

Wisconsin Dairy & Beef Well-Being Conference

Country Aire
Bar & Banquet Hall
Equity Livestock

March 3, 2017

Sponsors



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Professional Dairy Producers of Wisconsin

Agenda

Adult Track



Wisconsin Dairy & Beef Well-Being Conference

- 8:30 am Registration
- 9:00 am Greg Peterson—Peterson Farm Brothers
- 10:00 am Travel to Equity Livestock Cooperative
- 10:30 am Concurrent Sessions (*repeated*)—Equity Livestock
Dr. Ron Gill—Cattle Handling
Kory Stalsberg—Safe Transportation of Your Livestock
- 12:30 pm Lunch—Country Aire
- 1:30 pm Dr. Victor Cortese—Programming the Perinatal Immune System
(*for both beef and dairy calves*)
- 2:30 pm Concurrent Sessions (*choose 1*)
Dr. Victor Cortese—Beef Vaccination Protocols
Emily Yeiser Stepp—How to Prepare to Meet the
Expectations of FARM 3.0
- 3:20 pm Wrap-up
- 3:30 pm Adjourn

Please note that [photo/videographer] will be taking videos and pictures of the participants at this event. UW-Extension and potential partners will use these videos and pictures in a manner consistent with UW-Extension's mission. Your attendance at these events indicates your consent for your image to be recorded and used in this manner.

Agenda

Youth Track



Wisconsin Dairy & Beef Well-Being Conference

- | | |
|----------|--|
| 8:30 am | Registration |
| 9:00 am | Greg Peterson—Peterson Farm Brothers |
| 10:00 am | Travel to Equity Livestock Cooperative |
| 10:30 am | Concurrent Sessions (<i>repeated</i>)—Equity Livestock
Dr. Ron Gill—Cattle Handling
Kory Stalsberg—Safe Transportation of Your Livestock |
| 12:20 pm | Return to Country Aire for lunch and evaluation |
| 1:00 pm | Return to school |

Please note that [photo/videographer] will be taking videos and pictures of the participants at this event. UW-Extension and potential partners will use these videos and pictures in a manner consistent with UW-Extension's mission. Your attendance at these events indicates your consent for your image to be recorded and used in this manner.

Agenda

Veterinary Track



Wisconsin Dairy & Beef Well-Being Conference

Full Session

8:30 am Registration at Country Aire

9:00 am Greg Peterson—Peterson Farm Brothers

10:00 am Travel to Equity Livestock Cooperative

10:30 am Concurrent Sessions *repeated* at Equity Livestock

Dr. Ron Gill—Cattle Handling

Kory Stalsberg & Bill Halfman—Safe Livestock Transportation

12:20 pm Working Lunch with Dr. Vic Cortese at Country Aire

1:30 pm Dr. Victor Cortese—Programming the Perinatal Immune System

2:30 pm Concurrent Sessions (*choose 1*)

Dr. Victor Cortese—Beef Vaccination Protocols

Emily Yeiser Stepp—Preparing to Meet the Expectations of FARM 3.0

Half Session

12:00 Noon Registration

12:20 pm Working Lunch with Dr. Victor Cortese at Country Aire

1:30 pm Dr. Vic Cortese—Programming the Perinatal Immune System

2:30 pm Concurrent Sessions (*choose 1*)

Dr. Victor Cortese—Beef Vaccination Protocols

Emily Yeiser Stepp—Preparing to Meet the Expectations of FARM 3.0

Please note that [photo/videographer] will be taking videos and pictures of the participants at this event. UW-Extension and potential partners will use these videos and pictures in a manner consistent with UW-Extension's mission. Your attendance at these events indicates your consent for your image to be recorded and used in this manner.

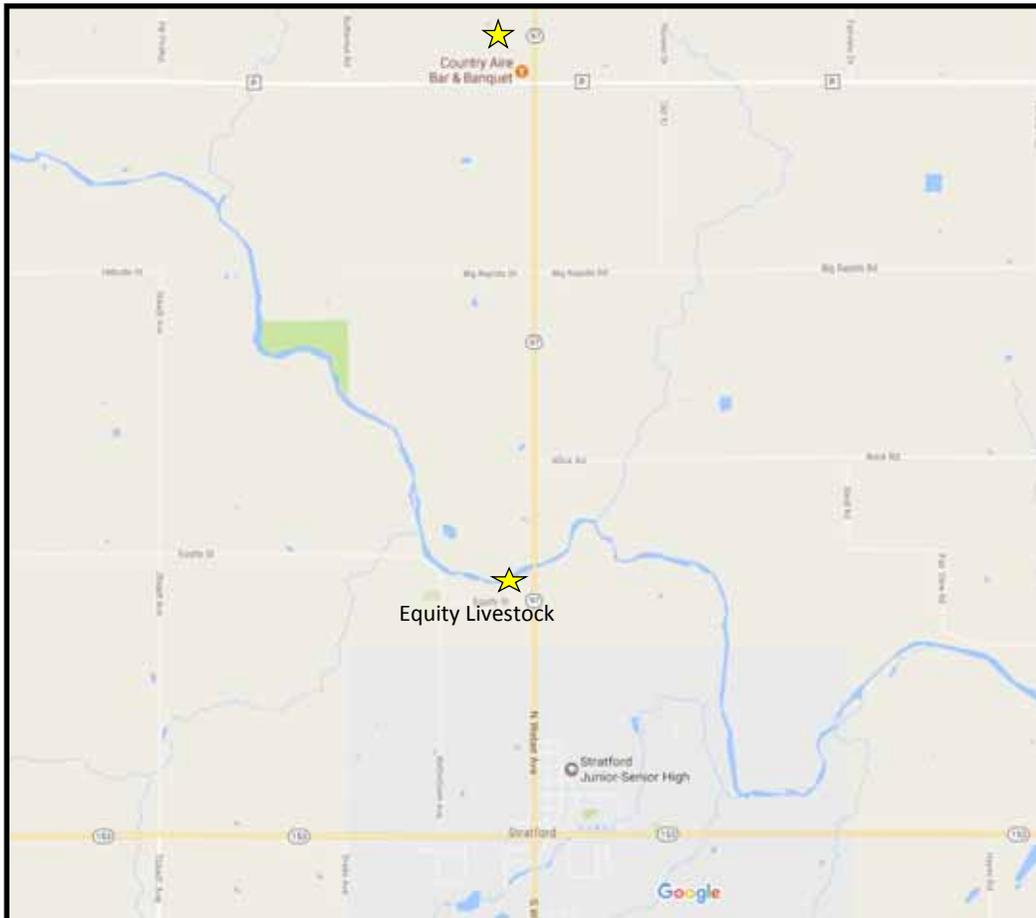
Wisconsin Dairy & Beef Well-Being Conference



Wisconsin Dairy & Beef Well-Being Conference

Country Aire Bar & Banquet Hall
F1312 Co Rd P
Stratford, WI 54484

Equity Livestock
EP4363 State Hwy 97
Stratford WI 54484



Please answer the following questions. Please print clearly!

Gender: Male Female

Race/Ethnicity: White/Caucasian Black Asian
American Indian Hispanic/Latino Other _____

What is your primary area of interest? (Circle all that apply.)
Dairy Beef Both

What is your occupation? (Circle all that apply.)
Farmer/Manager DVM Vet Tech Educator
Agri-business Government Agency Media
Non-agriculture employment Student

If you answered government agency to the question above,
which agency?

If media, how many subscribers does your publication reach?

If a dairy farmer: How many dairy cattle do you raise or manage?

How many calves and heifers do you raise?

If a beef farmer: How many cow-calf pairs do you raise or manage?

How many cattle do you finish (beef or dairy beef)?

If a veterinarian or other agribusiness professional, how many dairy cattle, heifers, and calves do you work with per month?

If a veterinarian or other agribusiness professional, how many dairy cattle, heifers and calves do you work with per month?

If a veterinarian or other agribusiness professional, how many beef cattle, calves, and/or steers do you work with per month?

Please list content which you learned from these conferences that you have put to work on your farm, in your practice or in your business:

OPTIONAL

If you want to attend or support more educational programs related to animal welfare on Wisconsin farms, please print your name and contact information (address, email, phone).

Have you attended previous WI Well-Being conferences? (Skip this section if this is your first conference. Check all that apply.)

- 2010, Kimberly, WI First Conference
- 2011, Neillsville, WI
- 2012, Madison, WI
- 2013, Kimberly, WI
- 2014, Eau Claire, WI
- 2015, Kimberly, WI
- 2016, Platteville, WI

If you have attended previous conferences, what value have these conferences had for you? Check the best answer that applies.

- Excellent value, I learned concepts/techniques applicable to me.
- Valuable, I enjoy attending these conferences and I generally learn a few things I can use on my farm, in my practice, in my business.
- I attend in hopes of learning something new that I can use on my farm, in my practice, or in my business.
- I keep attending because I know I will learn something new which I can use on my farm, in my practice, in my business.

Is more education concerning Animal Husbandry needed in Wisconsin? Yes No

If so, what topics would like to learn about?

Any speakers you would recommend?

Understanding Animal Well-Being

Please circle your answer.

In the context of today's conference, the term 'well-being' means:

- humanely handling dairy and beef animals.
- using production practices which benefit the health, comfort and emotional status of cattle.
- using production practices which benefit the safety of ourselves, the workers on our farms or ranches, and our consumers.
- all of the above
- I don't understand what this term means.

What is the most important step of advocating for agriculture?

- Being active on social media
- Writing letters to newspaper editors
- Taking the initiative to advocate
- Responding to comments
- I don't know

True or False or I don't know Stockmanship is a key component in Beef, Dairy Beef Quality Assurance and FARM programs

What are the three things involved with perinatal programming?

- Dry cow nutrition, timed colostrum, clean calving environment.
- Timed colostrum, timed vaccination, nutrition to double the calf's birth weight by 90 days of age.
- Dry cow nutrition, dry cow vaccination, early calf vaccination.
- Time colostrum from adequately vaccinated dams, timed calf vaccination, nutrition to double the calf's birth weight by 56 days of age
- I don't know

When hauling livestock with a pick-up truck and stock trailer, which of the following statements is correct?

- You can only gauge a tire's age by its condition.
- It's a good idea to paddle lock trailer doors closed so animals can't escape during travel.
- Set up the load alley so it's slightly wider than the trailer door.
- None of the above
- I don't know

True or False or I don't know The FARM Program provides value to the entire dairy supply chain, from producer to customers/consumers.

The Prime Boost strategy involves priming the immune system with one target agent (bacteria or virus) delivered by a specific route or mechanism and then boosting the immune system's response by:

- re-administering at a later date, the same product.
- re-administrating at a later date, the target bacteria or virus using another distinct route or mechanism.
- selecting products which never need to be re-administered.
- I don't know how to complete this sentence.

(over)

2017 PRE-Conference WI Dairy & Beef Well-Being Survey



What management practices do you plan to add or change as a result of what you learned about today regarding cattle stockmanship and transportation?

Please list content which you learned about today that you expect to use on your farm, in your practice, or in your business.

Please share what could be improved for this conference.

Is more education concerning animal well-being needed in Wisconsin? Y N

If so, what topics would like to learn about?

Any speakers you would recommend?

Optional: If you want to attend or support more educational programs related to animal welfare on Wisconsin farms, please print your name and contact information (address, email, phone).



Wisconsin Beef Quality Assurance & Dairy-Beef Quality Assurance

Re-Certification Program

The 2017 WI Dairy & Beef Well Being Conference
March 3, 2017, Stratford, WI

(Individual's signature)

By signing this certificate, the individual confirms their attendance and is awarded
Two (2) Re-Certification CEU's

Approved by

UW-Extension Ag Agent, dated 3/3/17

Retain this certificate along with a copy of agenda from this meeting, returning both to the WI Beef Council at the time of your re-certification. Keep copies of certificates and agendas for your own records. This certificate is not intended for initial certification.

