I believe the 2023 conference was the perfect opportunity for attendees to gain the tools and skills needed to become confident. A lot of amazing speakers added to the fire of knowledge and provided the encouragement needed to fight that fight.”

“The Recent Graduate Conference was launched in 2018 as a result of the different needs of AABP members who are recent graduates, many of whom are unable to attend the AABP Annual Conference in the fall. As I watched the interactions within and between participants and speakers, and as I talked with many of the participants myself, it was clear that the conference atmosphere was entirely one of positive energy, enthusiasm, optimism, and a ‘can do’ attitude,” added AABP President Dr. Sandra Godden. “These attendees were not just collecting new knowledge and skills that will allow them to succeed today, but were also building on the foundation that will carry them forward in their careers, and in particular building and strengthening the network of friends and colleagues who will support them throughout their careers, and indeed, their lives.”

At the 2023 conference, topics included c-sections, umbilical disease, tips and tricks for the vertically challenged, “parenting in the vet truck”, practice management topics, bovine physical exams, lameness treatment, euthanasia, cultural awareness for working with LatinX caretakers, mastitis, colostrum management, necropsy, palpation, chute safety, implants, data collection, urolithiasis, anesthesia, genomics, small ruminant parasitology and much more.

Ware added that the Knoxville location afforded the conference great opportunities for the hands-on seminars as well as top-notch speakers from the University of Tennessee College of Veterinary Medicine. “This conference offers an amazing opportunity for networking, not only with other recent graduates, but with some of your hero(s) of the bovine veterinarian world,” he said. “This conference removes the invisible barrier that recent grads see between themselves and their heroes who may be speaking. This, to me, creates the perfect environment for a young veterinarian to become more confident and inspired, which elevates the profession.”

For the third year, the Recent Graduate Conference offered a trade show featuring 24 animal-health-related companies and organizations.

Registrants and AABP members can access the RACE-approved recorded presentations as a free member benefit through the Beef Cattle Institute website accessible at <https://aabp.org>.

Find posts and photos on Facebook by searching for #2023RG.

Call for AABP Reviewers

Are you interested in serving as a peer reviewer for *The Bovine Practitioner* and research grants for the AABP Foundation? One challenge in managing a peer-reviewed journal is finding reviewers to assist in ensuring the scientific integrity of articles that are published. Research grants that are submitted to the AABP Foundation are also sent out for review to ensure that the research supported by the Foundation has scientific merit and is clinically applicable to practicing beef and dairy veterinarians.

Please consider signing up to be a reviewer by going to the online publication site for *The Bovine Practitioner* by going to the Publications tab of the website or at <https://bovine-ojs-tamu.tdl.org/bovine/login>, and click on the register link in the top right corner. When you register, you can sign up to be a reviewer but must list your areas of interest and expertise. You do not need academic credentials beyond a veterinary degree to serve as a reviewer! Please sign up so that our associate editors and Foundation Board has a list to select from to assist our organization with publication of journal articles and research projects.

Recorded Sessions from 2022 AABP Annual Conference Now Available

AABP membership includes free access to all recorded sessions from the annual conferences, recent graduate conferences and webinars. To access, click on the purple cow head logo at the bottom of any AABP webpage or at https://aabp.org/members/cont_ed.asp. Members can also listen to presentations on their mobile device by downloading the free “BCI Mobile Conference” app from your device’s app store. RACE-approved CE certificates are available (RACE number pending for the 2022 conference) after viewing on a web browser and passing a quiz. Note that certified CE is not available through the app. Search for conferences or session tracks using the search feature or set conference location to “webinar” to find recorded webinars. View upcoming webinars at the Members tab on the website and add them to your calendar.

AABP would like to thank the partnership with the Kansas State University Beef Cattle Institute, Dr. Brad White, and the Kansas State University students for assisting with the recordings and hosting the CE portal for AABP members.