Wisconsin BQA & Dairy-BQA Certification/Re-Certification Program

How can a producer or farm become certified?

1. Attend a Beef or Dairy Quality Assurance training session by a WI-BQA certified trainer
 1. Complete the certification test and personal contract
 2. Pay \$15 to Wisconsin Beef Council for manual and certification
2. or complete online National BQA Training at <http://www.bqa.org/certification>

How long is certification valid?

Certification is valid for 3 years.

Will I be notified when my certification expires?

1. If you certified in person with UW-Extension/WI Beef Council, the The WI Beef Council will contact you when your certification is set to expire.
2. If you certified online, you will receive an email from National BQA when your certification has expired.

How can I become re-certified?

1. Those individuals originally certified with UW-Extension/WI Beef Council may submit three (3) re-certification continuing education units (CEU) and a \$10 renewal fee to the Wisconsin Beef Council at: WI Beef Council, Inc. Attn. Ardel Quam, 632 Grand Canyon Drive, Madison, WI 53719

Pre-approval of CEU is at the discretion of the Wisconsin BQA Management Team. Examples of programs that *may* qualify are UW-Extension Cattle Feeders Workshops, Northwest Beef Producers clinics, the WI Dairy & Beef Well-Being etc.

2. Those individuals who certified on-line may re-certify by re-taking the online course.



Wisconsin Dairy and Beef
Well-Being Conference
March 3, 2017

UW
Extension
University of Wisconsin-Extension



<http://fyi.uwex.edu/animalhusbandryconference/>

Dairy Worker Certificate of Attendance

(Individual's signature)

By signing this certificate, the individual confirms their attendance at the

Wisconsin Dairy and Beef Well-Being Conference
March 3, 2017 Stratford, WI

The individual listed above was registered for this conference and their presence was confirmed. The agenda describes the activities the individual participated in during this conference. This educational agenda meets the education requirements of the National Dairy FARM program.

Retain this certificate, the program agenda, and receipt of paid registration, keeping all on file with your employing dairy.

You may also want to keep copies of certificates, agendas and receipts for your own records.

Sandra Stuttgen, dated 3/3/17

Heather Schlessor, dated 3/3/17

UW-Extension Agriculture Agents, 2017 Wisconsin Dairy and Beef Well-Being Conference co-chairs

An EEO/AA employer, University of Wisconsin-Extension provides equal opportunities in employment and programming, including Title IX and ADA. Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the Marathon County UW-Extension Office at (715) 261-1230. Requests for reasonable accommodations for disabilities or limitations should be made prior to the date of the program or activity for which it is needed. Please do so as early as possible prior to the program or activity so that proper arrangements can be made. Requests are kept confidential.

Greg Peterson

Peterson Farm Brothers



Greg Peterson is a 2013 graduate of Kansas State University where he majored in Agricultural Communications and Journalism. He grew up and still works on a family farm near Assaria, KS with his parents, two brothers, and sister. He has always enjoyed working on the farm and being an advocate for agriculture. Greg and his brothers create YouTube videos about farming that together have received over 40 million views. The videos have given Greg and his brothers many opportunities around the country and the world to talk about agriculture and he is passionate about the future of the industry, however their goal is to operate the family farm together after college.

Greg Peterson

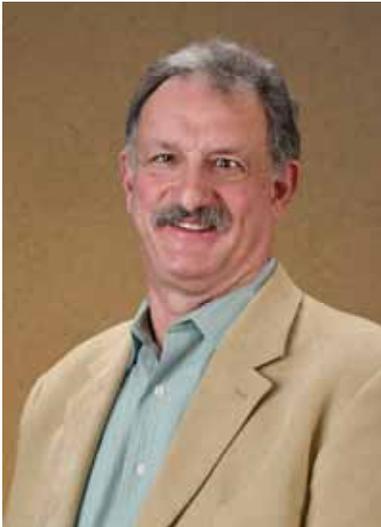
Peterson Farm Brothers



Notes

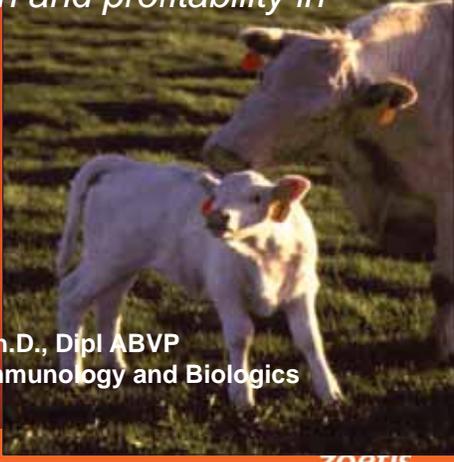
Dr. Victor Cortese

Zoetis



Vic graduated from Michigan State University with his bachelors and doctorate. He received his doctorate in veterinary medicine in 1980. He then entered a predominantly dairy practice in Wisconsin where he also held a non-tenured adjunct professor position with the University of Wisconsin-Madison, College of Veterinary Medicine. In 1989 he joined Diamond Scientific in their technical services department where he was promoted to director of veterinary operations. In June of 1990 he moved to SmithKline Beech Animal Health (now Pfizer Animal Health) as a senior technical services veterinarian, with his main emphasis on dairy and its allied sectors. He currently holds the title of Director Technical Services—Cattle Immunology. His responsibility is 75% North American and 25% international. He has many publications on viral infections, immunology, neonatal immunology and young dairy calf management, several textbook chapters and guest lectures at many veterinary and university meetings including the American Association of Bovine Practitioners/World Buiatrics Congress and the AVMA. He received his diplomat status to American Board of Veterinary Practitioners (Dairy Practice Specialty) in 1995. In September 1997, at the American Association of Bovine Practitioners Conference in Montreal, he received the AABP's Award for Excellence. In 1999, he successfully completed his Ph.D. in Microbiology from the Western College of Veterinary Medicine, University of Saskatchewan. In 2013, Bovine Veterinarian Magazine selected Dr. Cortese as one of the twenty most influential cattle veterinarians in the United States.

Using the immune system to maximize health and profitability in cattle



Victor Cortese, D.V.M., Ph.D., Dipl ABVP
Director Cattle-Equine Immunology and Biologics



At times, you can make almost anything work!



2 Presentation Title - 00/00/12 (Optional)



3 Presentation Title - 00/00/12 (Optional)

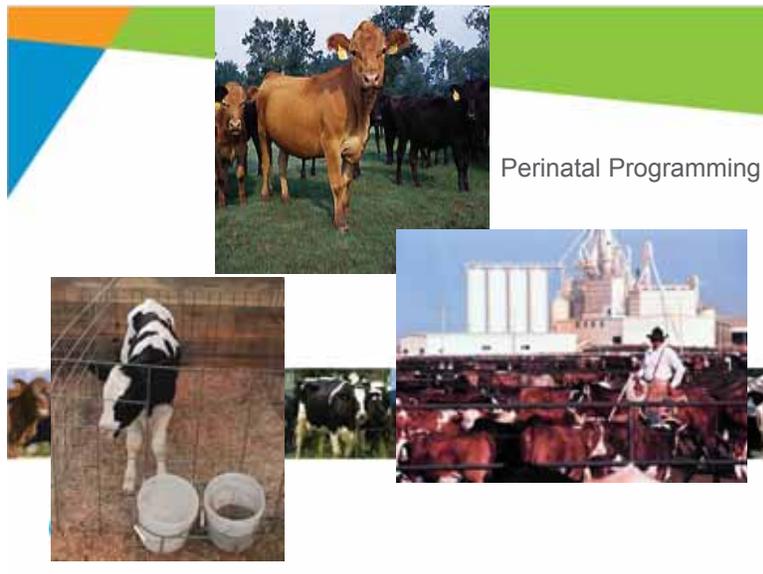


Four areas of research that are changing paradigms about impact of the immune system on performance

1. Perinatal programming
2. Maintaining/maximizing intakes and Average Daily Gain
3. Prime boost
4. Antigen interference



zoetis



Perinatal Programming

Colostrum

- Important for survival
- Concentrated source of proteins, vitamins (especially vitamin A), minerals, sugar
- Contains antibodies - only protection newborn calves have
- Laxative
- Must give enough early
- Stimulation of calf's own immunity

Colostrual Constituents Continued

- IGF-I – local gut effects
- IGF-II – local gut effects
- Lactoferrin – local immunity effect in gut
- Leptin – could affect the hypothalamic pituitary axis
- Prolactin – little data but good candidate for calves
- Insulin – local gut effects
- Leptin – could affect the hypothalamic pituitary axis
- Relaxin – humans, dogs, pigs – reproductive development
- Essential and non-essential amino acids
- Fatty acids – wide profile of fatty acids

Colostrum has long-term impacts on growth, health and production.



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9 Presentation Title – 00/00/12 (Optional)



W. Boland W, Cortese VS, Steffen D. Interactions between vaccination, failure of passive transfer and diarrhea in beef calves. *Agri-practice*, 1995.16(4):25-28.

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10 Presentation Title – 00/00/12 (Optional)

Assessing Failure of Passive Transfer — Days 3 – 10

Parameters for Assessing Passive Transfer of Immunoglobulins in the Calf			
Test	Failure of Transfer	Partial Failure	Adequate Transfer
Total protein	<5.0 g/dl	5-6 g/dl	>6 g/dl
Sodium sulfite	0-7	8-16	>16
Radial immunodiffusion	<800 mg/dl	800-1600 mg/dl	>1600 mg/dl
Zinc turbidity	0-1	2-3	3-4

Bovine Veterinary Forum in *Calf Immunology* 1994:9(1).p11
Dairy calves >5.5 generally considered adequate.

zoetis

11 Presentation Title – 00/00/12 (Optional)

Bovine Bacterial Pneumonia

Shipping Fever – Major cause of death, clinical disease and economic losses in the beef cattle industry
Enzootic Pneumonia – Second most severe disease of dairy calves



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12 Presentation Title – 00/00/12 (Optional)

Cost of Respiratory Disease

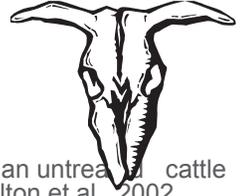
For calves treated before 3 months of age

- 2.5 x more likely to die after 3 months (Waltner-Toews et al, 1986)
- 2.4 times more likely to die between 3 mo – 2½ yrs of age than heifers that had not been treated & had reduced growth during the first 6 months of life (up to 22 lb) (VanDerFels-Klerx, et al, NJAS, 2002)
- 2.4 x more likely to experience dystocia & Calve two months later (Warnick et al, 1994)

What does it cost a producer to have a sick or dead calf?

Dead calf – 500 lb. -- \$512.50
910 lb. -- \$705.25

Treat Once -- \$40.64 less
Treat Twice --\$58.35 less
Treat 3 or more times ---\$291.93 less than untreated cattle
Fulton et al., 2002



Calf Diarrhea

- Number one cause of economic loss in dairy calves
- Number two economic loss in beef calves

- What About Sickness, Treatments and Milk Yield?
- 1st lactation milk yield was not significantly affected by reported cases of diarrhea
- However, antibiotic treatment had a significant effect on TDM residual milk
- Calves that were treated with antibiotics, produced 1,087 lbs less milk in the first lactation (P >0.01) than calves with no record of being treated

Soberon et al., 2012

Pro-active Calf Program Goals

- 1 Double birth weight by 56 days (minimum goal)
- 2 Calf mortality less than 5%
- 3 Calf morbidity (treatments) less than 10%

• Why Do This?