Student Case Presentation Competition AABP 56th Annual Conference

The AABP Program Committee seeks abstract submissions for the 2023 Student Research/Clinical Case Presentation Competition to be held Thursday, September 21, 2023 at the 56th AABP Annual Conference in Milwaukee, Wis.

Submit cases online by **April 14, 2023, 5:00 pm EST** at <https://aabp.org/students/case/default.asp>.

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.

Contact your AABP faculty representative for more information and for assistance in preparing your abstract. Contact Dr. Tracy Potter (tlpotter62@gmail.com) or Dr. Fred Gingrich (fred@aabp.org) for questions.

Call For AABP and AASRP Research Summaries Abstracts 56th AABP Annual Conference

The 56th 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 small ruminants.

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.

Abstracts must be submitted electronically by **April 14, 2023 by 5:00 pm EST**. The abstract submission portal opens Jan. 2, 2023, and will be available at aabp.org. Select the Conference link at the top of the page, then click on the Abstract Submission link located in the submenu.

For questions on AABP abstracts, contact Dr. Whitney Knauer (knaue20@umn.edu), Dr. Jared Bourek (jbourek@gmail.com) or Dr. Fred Gingrich (fred@aabp.org). For questions on AASRP abstracts, contact Dr. Clare Scully (cscully@lsu.edu).

AABP Beef Cow Nutrition Seminar

Are you a cow-calf veterinarian interested in offering nutrition consulting services to your clients? Do you have challenges attending CE meetings during calving or preg check season? Do you want to come to AABP seminars not associated with the annual or recent graduate conference? If you answered YES, then AABP is offering a seminar for you!

Feed cost makes up over 50% of the total cost of keeping a beef cow and many producers could use assistance in allocating those resources wisely. Unlike their dairy counterparts, beef cow-calf producers spend a small

amount of their feed dollars off farm as much of their feed is raised. Because of this, many beef producers do not utilize the services of a nutritionist. This is where you fit in.

We will discuss the basics of beef cow-calf nutrition and outline how you can get paid for your advice. We will spend about half of a day in lecture/discussion mode and a full day will be spent working with the BRaNDs beef cow nutrition program from Iowa State. You will need a computer with Microsoft Excel to run the BRaNDs program. We expect that the day you return to practice you will be ready to consult with your first client to help them save money on their winter ration AND provide improved nutrition for their herd.

The seminar faculty are Dr. Mark Hilton and Dr. Sara Linneen. These instructors have experience in providing nutrition consulting to cow-calf producers and are eager to teach you how to immediately incorporate this service into your practice. The seminar will be June 22-23, 2023 at the AABP office in Ashland, Ohio. Registration is limited to 20 AABP members and is now open. This course is approved for 15 hours of CE for veterinarian and credentialed veterinary technicians in jurisdictions that recognize RACE approval.

To register and find out more information, visit https://aabp.org/seminars/display_seminar.asp?seminar=2023-BEEF.

AABP COMMITTEE REPORTS

Sign Up to Vent Some Stress

Bovine practice is stressful! At least some of the time for all of us, and for some of us, most of the time. An important question is "How do you deal with the stress?" Exercise, prayer and meditation are some ways. Talking and venting with colleagues is another.

A virtual support group limited to bovine practitioners will start on March 1st, at 8:00 pm Eastern. It will continue every other Wednesday night until at least late May. Previous sessions have been well-received. Don't let the term "support group" scare you off. You will experience general discussion around issues that tend to stress us. Collecting bills, dealing with conflict, feeling over-worked and under-appreciated are common themes. Some good suggestions usually emerge before the session ends.

If you would like to join us, contact me at dairymancon@ptd.net, or call Dr. Charlie Gardner at 717-816-4246.