- Capture feed efficiency of early life
- Achieve breeding weight at an earlier age
- Potentially reduce AFC/increase BW @ calving
- Increase potential for Internal Herd Growth
- Potentially increase milk yield and herd life

Correlation of ADG Pre-weaning with Milk Production

Lactation n Predicted Difference in Milk per lb of Pre-weaning ADG P Value

1st	1,244	849.6 (216.3)	< 0.01
2nd	826	888.1 (310.1)	< 0.01
1st to 3rd	450	2,279.5 (918.9)	0.01

Soberon et al., 2012

Nature vs. Nurture

In this study, 22% of the variation in first lactation milk yield was explained by pre-weaning ADG
 No genetic trait accounts for as much variation yield 22

Sire selection for milk results in 150 to 250 lb milk per lactation

This suggests that pre-weaning nutrient intake is responsible for up to 7 times more milk per lactation than sire selection for milk yield

Soberon et al., 2012

Four areas of research that are changing paradigms about impact of the immune system on performance

1. Perinatal programming
2. Maintaining/maximizing intakes and Average Daily Gain
3. Prime boost
4. Antigen interference



Maintaining Intakes and growth

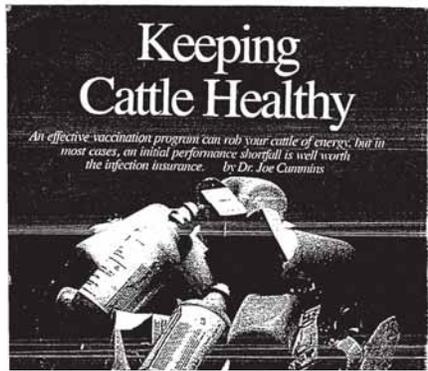


Table 2. Economic impact of temperature-sensitive vaccine on gain profit.

Treatment group	No. of calves	Average gain	Comparison to 75F
Control ^a	10	64.4	-35.70
IN ^b	9	69.0	-2.94
TSV ^c	10	72.9	8.66
IN ^d	10	67.5	-2.84
IN/TSV ^e	10	68.5	-2.64

Table 3. Economic impact of TTV on cost efficiency and CMF.

Treatment group	No. of calves	Feed cost/CMF	Comparison to 75F
Control ^a	10	42.77	-\$1.54
IN ^b	9	40.69	+1.55
TSV ^c	10	39.15	\$2.66
IN ^d	10	41.02	-1.69
IN/TSV ^e	10	42.84	-3.71

^aNon-vaccine.
^bTemperature-sensitive vaccine.
^cTemperature-sensitive vaccine.
^dNon-vaccine.
^eTemperature-sensitive vaccine at 1/10th dose.

^aNon-vaccine.
^bTemperature-sensitive vaccine.
^cTemperature-sensitive vaccine.
^dTemperature-sensitive vaccine.
^eTemperature-sensitive vaccine at 1/10th dose.



Study Design

Group	IVP ¹	N	Approximate Study Days		
			Vaccination (Study Days)	Dose	Clinical Observations
NTX	None	29	None	None	Days 0 through 120
T01	Control	44	None	None	Days 0 through 120
T02 (1-week interval)	INFORCE™ + Bovi-Shield® L5 (SQ)	206	INFORCE-0 Bovi-Shield-7	2 mL	Days 0 through 120
T03 (3-week interval)	INFORCE™ + Bovi-Shield® L5 (SQ)	206	INFORCE-0 Bovi-Shield-21	2 mL	Days 0 through 120
T04 (5-week interval)	INFORCE™ + Bovi-Shield® L5 (SQ)	206	INFORCE-0 Bovi-Shield-35	2 mL	Days 0 through 120
T05 (3- and 5-week interval)	INFORCE™ + Bovi-Shield® L5 (SQ)	204	INFORCE-0 Bovi-Shield-7 and 35	2 mL	Days 0 through 120
T06 (2 IN + 2 BS)	INFORCE™ + Bovi-Shield® L5 (SQ)	204	INFORCE-0 and 28 Bovi-Shield-49 and 65	2 mL	Days 0 through 120



Morbidity Results

Treatment	Frequency of Ever Morbid	
	Respiratory Morbidity	Enteric Morbidity
NTX (Sentinels)	28/29 (96.6%)	14/29 (48.3%)
T01 (Non-treated)	40/44 (90.9%)	14/44 (31.8%)
T02 (IN-0, BS-7)	182/206 (88.3%)	97/206 (47.1%)
T03 (IN-0, BS-21)	180/206 (87.4%)	91/206 (44.2%)
T04 (IN-0, BS-35)	178/206 (86.4%)	98/206 (47.6%)
T05 (IN-0, BS-7 and 35)	174/204 (85.3%)	99/204 (48.5%)
T06 (IN-0, IN-28, BS-49, BS-65)	169/204 (82.8%)	96/204 (47.1%)



Average Daily Gain

Least squares means average daily gain ± SEM (95% Confidence Intervals)

Treatment	ADG
T01 (Non-treated)	1.51 ±0.045 (1.42-1.60)
T02 (IN-0, BS-7)	1.48 ±0.027 (1.43-1.54)
T03 (IN-0, BS-21)	1.43 ±0.028 (1.38-1.49)
T04 (IN-0, BS-35)	1.48 ±0.024 (1.44-1.53)
T05 (IN-0, BS-7 and 35)	1.48 ±0.024 (1.43-1.53)
T06 (IN-0, IN-28, BS-49, BS-65)	1.53 ±0.024 (1.48-1.58)

The overall F-test was not significant (P>0.05).



Conclusions

- No differences in mortality
- NTX animals exhibited declining maternal antibody titers-no apparent viral challenge exposure.
- Efficacy improved with delayed BoviShield administration.
- Two doses of Inforce showed the best efficacy and improved weight gain (significant at >.1)

Calf Vaccination Intake Study

Gaspers, J., Kendall Swanson, Jon Seeger, Gerald Stokka
NDSU Dept of Animal Sciences, Zoetis

Calf Vaccination Study

- 76 NDSU Beef Calves Angus, Simmental, and Shorthorn.
- Weaned 45 days, transported to the BCRC, and trained (2 weeks) to the Insentec feeding system.
 - Calves had been vaccinated at birth, turnout and pre-weaning.
- 2 day average weights on study, 2 day average weights off study. Calves vaccinated on Day 0.
- Calves blocked by weight to 3 pens, light, medium and heavy. Calves then randomly assigned to treatment with equal treatments within pen.
- Receiving diet, 53% DM, 50% forage, corn silage, with dry distillers.

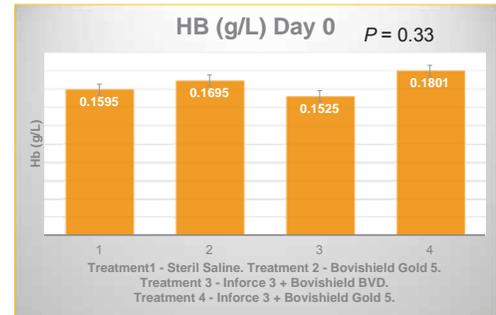
Summary

Treatment	On weight	Off weight	Gain/ADG	3 Day gain	6 Day gain
TX 1 Saline	795(76.2)	847.5(76.4)	52.5/1.88	6.05(11.53)	5.26
TX 2 BS Gold/OS	778.2(89.4)	845.5(94.9)	67.4/2.41	8.68(22.01)	13.68
TX 3 OS/BVD & INF3	789.4(71.9)	847.6(76.9)	58.16/2.08	9.47(12.01)	10.53
TX 4 BS Gold/OS & INF3	778.5(82.7)	836.3(92.8)	57.76/2.06	8.55(18.34)	9.87

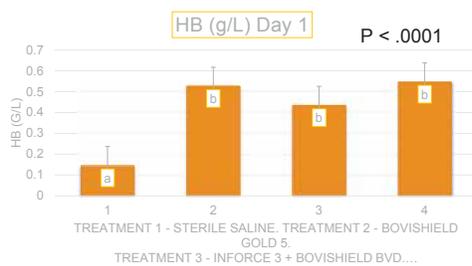
Summary

Treatment	DMI(kg)	Avg time(min)	Avg number visits	Avg number of meals	
TX 1 Saline	8.86(0.78)	172	42.7(14.95)	12.03(1.76)	
TX 2 BS Gold/OS	9.14(0.83)	175.1	42.1(11.9)	12.07(1.90)	
TX 3 OS/BVD & INF3	9.07(0.84)	176.3	41.35(12.5)	11.75(1.67)	
TX 4 BS Gold/OS & INF3	8.73(0.85)	177.7	36.1(10.25)	11.23(1.81)	

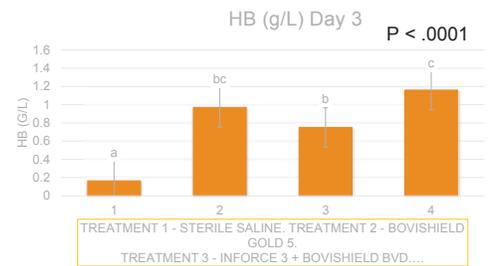
Haptoglobin Day 0



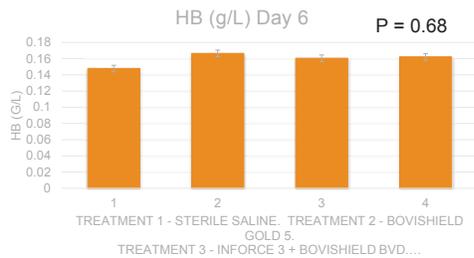
Haptoglobin Day 1



Haptoglobin Day 3



Haptoglobin (g/L) Day 6



Impact on intakes of arrival vaccination programs –A few references

1. Cooper VL, Brodersen BW. Bovine Respiratory Disease. *Vet Clin North Am: Food Anim Pract* 2010;26(2):191–417.
2. Richeson JT, Beck PA, Gadberry MS. Effects of on-arrival versus delayed modified live virus vaccination on health, performance, and serum infectious bovine rhinotracheitis titers of newly received beef calves. *J Anim Sci* 2014;86(4):999–1005.
3. Duff GC, Malcolm-Callis KJ, Walker DA, et al. Effects of intranasal versus intramuscular modified live vaccines and vaccine timing on health and performance by newly received beef cattle. *Bov Pract* 2000;34(1):66–71.
4. Cummins J. Keeping cattle healthy. *Feedlot Management*. 1983.
5. Richeson JT, Beck PA, Gadberry MS et.al. Effects of administration of a modified-live respiratory vaccine and timing of vaccination on health and performance of high risk beef stocker calves. *Bov Pract*, 2015;49(!):37-42

TSV2 or Conventional Intranasal Vaccine?

Number of Calves	treatment	Mortality
2500	TSV2	4.2%
2500	Traditional IN	5.5%

Apparent Risk Reduction = 1.32%
Relative Risk Reduction = 23.9 %

Four areas of research that are changing paradigms about impact of the immune system on performance

1. Perinatal programming
2. Maintaining/maximizing intakes and Average Daily Gain
3. Prime boost
4. Antigen interference



What is prime boost?

The basic prime boost strategy involves:

1. **Priming** the immune system to a target antigen delivered by one vector, route, or mechanism, and then
2. selectively **boosting** this immunity by re-administration of the antigen in the context of a second and distinct method.

Several papers have highlighted the power of prime-boost strategies in eliciting protective cellular immunity to a variety of pathogens and have demonstrated efficacy in humans. Coupled with recent advances in our understanding of the mechanisms underlying the generation, maintenance and recall of T-cell memory, the field is poised to make tremendous progress.

[Woodland DL](#)¹ Jump-starting the immune system: prime-boosting comes of age. [Trends Immunol.](#) 2004 Feb;25(2):98-104.

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What is prime boost?

The key strength of this strategy is that greater levels of immunity are established by heterologous prime boost than can be attained by a single vaccine administration or homologous boost strategies.

With some of the early prime boost strategies this effect was merely additive, whereas some newer strategies indicate powerful synergistic effects can be achieved

- more complete immune system stimulation
- better CMI/T cell stimulation
- increased number of antigen-specific T cells,
- selective enrichment of high avidity T cells
- potentially better local immunity
- increased efficacy against pathogen challenge

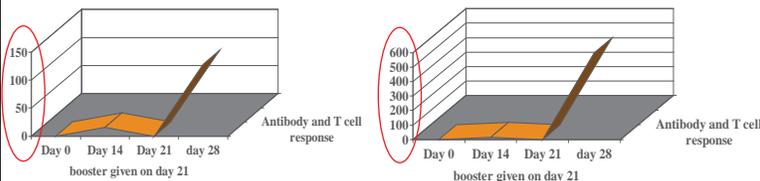
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Anamnestic Response

Conventional vs. Prime Boost

Conventional
(Homologous boost)

Prime boost
(Heterologous boost)



>4x higher antibody and T-cell response

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What is prime boost?

Prime boost strategies may include:

1. Different routes of administration
2. Different antigen presentations
3. Modified live and killed
4. Different adjuvants (i.e. different antigen-delivery systems)
5. It is not vaccine rotation

Heterologous boosting

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What is prime boost?

Examples of prime boost research in human immunology include:

- M. tuberculosis
- HIV and simian immunodeficiency virus (SIV)
- malaria
- Listeria monocytogenes
- Leishmania
- Ebola virus
- Hepatitis C virus
- Herpes simplex virus
- Human papillomavirus
- Hepatitis B virus

– Often utilizing different vectors etc.



Prime boost studies

with Zoetis vaccines

Evaluating the serological effect of two concurrent IBRV, BVDV, BRSV, PI3V, and *Mannheimia haemolytica* vaccination protocols and time interval between the first and second dose on the subsequent serological response to the BRSV and *M. haemolytica* fractions in suckling beef calves

Gerald L. Stokka, DVM, MS;¹ Bryan Neville, PhD;² Jon T. Seeger, DVM;³ Victor S. Cortese, DVM, PhD;⁴ James J. Gaspers, BS¹

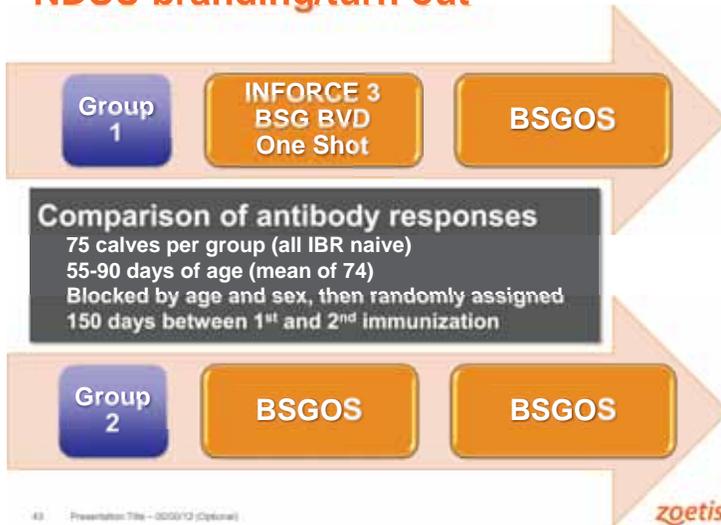
(North Dakota State University “branding/turnout study”)

Status:

- Manuscript being submitted for publication in the next issue of *Bovine Practitioner* (AABP)



NDSU branding/turn out



Samples collected

Day -30	Serum levels for IBR, BRSV and Mh LKT
Day 0 (1 st vaccine)	Serum levels for IBR, BRSV and Mh LKT, BVD (treatment group 2 only)
Day 14	Serum levels for BRSV and Mh LKT
Day 27	Serum levels for IBR, BRSV and Mh LKT, BVD (treatment group 2 only, if ABOVE 1:32 OR BELOW 1:8 ON DAY 0)
Day 153 (2 nd vaccine)	Serum levels for IBR, BRSV and Mh LKT
Day 174	Serum levels for BRSV and Mh LKT



Least squares means of BRSV neutralizing antibody at days 0, 14, 27, 153, and 174

Treatment Group	Vaccine	Day 0	Day 14	Day 27	Day 153	Day 174
T1	INFORCE 3 BSG BVD One Shot	14.1	8.7	24.1	2.8	15.3
T2	BSGOS	12.9	7.4	14.7	2.1	7.2
P value		ns	ns	*	*	*
T1 vs T2		P = 0.64	P = 0.33	P = 0.003	P = 0.001	P = 0.006

* significant

↑
1st Vaccine

↑
Boost with BSGOS

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Least squares means serological levels (µg/mL) of Mannheimia haemolytica leukotoxoid at days 0, 14, 27, 153, and 174

Treatment Group	Vaccine	Day 0	Day 14	Day 27	Day 153	Day 174
T1	INFORCE 3 BSG BVD One Shot	0.25	0.40	0.38	0.62	1.19
T2	BSGOS	0.26	0.47	0.43	0.69	1.43
P value		ns	ns	ns	ns	*
T1 vs T2		P = 0.51	P = 0.10	P = 0.15	P = 0.24	P = 0.02

* significant

↑
1st vaccine

↑
Boost with BSGOS

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Serological Levels for BHV-1 for Day 0, 27 and 153

Treatment	Vaccine	Day 0	Day 27	Day 153
T01	Inforce 3 BSG BVD One Shot	2.0	1.8	1.1
T02	BSGOS	2.7	2.4	1.1
p value		* p = 0.0498	* p = 0.0385	ns p=0.8419

* significant

↑
1st vaccine

↑
Boost with BSGOS

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CONCLUSIONS

- Either calf vaccination program at the time of turnout would be highly successful in stimulating a humoral immune response.
- Vaccination of the calves with intranasal Inforce 3 resulted in the most significant BRSV response both initially, at 153 days later and again following a revaccination with Bovi-Shield GOLD One Shot. \
- No interference was seen with the new BS/OS combination in this study
- The improved OS had the most significant leucotoxoid response both following initial vaccination and again following revaccination when Bovi-Shield GOLD
- Vaccination of calves with the newly adjuvanted BVD in BS/OS did not stimulate antibody increases if the calves had maternal antibody >32
- The most effective vaccination program will be the intranasal administration of Inforce 3 and the concurrent subcutaneous administration of One Shot BVD at turnout followed by the subcutaneous administration of Bovi-Shield GOLD One Shot at the time of pre-weaning / weaning.

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INTRANASAL FOLLOWED BY SYSTEMIC VACCINATION IS AN OPTIMAL VACCINATION SCHEDULE FOR YOUNG CALVES AGAINST BOVINE RESPIRATORY SYNCYTIAL VIRUS AND PARAINFLUENZA TYPE 3 VIRUS

Vangeel I, Raue R

Pfizer Animal Health, Veterinary Medicine Research and Development, Sandwich, UK

Outbreaks of bovine respiratory disease (BRD) most frequently occur in young animals. Due to the high prevalence of maternal antibodies against Bovine Respiratory Syncytial Virus (BRSV) and Parainfluenza Type 3 Virus (PI3V), systemic two-dose vaccination of calves below three months of age often induces insufficient protection against these viruses. In this study, a vaccination schedule comprising intranasal vaccination with a modified live BRSV and PI3V vaccine at three weeks of age followed by systemic booster vaccinations with modified live vaccine at three and four months of age was evaluated in calves with and without maternal antibodies.

Calves were either vaccinated intranasally (Rapova® RB-PI3 IntraNasal, Pfizer Ltd) at three weeks of age followed by booster vaccinations intramuscularly (Rapova® 3, Pfizer Ltd) at three and four months of age, vaccinated intranasally at three weeks of age only, vaccinated intramuscularly at three and four months of age only or not vaccinated at all. The same experiment was carried out in calves with and without maternal antibodies. Blood samples were collected weekly until four weeks after the second booster and BRSV and PI3V serum antibody levels were measured by ELISA.

In calves without maternal antibodies intranasal vaccination induced high serum antibody levels to BRSV and PI3V. The booster injections were necessary to prevent antibody levels for PI3V declining from nine weeks and BRSV from 14 weeks after intranasal vaccination as observed in calves that did not receive the boosters. Antibody responses to both BRSV and PI3V after the first intranasal vaccination at three months of age were higher in calves vaccinated earlier with the intranasal vaccine compared with calves that only received their first vaccination at three months of age.

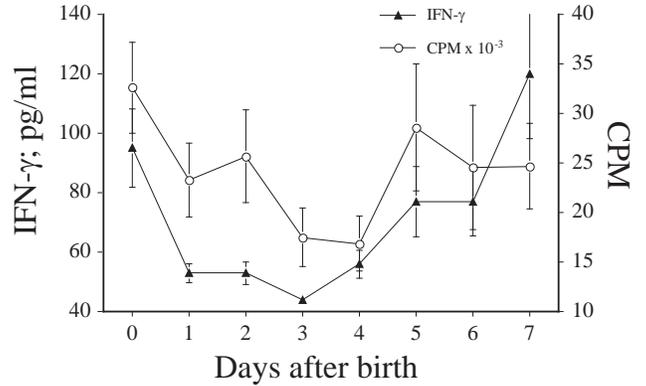
In calves with maternal antibodies there was no increase in BRSV or PI3V serum antibody levels after intranasal vaccination. However, after the first booster again higher antibody levels were measured in calves earlier vaccinated intranasally compared with calves that had not been vaccinated before. BRSV and PI3V antibody levels of calves that were not given booster vaccinations continued to decline beyond three months of age.

Based on the serological monitoring carried out in this study, it was concluded that intranasal followed by systemic vaccination is an optimal vaccination schedule for young calves against BRSV and PI3V.



Neonatal immune dysfunction

Diminished IFN-γ and Blastogenic responses in the first few days after birth, in neonatal calves



DURATION OF IMMUNITY TO EXPERIMENTAL INFECTION WITH BOVINE RESPIRATORY SYNCYTIAL VIRUS (BRSV) FOLLOWING INTRANASAL VACCINATION OF YOUNG PASSIVELY IMMUNE CALVES¹²

• STUDY DESIGN

- 84 dairy calves (3 to 11 days old)
- Study one
 - Sero-negative calves administered TSV-2® (10)
 - Sero-negative calves administered Inforce 3 with MID BRSV (16)
 - Challenged 7 weeks post-vaccination
- Study two
 - Sero-positive calves administered TSV-2 (15)
 - Sero-positive calves administered Inforce 3 (15)
 - Challenged 9 weeks post-vaccination
- Study three
 - Sero-positive calves administered TSV-2 (14)
 - Sero-positive calves administered Inforce 3 (14)
 - Challenged 14 weeks post-vaccination

¹² Ellis, J. et al. JAVMA. Vol 243, No. 11, December 1, 2013.
51 Presentation Title - 00/00/12 (Optional)



KEY FINDINGS¹²

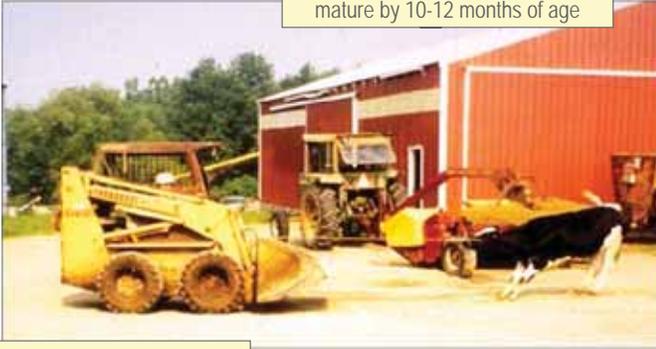
	MORTALITY	
	CONTROLS	VACCINATES
Study 1	9/10*	0/16*
Study 2	10/15*	3/15*
Study 3	10/10	7/16

* indicates a significant difference between control and vaccinates groups P<0.05
52 Presentation Title - 00/00/12 (Optional)



A Mature Immune System

Consider the immune system to be mature by 10-12 months of age



Some maternal antibody may persist at this time, so consider a 2nd MLV vaccination at 10-12 months of age.