*Submitted by the AABP
Mental Health Task Force*

GENERAL INFORMATION

Upcoming AABP Webinar

Vaccination to Prevent Respiratory Disease in Calves

Dr. Amelia Woolums

Wednesday, March 15, 2:00-3:00pm Central

In the first six months of the life of a calf, respiratory disease is either the #1 or #2 most common cause of sickness, depending on the calf's exact age. Historically, it was thought that vaccination couldn't be useful to prevent disease in calves in this age group, because maternal antibodies would suppress vaccine responses. However, research supports the concept that calves with maternal antibody can be vaccinated effectively in the first six months of life, although various factors impact the degree and duration of this protection. In this webinar, we'll discuss the evidence for efficacy of vaccination to prevent respiratory disease in young calves, the factors that impact how well respiratory vaccination works in this age group, and the things we still don't understand very well when it comes to the practice of vaccinating calves to prevent respiratory disease.

AABP members can find all upcoming webinars at <https://aabp.org>, select the Members tab, then click on Webinars to find login information or add to your calendar. To view previous webinars, click on the purple cow head logo at the bottom of any AABP webpage, and under the Conference Location dropdown menu, scroll down and select Webinar, then click Search.

CalfCare offers "Calfternship"

CalfCare, North Manchester, Ind., is offering a paid "calfternship" for the fall of 2023 and the spring of 2024. The Calfternship was created as opportunity for the best and the brightest third- and fourth-year veterinary students with a strong interest in bovine medicine and research to experience a paid externship focused on calves. Calfterns will receive a \$500 travel stipend along with a \$500 stipend for each week they spend on the Calfternship. CalfCare will also arrange housing during the Calfternship.

Students will spend their two-to-three-week externship working with veterinarians and staff as they go about working with clients and their calves. Externs will also take part in consultations, research trial design and/or



assistance, research animal caretaking, research animal processing, emergency calls, vaccination protocol creation, diagnostics, and necropsy. The extern will also be expected to develop a presentation on a special case or topic from their time on the Calfternship that they will then present to the group at their last Thursday during the morning veterinarian meeting.

For details and application information, visit <https://calfcarevet.com/calfternship/>. Questions? Email Jeff Getts (jeff@calfcarevet.com) or call 260-982-7596. Visit CalfCare's website at www.calfcarevet.com.

BEEF

Trans Anim Sci

October 2022

<https://doi.org/10.1093/tas/txac148>

Assessment Of Effectiveness of Deworming Options in Recently Weaned Beef Cattle Utilizing Different Anthelmintic Programs in the Southeast

S.R. Hernandez, D.B. Davis, B.C. Credille,
J.J. Tucker, R.L. Stewart

This study evaluated the effects of three different anthelmintic strategies on animal performance and anthelmintic effectiveness in weaned calves during a 42-d preconditioning period. The study was conducted at four locations over 2 yr and included a total of 797 recently weaned spring-born calves (initial BW 260 ± 37.7 kg). At the start of each year, at each location, calves were weaned and randomly assigned to one of four treatments: 1) oxfendazole (ORAL); 2) transdermal eprinomectin (POUR); 3) both anthelmintic treatments (BOTH); and 4) the control (CONT) group who did not receive treatment. Anthelmintic was applied per the manufacturer recommendation, the transdermal eprinomectin was administered at 1 mL per 10 kg and oxfendazole was administered orally at 1 mL per 50 kg. Weights were measured at the start of the study (day 0) and again at the end of the preconditioning phase (day 42). Fecal samples were collected at the start of the study prior to treatment application (day 0) and again on day 14. Ruminal fluid was collected at the start of the study prior to treatment (day 0) and again on day 6. There were treatment effects for all performance metrics ($P < 0.001$). All treatments had greater weight gain and value of weight gained ($P < 0.024$), and all three strategies did not differ from each other ($P > 0.420$). On day 0, there were no ($P = 0.795$) treatment effects detected for fecal eggs per gram (EPG) counts. On day 14, there were ($P < 0.001$) treatment effects for EPG counts with feces from CONT calves containing greater ($P < 0.014$) EPG than feces from treated calves. EPG in feces from BOTH calves did not differ ($P > 0.123$) from the other two treated groups and feces from POUR calves tended (P

= 0.052) to contain greater EPG counts than feces from ORAL calves. Volatile fatty acids were similar across treatments on days 0 and 6 ($P > 0.115$). Butyrate tended ($P = 0.063$) to be lower in ORAL on day 6. These results suggest that using eprinomectin and oxfendazole in combination was an effective strategy for reducing EPG and improving performance during a 42-d preconditioning phase.