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Thank you!



54 Presentation Title - 00/00/12 (Optional)

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Questions?



Hwy 30, traveling to London, KY

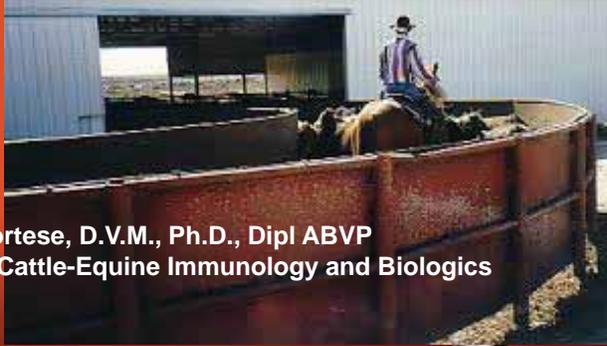
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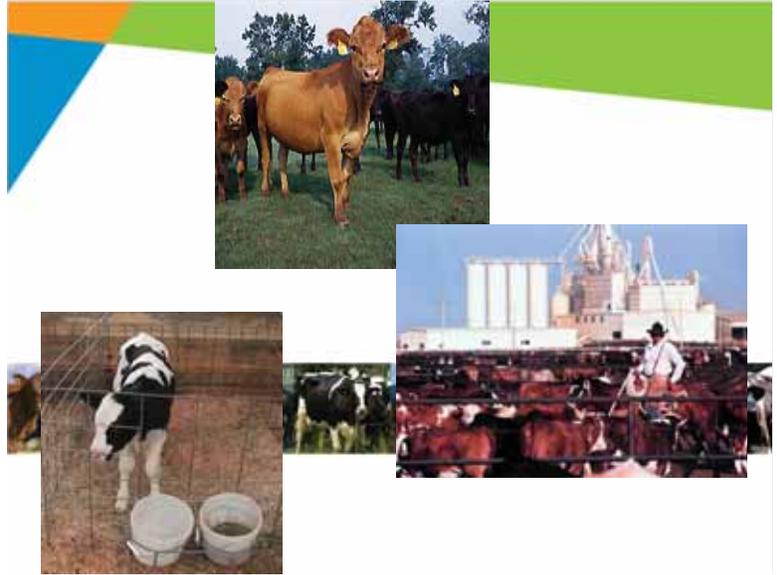
55 Presentation Title - 00/00/12 (Optional)

Designing Vaccination Programs – Is there a better way?

Victor Cortese, D.V.M., Ph.D., Dipl ABVP
Director Cattle-Equine Immunology and Biologics

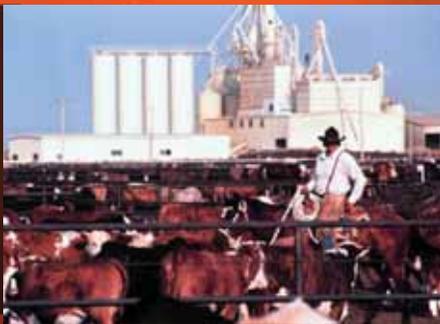


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Four areas of research that are changing paradigms about impact of the immune system on performance

1. Perinatal programming
2. Maintaining/maximizing intakes and Average Daily Gain
3. Prime boost
4. Antigen interference
5. Biberstenia trehalosi



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Colostrum

- Important for survival
- Concentrated source of proteins, vitamins (especially vitamin A), minerals, sugar
- Contains antibodies - only protection newborn calves have
- Laxative
- Must give enough early
- Stimulation of calf's own immunity

Colostrual Constituents Continued

- IGF-I – local gut effects
- IGF-II – local gut effects
- Lactoferrin – local immunity effect in gut
- Leptin – could affect the hypothalamic pituitary axis
- Prolactin – little data but good candidate for calves
- Insulin – local gut effects
- Leptin – could affect the hypothalamic pituitary axis
- Relaxin – humans, dogs, pigs – reproductive development
- Essential and non-essential amino acids
- Fatty acids – wide profile of fatty acids

Colostrual Leukocytes

- 10^6 leukocytes per milliliter of colostrum comprised of:
 - Macrophages
 - Neutrophils
 - Lymphocytes 10,000/ml
 - T-cells 9,700/ml
 - B-cells 300/ml

Colostrual Leukocytes

- Regulate and enhance defense mechanisms
 - Lymphocyte responses
 - Passive immunity
 - Phagocytosis
 - Bactericidal
 - Transfer cell-mediated immunity

Gerd Riedel-Caspari. The influence of colostrual leukocytes on the Gerd Riedel-Caspari and F. W. Schmidt. The influence of colostrual leukocytes on the immune system of the neonatal calf II Effects on passive and active immunization. Dtsch.tierarztl.Wschr. 96:190-194, 1991.



W. Boland W, Cortese VS, Steffen D. Interactions between vaccination, failure of passive transfer and diarrhea in beef calves. Agri-practice, 1995.16(4):25-28.

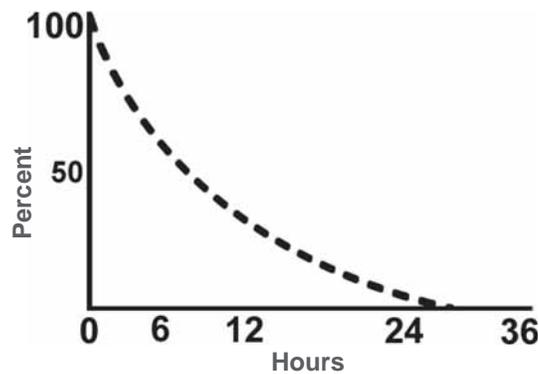
Assessing Failure of Passive Transfer — Days 3 – 10

Parameters for Assessing Passive Transfer of Immunoglobulins in the Calf			
Test	Failure of Transfer	Partial Failure	Adequate Transfer
Total protein	<5.0 g/dl	5-6 g/dl	>6 g/dl
Sodium sulfite	0-7	8-16	>16
Radial immunodiffusion	<800 mg/dl	800-1600 mg/dl	>1600 mg/dl
Zinc turbidity	0-1	2-3	3-4

Bovine Veterinary Forum in *Calf Immunology* 1994;9(1).p11
Dairy calves >5.5 generally considered adequate.



Calf Colostrum Absorption



10 Presentation Title – 00/00/12 (Optional)



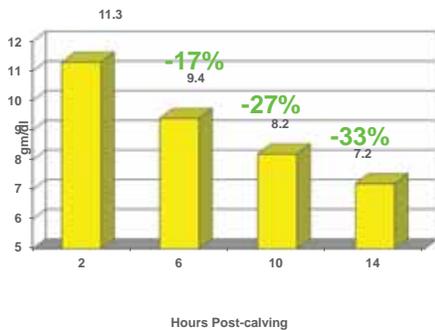
Declining IgG in Colostrum Following Calving

13 cows/52 quarters

Reason for effect?

-not due to dilution (same volume from all quarters at each time point)

- possibly due to reabsorption into maternal circulation



Moore, et al., 2005 JAVMA 226:1375



Bovine Bacterial Pneumonia

Shipping Fever –

Major cause of death, clinical disease and economic losses in the beef cattle industry

Enzootic Pneumonia –

Second most severe disease of dairy calves



12 Presentation Title – 00/00/12 (Optional)



Cost of Respiratory Disease

For calves treated before 3 months of age

- 2.5 x more likely to die after 3 months (Waltner-Toews et al, 1986)
- 2.4 times more likely to die between 3 mo – 2½ yrs of age than heifers that had not been treated & had reduced growth during the first 6 months of life (up to 22 lb) (VanDerFels-Klerx, et al, NJAS, 2002)
- 2.4 x more likely to experience dystocia & Calve two months later (Warnick et al, 1994)

Producer survey of herd-level risk factors for nursing beef calf respiratory disease (Florida, Georgia, and West Virginia) and 3 Plains states (Iowa, Kansas, and Nebraska)

Amelia R. Woolums, DVM, PhD, DACVIM; Roy D. Berghaus, DVM, PhD, DACVPM; David R. Smith, DVM, PhD, DACVPM; Brad J. White, DVM, MS; Terry J. Engelken, DVM, MS; Max B. Irsik, DVM, MAB; Darin K. Matlick, DVM; A. Lee Jones, MS, DVM; Roger W. Ellis, DVM, MS; Isaiah J. Smith, DVM, MFAM; Gary L. Mason, DVM, PhD, DACVP; Emily R. Waggoner, DVM

Table 2—Use of vaccines against respiratory tract pathogens in Plains and Eastern states beef cow/calf operations that had ≥ 1 calf born during 2010 and responded to a survey for identification of risk factors for BRD in nursing calves

Type of animal receiving vaccines	No. of operations responding	Percentage (95% CI) of herds that vaccinated	P value*
Nursing calves			< 0.001
Plains states	210	52.2 (46.9–58.4)	
Eastern states	219	15.0 (10.1–20.0)	
Replacement heifers			< 0.001
Plains states	188	55.9 (48.8–62.5)	
Eastern states	197	14.3 (10.3–19.3)	
Adult cows			< 0.001
Plains states	202	47.5 (40.8–54.2)	
Eastern states	206	17.2 (12.2–22.2)	

*Determined with a Design-Based Pearson χ^2 test. See Table 1 for remainder of key.

Twenty-one percent of respondents to the survey of the present study indicated BRD had been detected in at least 1 calf in their operation during 2010; similarly, results of a mailed survey of producers in Québec indicated 16% of respondents with < 40 cows had detected BRD in calves, versus 36% of respondents with 40 cows.

JAVMA, Vol 243, No. 4, August 15, 2013

[Journal of the American Veterinary Medical Association](#)

May 15, 2016, Vol. 248, No. 10, Pages 1157-1164
doi: 10.2460/javma.248.10.1157

The association between calfhood bovine respiratory disease complex and subsequent departure from the herd, milk production, and reproduction in dairy cattle

Aaron P. Schaffer MS; Robert L. Larson DVM, PhD; Natalia Cernicchiaro DVM, PhD; Gregg A. Hanzlicek DVM, PhD; Steven J. Bartle PhD; Daniel U. Thomson DVM, PhD
Department of Diagnostic Medicine and Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506. (Schaffer, Cernicchiaro, Hanzlicek, Bartle, Thomson); Department of Clinical Sciences, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506. (Larson)

OBJECTIVE To describe the frequency of calfhood producer-identified bovine respiratory disease complex (BRDC) in Holstein replacement heifers on 1 large farm and determine associations between development of BRDC at ≤ 120 days of age (BRDC120) with milk production estimate, calving interval, and risk of departure from the herd (DFH).

DESIGN Retrospective, observational study.

ANIMALS 14,024 Holstein heifer calves born on 1 farm.

PROCEDURES Data were obtained from herd management records. Cox proportional hazard and generalized linear mixed-effects models were used to assess associations for variables of interest (BRDC120 status, demographic data, and management factors) with DFH, milk production estimate, and calving interval.

RESULTS Except for the year 2007, animals identified as having BRDC120 were 1.62 to 4.98 times as likely to leave the herd before first calving, compared with those that did not have this designation. Calves identified as having BRDC prior to weaning were 2.62 times as likely to have DFH before first calving as those classified as developing BRDC after weaning. Cows identified as having BRDC120 were 1.28 times as likely to have DFH between the first and second calving as were other cows. The BRDC120 designation was associated with a 233-kg (513-lb) lower 305-day mature equivalent value for first lactation milk production, but was not associated with longer or shorter calving intervals at maturity.

CONCLUSIONS AND CLINICAL RELEVANCE Dairy cattle identified as having BRDC120 had increased risk of DFH before the first or second calving and lower first-lactation milk production estimates, compared with results for cattle without this finding. Further investigation of these associations is warranted.

Calf Diarrhea

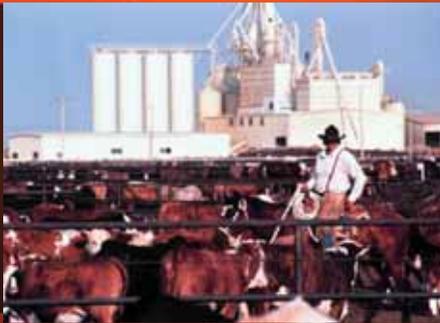
- Number one cause of economic loss in dairy calves
- Number two economic loss in beef calves

- What About Sickness, Treatments and Milk Yield?
- 1st lactation milk yield was not significantly affected by reported cases of diarrhea
- However, antibiotic treatment had a significant effect
- on TDM residual milk
- Calves that were treated with antibiotics, produced 1,087 lbs less milk in the first lactation (P > 0.01) than calves with no record of being treated

Soberon et al., 2012

Four areas of research that are changing paradigms about impact of the immune system on performance

Maintaining/
maximizing intakes and
Average Daily Gain



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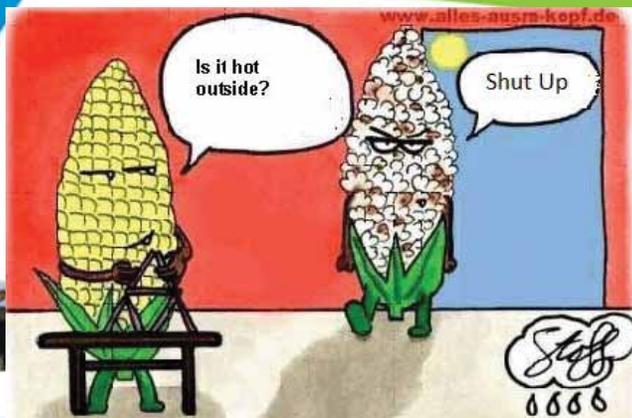


Pfizer Animal Health

Avoid Vaccinating >85°F

Don't vaccinate at >85°F (29.4C) as this will increase the possibility of adverse reactions.

Be aware of night time lows 75°F (23.8C)



Pfizer Animal Health

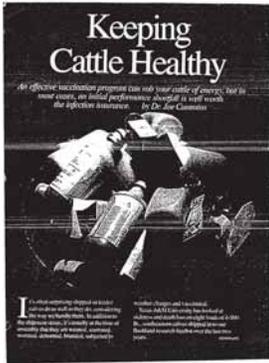


Table 2. Economic impact of temperature-sensitive vaccine on gain profit.

Treatment	No. of calves	Average gain	Comparison to 12%
Control ^a	10	64.4	-35.70
12% ^b	9	69.0	-2.94
12% ^c	10	72.9	0.96
12% ^d	10	67.5	-2.84
12% ^e	10	68.5	-2.64

Table 3. Economic impact of TVV on cost efficiency and CMF.

Treatment	No. of calves	Feed cost/CMF	Comparison to 12%
Control ^a	10	42.77	-\$1.54
12% ^b	9	40.69	+1.55
12% ^c	10	39.15	0.96
12% ^d	10	41.02	-1.69
12% ^e	10	42.84	-3.71

^aNon-vaccine.
^bTemperature-sensitive vaccine.
^cTemperature-sensitive vaccine.
^dTemperature-sensitive vaccine.
^eTemperature vaccine at 1/10th dose.

^aNon-vaccine.
^bTemperature-sensitive vaccine.
^cTemperature-sensitive vaccine.
^dTemperature-sensitive vaccine.
^eTemperature vaccine at 1/10th dose.



Arrival Intake and Haptoglobin Study

Gaspers, J., Kendall Swanson, Jon Seeger, Gerald Stokka NDSU Dept of Animal Sciences, Zoetis

Calf Vaccination Study

- 76 NDSU Beef Calves Angus, Simmental, and Shorthorn.
- Weaned 45 days, transported to the BCRC, and trained (2 weeks) to the Insentec feeding system.
 - Calves had been vaccinated at birth, turnout and pre-weaning.
- 2 day average weights on study, 2 day average weights off study. Calves vaccinated on Day 0.
- Calves blocked by weight to 3 pens, light, medium and heavy. Calves then randomly assigned to treatment with equal treatments within pen.
- Receiving diet, 53% DM, 50% forage, corn silage, with dry distillers.

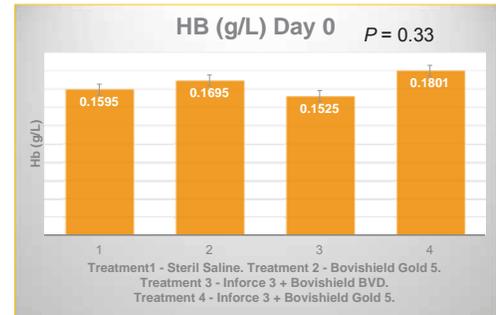
Summary

Treatment	On weight	Off weight	Gain/ADG	3 Day gain	6 Day gain
TX 1 Saline	795(76.2)	847.5(76.4)	52.5/1.88	6.05(11.53)	5.26
TX 2 BS Gold/OS	778.2(89.4)	845.5(94.9)	67.4/2.41	8.68(22.01)	13.68
TX 3 OS/BVD & INF3	789.4(71.9)	847.6(76.9)	58.16/2.08	9.47(12.01)	10.53
TX 4 BS Gold/OS & INF3	778.5(82.7)	836.3(92.8)	57.76/2.06	8.55(18.34)	9.87

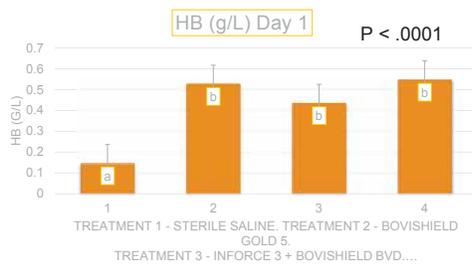
Summary

Treatment	DMI(kg)	Avg time(min)	Avg number visits	Avg number of meals	
TX 1 Saline	8.86(0.78)	172	42.7(14.95)	12.03(1.76)	
TX 2 BS Gold/OS	9.14(0.83)	175.1	42.1(11.9)	12.07(1.90)	
TX 3 OS/BVD & INF3	9.07(0.84)	176.3	41.35(12.5)	11.75(1.67)	
TX 4 BS Gold/OS & INF3	8.73(0.85)	177.7	36.1(10.25)	11.23(1.81)	

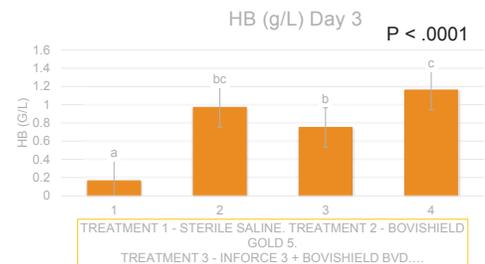
Haptoglobin Day 0



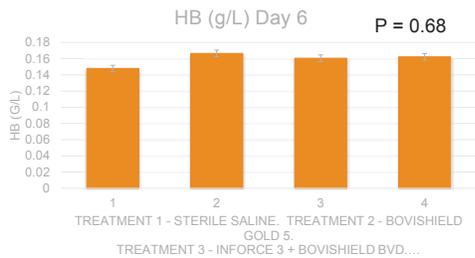
Haptoglobin Day 1



Haptoglobin Day 3



Haptoglobin (g/L) Day 6

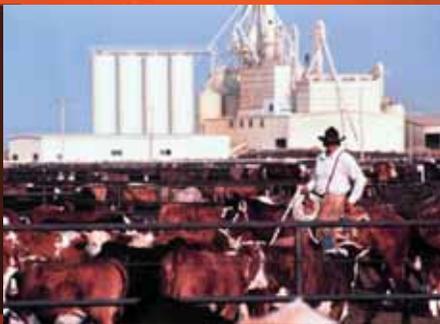


Impact on intakes of arrival vaccination programs –A few references

1. Cooper VL, Brodersen BW. Bovine Respiratory Disease. *Vet Clin North Am: Food Anim Pract* 2010;26(2):191–417.
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4. Cummins J. Keeping cattle healthy. *Feedlot Management*. 1983.
5. Richeson JT, Beck PA, Gadberry MS et.al. Effects of administration of a modified-live respiratory vaccine and timing of vaccination on health and performance of high risk beef stocker calves. *Bov Pract*, 2015;49(!):37-42

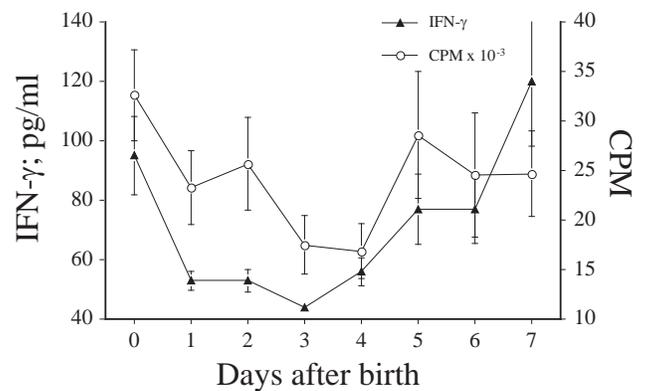
Four areas of research that are changing paradigms about impact of the immune system on performance

Prime boost



Neonatal immune dysfunction

Diminished IFN- γ and Blastogenic responses in the first few days after birth, in neonatal calves



DURATION OF IMMUNITY TO EXPERIMENTAL INFECTION WITH BOVINE RESPIRATORY SYNCYTIAL VIRUS (BRSV) FOLLOWING INTRANASAL VACCINATION OF YOUNG PASSIVELY IMMUNE CALVES¹²

• STUDY DESIGN

- 84 dairy calves (3 to 11 days old)
- Study one
 - Sero-negative calves administered TSV-2® (10)
 - Sero-negative calves administered Inforce 3 with MID BRSV (16)
 - Challenged 7 weeks post-vaccination
- Study two
 - Sero-positive calves administered TSV-2 (15)
 - Sero-positive calves administered Inforce 3 (15)
 - Challenged 9 weeks post-vaccination
- Study three
 - Sero-positive calves administered TSV-2 (14)
 - Sero-positive calves administered Inforce 3 (14)
 - Challenged 14 weeks post-vaccination

12. Ellis, J. et al. JAVMA. Vol 243, No. 11, December 1, 2013.
33 Presentation Title – 00/00/12 (Optional)



KEY FINDINGS¹²

	MORTALITY	
	CONTROLS	VACCINATES
Study 1	9/10*	0/16*
Study 2	10/15*	3/15*
Study 3	10/10	7/16

* indicates a significant difference between control and vaccinates groups P<0.05
34 Presentation Title – 00/00/12 (Optional)



What is prime boost?