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Submitted by the AABP Beef Health Management Committee

Appl Anim Behaviour Sci January 2023
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Feeding Behaviour and Activity of Beef Calves During the First Week at the Feedlot: Impact of Calf Source and Commingling Ratios

A. Hodder*, E. Pajor, F. Van Der Meer, J. Loudon, S. Thompson, K. Orsel

Preconditioned (PC) calves have reduced morbidity, mortality and improved performance compared to auction-derived (AD) and non-preconditioned calves; however, there is limited research on the impacts of commingling PC and AD calves at the feedlot. Commingling calves from various sources is known to be highly stressful and can impact performance on arrival at the feedlot. Therefore, the first objective was to assess feeding behaviour (time spent eating and ruminating) and activity of PC beef calves during the first 7 days after arrival at the feedlot compared to ranch-sourced (RS) and AD calves. The second objective was to assess the impacts of commingling PC calves with various proportions of AD calves (25, 50, 75 %) on feeding behaviour and activity in that same time frame. A subset of 45 calves per pen for PC, AD, and commingled pens, and 20 RS calves were equipped with CowManager® tags on arrival. This technology detects ear movement through a sensor in the tag linked to eating, ruminating, active and not active. On average, in the first 7 days at the feedlot, PC calves spent 11 % more time eating than RS and 15 % more time than AD calves. PC calves spent 5 % less time active compared to RS ($P < 0.000$), and there was no significant difference in activity compared to AD. PC calves spent 4 % less time not active compared to RS ($P = 0.017$) and 15 % less time inactive compared to AD calves ($P < 0.001$). There was no difference among PC, RS and AD in overall time spent ruminating. When comparing PC calves from 100 % PC and commingled pens, 100 % PC calves spent 5 % more time eating compared to a 75 % ratio PC and 5 % more time eating compared to a 25 % ratio PC pen. However, time spent eating was not significantly different between 100 %

PC and 50 % ratio PC. Furthermore, PC calves had increased time spent eating and less time spent active and not active during the first 7 days after arrival at the feedlot compared to RS and AD calves. When commingled with AD calves, PC calves had more time spent eating and reduced time spent active and not active; therefore, PC calves have exhibited increased feeding behaviour also after being commingled with AD calves at the feedlot. The current study acknowledges the limitations of the field experiment that not all confounding variables could be controlled for, explicitly pen effect due to the lack of replication of pens across groups.

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Prev Vet Med February 2023
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A Scoping Review of Neonatal Calf Diarrhea Case Definitions

D.J. Wilson*, G. Habing, C.B. Winder, D.L. Renaud

Various case descriptions and scoring systems have been used to define neonatal calf diarrhea (NCD) and diverse diarrhea-related outcomes are reported, which limits direct comparison between studies. Therefore, the objective of this scoping review was to characterize the case definitions used for NCD and describe diarrhea-related outcomes to inform future efforts towards standardization. A literature search identified articles using 3 databases (Medline, CAB Direct, Agricola), along with Google and Google Scholar. This returned 16,854 unique articles, which were then screened for eligibility by two independent reviewers, resulting in 555 being selected for data extraction. Among articles, the study populations included mostly dairy-breed calves (88%; $n = 486$) while the remainder evaluated beef, crossbred, or dual-purpose beef/dairy calves (10%; $n = 53$), or did not report breed (3%; $n = 16$). Studies used between 1 and 8 metrics to define NCD, with 933 unique metrics extracted in total. The most common metric was fecal consistency alone (30%; $n = 281$), or with at least 1 other metric (26%; $n = 241$). To define diarrhea, fecal consistency was either described qualitatively (e.g., "profuse liquid feces"), or semi-quantitatively, for example using a scoring system that frequently included 4 levels ($n = 208$). Some NCD case definitions included fecal color, volume, or odor (10%; $n = 98$), physical exam parameters (8%; $n = 79$), the duration of abnormal feces (7%; $n = 67$), the presence of abnormal contents (e.g., blood, 7%; $n = 61$), farm treatment records (6%; $n = 54$), fecal dry matter (1%; $n = 12$), or another metric (4%; $n = 41$). One or more references were cited for the NCD case definition by 49% of studies ($n = 273/555$),

with the most common references being Larson et al. (1977) (n = 85), and McGuirk (2008) (n = 59). In the 555 included articles, 979 unique diarrhea-related outcomes were found, most commonly a binary categorization of calves having or not having diarrhea (49%; n = 483). Other articles reported statistical outcomes calculated from fecal scores (16%; n = 159), multiple diarrhea severities (10%; n = 95), or the age calves first developed NCD (8%; n = 76). This review characterized substantial heterogeneity among NCD case definitions and diarrhea-related outcomes, which limits interpretation and comparison of studies. Future work is required to develop and validate reporting standards for NCD to optimize knowledge synthesis and support rigorous and ethical calf health research.

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Submitted by the AABP Beef Health Management Committee

DAIRY

New Zealand Vet J
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January 2023

Biochemical Profile of Heifers with Spontaneous Humeral Fractures Suggest that Protein-energy Malnutrition Could be an Important Factor in the Pathology of this Disease

A. Wehrle-Martinez*, K. Dittmer, P. Back,
C. Rogers, K. Lawrence

Serum and liver samples from 35, 2-year-old dairy heifers that had fractured one or both humeri post-calving between July and December 2019 were submitted to a diagnostic laboratory for analysis. Serum samples were analysed for albumin, β -hydroxybutyrate (BHB), creatinine, Ca, Mg, phosphate, non-esterified fatty acids (NEFA), and serum Cu concentration. Liver samples were analysed for liver Cu concentration. Data were compared to published reference intervals. Data values for heifers that prior to fracture had grazed fodder beet were also compared to values for those that had grazed pasture. Sixty-nine percent of heifers with humeral fracture had serum creatinine concentrations below the lower value of the reference range (55–130 $\mu\text{mol/L}$). In 3/32 (9%) heifers, serum NEFA concentrations were increased above the reference value indicating body fat mobilisation (≥ 1.2 mmol/L for peri-partum cows) and in 20/35 (57%) heifers BHB serum concentrations were above the reference value indicating subclinical ketosis (≥ 1.1 mmol/L for peri-partum cows). In 24/35 (69%) heifers, liver Cu concentration was low (≤ 44 $\mu\text{mol/kg}$) or marginal (45–94 $\mu\text{mol/kg}$). The concentration of Cu in serum was low (≤ 4.5 $\mu\text{mol/L}$) in 2/33 (6%) heifers and marginal (4.6–7.9 $\mu\text{mol/L}$) in 5/33 (15%) heifers. There was moderate positive correlation