The basic prime boost strategy involves:

1. **Priming** the immune system to a target antigen delivered by one vector, route, or mechanism, and then
2. selectively **boosting** this immunity by re-administration of the antigen in the context of a second and distinct method.

Several papers have highlighted the power of prime-boost strategies in eliciting protective cellular immunity to a variety of pathogens and have demonstrated efficacy in humans. Coupled with recent advances in our understanding of the mechanisms underlying the generation, maintenance and recall of T-cell memory, the field is poised to make tremendous progress.

[Woodland DL](#)¹ Jump-starting the immune system: prime-boosting comes of age. [Trends Immunol.](#) 2004 Feb;25(2):98-104.

What is prime boost?

The key strength of this strategy is that greater levels of immunity are established by heterologous prime boost than can be attained by a single vaccine administration or homologous boost strategies.

With some of the early prime boost strategies this effect was merely additive, whereas some newer strategies indicate powerful synergistic effects can be achieved

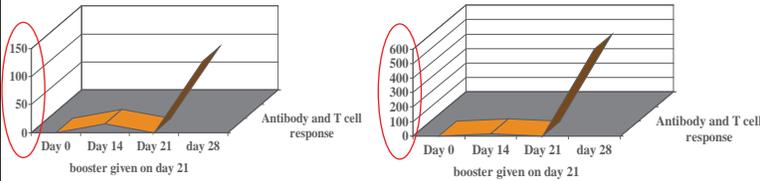
- more complete immune system stimulation
- better CMI/T cell stimulation
- increased number of antigen-specific T cells,
- selective enrichment of high avidity T cells
- potentially better local immunity
- increased efficacy against pathogen challenge

Anamnestic Response

Conventional vs. Prime Boost

Conventional (Homologous boost)

Prime boost (Heterologous boost)



>4x higher antibody and T-cell response

What is prime boost?

Prime boost strategies may include:

1. Different routes of administration
2. Different antigen presentations
3. Modified live and killed
4. Different adjuvants (i.e. different antigen-delivery systems)

Heterologous boosting

Prime boost studies

with Zoetis vaccines

Evaluating the serological effect of two concurrent IBRV, BVDV, BRSV, PI3V, and *Mannheimia haemolytica* vaccination protocols and time interval between the first and second dose on the subsequent serological response to the BRSV and *M. haemolytica* fractions in suckling beef calves

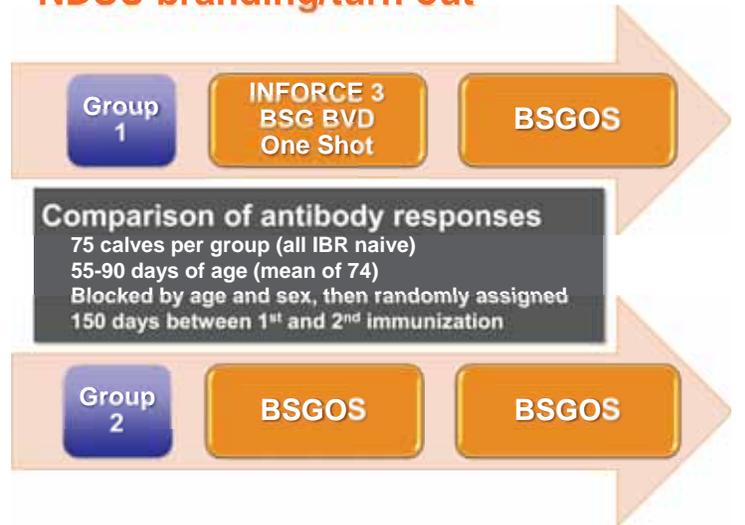
Gerald L. Stokka, DVM, MS;¹ Bryan Neville, PhD;² Jon T. Seeger, DVM;³ Victor S. Cortese, DVM, PhD;⁴ James J. Gaspers, BS¹

(North Dakota State University "branding/turnout study")

Status:

- Manuscript being accepted for publication in the next issue of Bovine Practitioner (AABP)

NDSU branding/turn out



Least squares means of BRSV neutralizing antibody at days 0, 14, 27, 153, and 174

Treatment Group	Vaccine	Day 0	Day 14	Day 27	Day 153	Day 174
T1	INFORCE 3 BSG BVD One Shot	14.1	8.7	24.1	2.8	15.3
T2	BSGOS	12.9	7.4	14.7	2.1	7.2
P value		ns	ns	*	*	*
T1 vs T2		P = 0.64	P = 0.33	P = 0.003	P = 0.001	P = 0.006

* significant

↑
1st Vaccine
↑
Boost with BSGOS

088 (4/12)

Old Presentation

INTRANASAL FOLLOWED BY SYSTEMIC VACCINATION IS AN OPTIMAL VACCINATION SCHEDULE FOR YOUNG CALVES AGAINST BOVINE RESPIRATORY SYNCYTIAL VIRUS AND PARAINFLUENZA TYPE 3 VIRUS

Vangeel I, Raue R.

Pfizer Animal Health, Veterinary Medicine Research and Development, Sandwich, UK

Outbreaks of bovine respiratory disease (BRD) most frequently occur in young animals. Due to the high prevalence of maternal antibodies against Bovine Respiratory Syncytial Virus (BRSV) and Parainfluenza Type 3 Virus (PI3V), systemic two-dose vaccination of calves below three months of age often induces insufficient protection against these viruses. In this study, a vaccination schedule comprising intranasal vaccination with a modified live BRSV and PI3V vaccine at three weeks of age followed by systemic booster vaccinations with modified live vaccine at three and four months of age was evaluated in calves with and without maternal antibodies.

Calves were either vaccinated intranasally (Hapovet® RS-PI3 Intranasal, Pfizer Ltd) at three weeks of age followed by booster vaccinations intramuscularly (Hapovet® 3, Pfizer Ltd) at three and four months of age, vaccinated intranasally at three weeks of age only, vaccinated intramuscularly at three and four months of age only or not vaccinated at all. The same experiment was carried out in calves with and without maternal antibodies. Blood samples were collected weekly until four weeks after the second booster and BRSV and PI3V serum antibody levels were measured by ELISA.

In calves without maternal antibodies intranasal vaccination induced high serum antibody levels to BRSV and PI3V. The booster injections were necessary to prevent antibody levels for PI3V declining from nine weeks and BRSV from 14 weeks after intranasal vaccination as observed in calves that did not receive the boosters. Antibody responses to both BRSV and PI3V after the first intramuscular vaccination at three months of age were higher in calves vaccinated earlier with the intranasal vaccine compared with calves that only received their first vaccination at three months of age.

In calves with maternal antibodies there was no increase in BRSV or PI3V serum antibody levels after intranasal vaccination. However, after the first booster again higher antibody levels were measured in calves earlier vaccinated intranasally compared with calves that had not been vaccinated before. BRSV and PI3V antibody levels of calves that were not given booster vaccinations continued to decline beyond three months of age.

Based on the serological monitoring carried out in this study, it was concluded that intranasal followed by systemic vaccination is an optimal vaccination schedule for young calves against BRSV and PI3V.



Vaccinal protection against Bovine Viral Diarrhea virus and Bovine Herpesvirus-1 provided by annual revaccination with Bovi-Shield GOLD FP® 5 or CattleMaster GOLD FP® 5 after pre-breeding vaccination with Bovi-Shield GOLD FP 5

Walz, Givens, Riddell, Rodning, et. al.
Auburn University College of Veterinary Medicine
Study report data on file, April 2014. Manuscript accepted for publication.

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A Mature Immune System

Consider the immune system to be mature by 10-12 months of age



Some maternal antibody may persist at this time, so consider a 2nd MLV vaccination at 6-8 months of age.

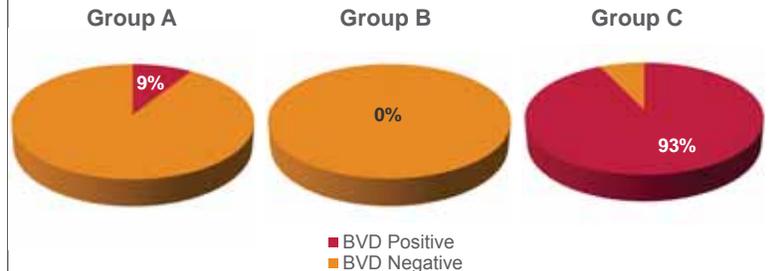
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Clinically relevant question to address

Will initial pre-breeding immune system priming with Bovi-Shield GOLD FP 5 allow an annual booster dose of CattleMaster GOLD FP 5 to provide reproductive protection against BVD and IBR challenges?



Summary of BVD challenge: Offspring (Positive and negative aborted fetuses and live born calves)



BVD Offspring Results: Key Points

- > No statistical difference between vaccine Groups A and B ($p=0.4894$)
- > Both Group A and Group B results were significantly better than Group C ($p<0.0001$)
- > There were no BVD-negative live births in Group C

Pregnancy rate and number of abortions in cows after BVD and IBR challenge

Treatment Group	Pregnant at challenge onset	Abortions occurring after BVD challenge but before IBR challenge	Abortion occurring after IBR Challenge	Total Abortions
Group A	23/24 (96%)	1	2	3/23 (13%)
Group B	22/23 (96%)	0	1*	1/22 (5%)
Group C	15/15 (100%)	2	9	11/15 (73%)

BVD and IBR abortions: Key Points

- > A double challenge of this nature would rarely occur in the real world
- > The most abortions were a result of the IBR challenge
- > Without the IBR challenge, the BVD positive Group C fetuses would have been born BVD Persistently Infected (PI).

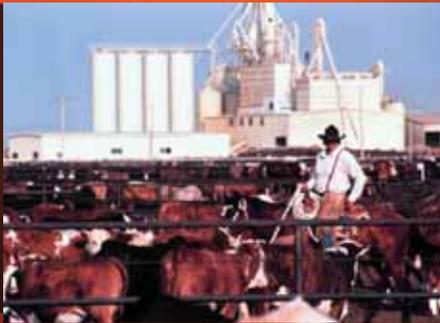
*The Group B aborted fetus was negative to both BDV and IBR

Vaccination Pre-breeding or Dry Off/Pre-calving

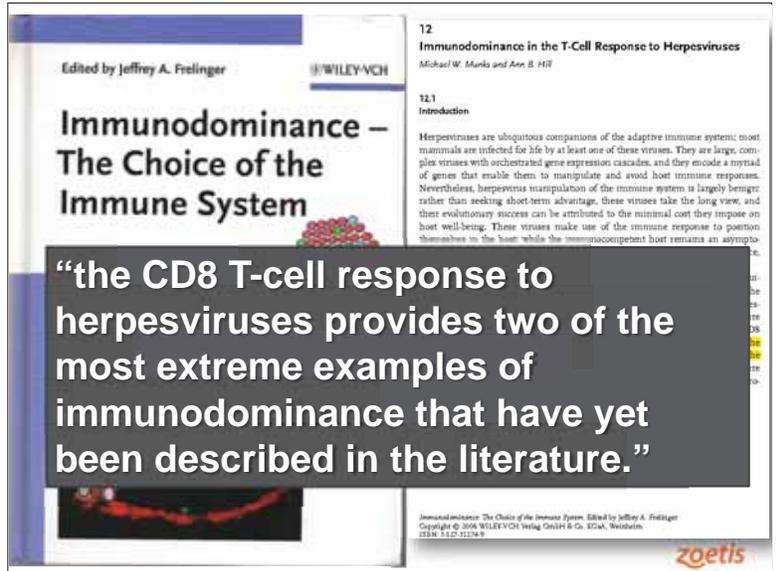
- Reasons to vaccinate pre-breeding
 - 1. pregnancy is immunosuppressive
 - 2. no risk of vaccine causing abortions
 - 3. the majority of reproductive diseases' impacts are early to mid pregnancy
 - 4. substantial drop in immunity during colostrogenesis
 - 5. pregnancy check vaccines require longer durations of immunity to cover all of pregnancy

Four areas of research that are changing paradigms about impact of the immune system on performance

Antigen interference



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Dominant Antigen Interference

Immunologic impacts of injectable IBR:

In IBR-negative calves administered injectable IBR:

- Reduced immune response to co-administered *Pasteurella* vaccines¹
 - Level of immune response
 - Number of animals with immune response
- May also suppress immune response to co-administered bacterins or toxoids
 - Clostridial
 - *Histophilus* (*Haemophilus*)
- Possibly occurs with other vaccines (impact on autogenous?)