between the logged concentrations of Cu in paired liver and serum samples, $r(31) = 0.43$; (95% CI = 0.1–0.79; $p = 0.014$). One heifer had a serum phosphate concentration below the lower limit of the reference range (< 1.10 mmol/L). For all heifers, the concentrations of albumin, Ca, and Mg in serum were within the reference intervals (23–38 g/L, 2.00–2.60 mmol/L, and 0.49–1.15 mmol/L respectively). Over winter, 15/35 (43%) heifers grazed predominantly pasture, 14/35 (40%) grazed fodder beet and 6/35 (17%) had a mixed diet. In some of these heifers with humeral fractures, there was evidence for protein and/or energy malnutrition in the form of elevated NEFA and BHB concentrations and low creatinine concentrations in serum. Liver Cu concentrations were also reduced in most affected heifers. However, the absence of a control group means it is not possible to determine if these are risk factors for fracture or features common to all periparturient heifers. Clinical trials and molecular studies are needed to determine the true contribution of Cu and protein-energy metabolism to the pathogenesis of spontaneous humeral fractures in dairy heifers.

* School of Veterinary Sciences, Massey University, Palmerston North, New Zealand

Can J Vet Res
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January 2023

Comparison of the Levels of Selected Specific Antibodies in the Immunoglobulin G of Colostrum Versus Milk and Serum in Dairy Cows (*Bos taurus*)

S. Lacoste*, J. Ellis M. Campos, D. Ramsay, D. Haines

Commercial products containing immunoglobulin G (IgG) sourced from colostrum, milk, and/or serum may be used to supplement or replace maternal colostrum in newborn dairy calves. To determine if antibody specificities in bovine milk and serum IgG differ from colostrum IgG, we sampled serum, colostrum (1 to 2 hours post-partum), and milk (day 5 post-partum) from 24 dairy heifers or cows. Specific antibodies [IgG class (H&L)] to 8 common pathogens were measured using enzyme-linked immunosorbent assays (ELISAs). Immunoglobulin G1 and IgG2 subclass-specific ELISAs were performed for 3 of these pathogens. Colostrum-derived IgG contained more specific antibodies to rotavirus [IgG (H&L) and IgG1] and to IgG (H&L) of bovine respiratory syncytial virus (BRSV), bovine parainfluenza-3 virus (BPI3V), *Staphylococcus aureus*, *Escherichia coli* F5 (K99), and bovine coronavirus than milk IgG. Colostral IgG contained more antibodies to BRSV (IgG1), rotavirus (IgG1), and IgG (H&L) specific for BRSV, bovine herpesvirus-1 (BHV-1), BPI3V, *E. coli* F5 (K99), and *Streptococcus uberis* than serum IgG. Compared to serum, milk contained more IgG (H&L) antibody to BRSV, BHV-1, and BPI3V, IgG1-specific BRSV, and rotavirus. These data indicate that IgG derived from colostrum delivers

more specific antibodies to these endemic pathogens of calves compared to IgG sourced from milk or serum. In addition, the IgG1 subclass predominates in milk and colostrum, and both deliver a similar spectrum of antibodies.

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Theriogenology
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March 2023

**Gestational and Health Outcomes of Dairy Cows
Conceived by Assisted Reproductive Technologies
Compared to Artificial Insemination**

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Herd gestation and health management are key aspects of effective dairy farm operations and animal welfare improvement. Unfortunately, very little is known about the developmental divergences induced by assisted reproduction technologies (ART) and their consequences once the animal is mature. Indeed, the gestational and

health outcomes of this subset of the Holstein population is yet to be characterized. In this study, the intergenerational impacts of ART conception were assessed by looking at the gestation and health outcomes of a large cohort of cows (n = 284,813) for which the conception methods were known. Our results showed that cows conceived by multiple ovulation embryo transfer (MOET) and in vitro fertilisation (IVF) displayed longer gestations: $+0.37 \pm 0.079$ and $+0.65 \pm 0.21$ day compared to cows conceived by artificial insemination (AI). Surprisingly, animals conceived by all methods experienced a similar 1-day decline in average gestation length from 2012 to 2019. Cows conceived by IVF were not more likely to experience stillbirths but were affected by common diseases such as ovarian cysts, mastitis, and uterine diseases in different proportions compared to cows conceived by other methods. This study provides new and unique information on ART animals regarding perinatal mortality and general health outcomes.

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