PEER REVIEWED:

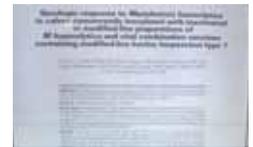
¹Harland, RJ et al. The Effect of Subunit or Modified live bovine herpesvirus-1 vaccine on the efficacy of a recombinant *Pasteurella hemolytica* vaccine for the prevention of respiratory disease in feedlot calves. *Can Vet J* 1992 33:734-741.

Stollenow C¹, Cortese VS², Seeger JT³, Stokka GS⁴, Weigel D⁵. Immunologic Responses of Beef Calves to Concurrent Application of Modified-Live Viral Vaccine (Intranasal and Systemic Administration) and Systemically Administered *Mannheimia haemolytica* Bacterin-Leukotoxoid. *Bovine Practitioner* 2011;45(2):132-138.

Cortese VS, Seeger JT, Stokka GL, Hunsaker BD; Lardy GP, Weigel DJ, Brumbaugh GW. Serologic response to *Mannheimia haemolytica* in calves concurrently inoculated with inactivated or modified-live preparations of *M. haemolytica* and viral combination vaccines containing modified-live bovine herpesvirus type 1. *Am J Vet Res*, 2011 72(11); 1541–1549).

Dominant Antigen/Interference Impacts:

- Blocking *Pasteurella* vaccines¹
 - Published with IBR (MLV)
- May occur with other vaccines
- May also be seen with other antigens
 - Clostridial
 - *Histophilus* (*Haemophilus*)



PEER REVIEWED

Immunologic Responses of Beef Calves to Concurrent Application of Modified-Live Viral Vaccine (Intranasal and Systemic Administration) and Systemically Administered *Mannheimia haemolytica* Bacterin-Leukotoxoid

Charles Stollenow¹, DVM; Victor S. Cortese², DVM, PhD; Jon T. Seeger³, DVM; Gerald S. Stokka⁴, DVM, MS; Daniel Weigel⁵, PhD

¹The Effect of Subunit or Modified live bovine herpesvirus-1 vaccine on the efficacy of a recombinant *Pasteurella hemolytica* vaccine for the prevention of respiratory disease in feedlot calves

Harland, RJ et al *Can Vet J* 1992 33:734-741

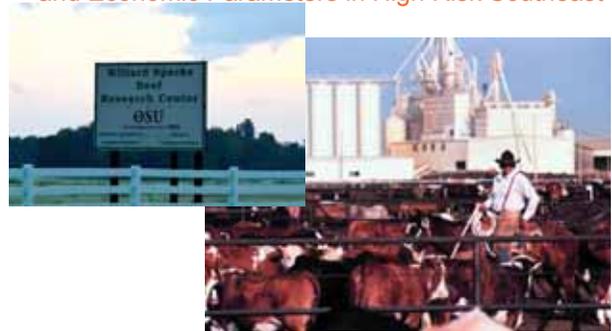
Four areas of research that are changing paradigms about impact of the immune system on performance

Putting it all together
Newest arrival study
from Oklahoma State
University



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Evaluation of Three Arrival Vaccination Programs On Health and Economic Parameters in High Risk Southeast Cattle



THIS STUDY WAS CONDUCTED BY ZOETIS AND OKLAHOMA STATE UNIVERSITY

AT THE WILLARD SPARKS BEEF RESEARCH CENTER (WSBRC) FEEDLOT

OKLAHOMA STATE PERSONNEL

D.L. Step, DVM
Clint Krehbiel, PhD
Jerry Malayer, DVM
Cody Hixon, MS

ZOETIS PERSONNEL

Douglas Hilbig, DVM
Victor Cortese, DVM, PhD, Dipl. ABVP (Dairy)
Tom Short, PhD

CATTLE ENROLLED IN THE STUDY

Image property of Zoetis Inc.



- Southeast origin mixed beef breeds
- Multiple origins (sale barn)
- Health histories
 - 4-8 months of age
 - 350-600 pounds
 - Bulls and steers
- Considered high risk cattle
- Typical of the cattle fed at this location over the last few years
- Cattle were received and enrolled in late winter and early summer of 2014

Study Objective

Compare the health and growth outcomes of calves receiving either Inforce™ 3 & One Shot® BVD, Pyramid® 5 + Presponse® SQ, or Vista® Once SQ followed by respective 5-way modified-live vaccines



Image property of Zoetis Inc.

TREATMENT GROUPS

- **Treatment One:** **INFORCE 3** and **ONE SHOT^{BVD}** followed by **Bovi-Shield® GOLD 5**
- **Treatment Two:** Pyramid® 5 + Presponse® SQ followed by Pyramid® 5
- **Treatment Three:** Vista® Once SQ followed by Vista® 5 SQ

- All cattle
 - Dewormed with Dectomax® injectable
 - Castrated
 - Tip dehorned
 - Vaccinated with Ultrachoice™ 7
 - **No Metaphylaxis**

~480 Calves per Treatment Group
16 Pens per Treatment
30 Head per Pen

Pyramid and Presponse are registered trademarks of Boehringer Ingelheim Vetmedica Inc.
Vista is a registered trademark of Merck Inc.
INFORCE 3, Ultrachoice, Bovi-Shield GOLD and One Shot are trademarks of Zoetis Inc.

STUDY DESIGN

Image property of Zoetis Inc.

- Randomized to weight and castration status
- 60 day duration of trial
- INFORCE 3 and One Shot BVD calves kept separate by barrier and empty pen
- Calves were treated and then sent to home pen



STUDY MEASUREMENTS

Image property of Zoetis Inc.

- 1 Incoming and 60 day weights
- 2 Feed intakes (pen basis)
- 3 Treatments
- 4 Re-treatments
- 5 Mortality and Chronics



RESULTS

	INFORCE 3 and ONE SHOT BVD	PYRAMID 5 + PREPONSE SQ	VISTA ONCE SQ	P-VALUE
Number of Calves	483	481	478	
Health Variables				
1 st Rx	42.7%	44.1%	46.6%	0.49
2 nd Rx	8.0% _a	10.1% _{a,b}	13.6% _b	0.01
3 rd Rx	3.7% _a	3.7% _a	6.7% _b	0.03
Mortality	4.4%	6.4%(P=.14)	7.6%(p=.03)	0.09
Chronics	1.7%	0.9%	1.5%	0.55

Rows with different subscripts differ.

1st Rx = Percent of cattle treated initially (1st treatment)

2nd Rx = Percent of cattle treated a second time

3rd Rx = Percent of cattle treated a third time

RESULTS: Evidence Based Medicine

Inforce 3 and One-Shot BVD vs Vista Once SQ

- Cattle that received Inforce 3 and One Shot BVD were 1.8 times less likely to experience mortality than were cattle that received Vista Once SQ ($P = 0.09$)
- Using Inforce 3 and One Shot BVD reduced the risk of mortality by 40.9%. (95% CI = 4.9 to 63.5)
- The absolute reduction in incidence of mortality was 3.6%, or a reduction of about 3 out of 100 head treated during 60 days of observation. (95% CI = 0.4 to 6.9)

NNT:

In circumstances similar to those in which this 60 day study was conducted, one needs to vaccinate 27 head with Inforce 3 and One Shot BVD to help prevent 1 mortality that would have occurred if Vista Once SQ were used. (95% CI = 14 to 266)

RESULTS: Evidence Based Medicine

Inforce 3 and One-Shot BVD vs Pyramid Presponse

- Cattle that received Inforce 3 and One Shot BVD were 1.2 times less likely to experience mortality than were cattle that received Pyramid Presponse ($P = 0.09$)
- The absolute reduction in incidence of mortality was 1.9%, or a reduction of about 2 out of 100 head treated during 60 days of observation. (95% CI = -0.047 to 0.0090.4)

NNT:

In circumstances similar to those in which this 60 day study was conducted, one needs to vaccinate 53 head with Inforce 3 and One Shot BVD to help prevent 1 mortality that would have occurred if Pyramid Presponse were used. (95% CI = -21 to 116)

What is driving this?

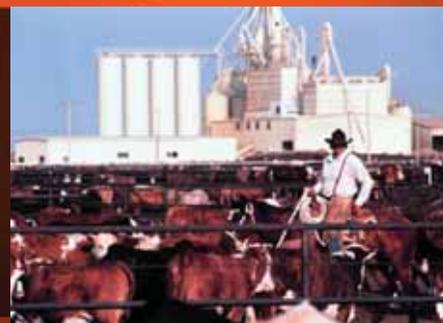
- Four potential
 - 1. Getting or keeping them at the bunk for the first five days after vaccination
 - 2. Higher levels of interferon in the nasal secretions after vaccination and/or on challenge
 - 3. Higher BRSV protection and Mannheimia
 - 4. Lack of Mannheimia vaccine interference

Effect of constant exposure to cattle persistently infected with bovine viral diarrhea virus on morbidity and mortality rates and performance of feedlot cattle

– Daniel L. Grooms, DVM, PhD; Kenny V. Brock, DVM, PhD; Steven R. Bolin, DVM, PhD; Dale M. Grotelueschen, DVM, MS; Victor S. Cortese, DVM, PhD

Four areas of research that are changing paradigms about impact of the immune system on performance

Bibersteinia trehalosi



Emerging Respiratory Pathogen

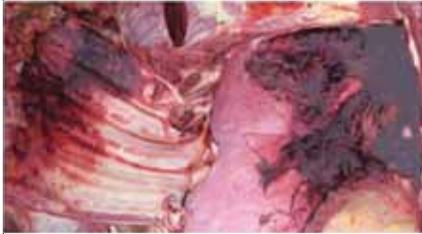
Bibersteinia (Pasteurella) trehalosi

- Closely related to Mannheimia hemolytica
 - Most labs report out a M. hemolytica on culture results
 - Has leukotoxin, endotoxin and capsular polysaccharide and as a virulence factor¹
- Has been shown to be resistant to florfenicol²
- Until now has been primarily associated with septicemia and systemic pasteurellosis in young sheep and goats
- Similar predisposing factors to M. hemolytica
- Tonsillar crypt colonization?
- More contagious?

1. Robert L. Davies, Susan Campbell, Thomas S. Whittam. Mosaic Structure and Molecular Evolution of the Leukotoxin Operon (*lktCABD*) in *Mannheimia (Pasteurella) haemolytica*, *Mannheimia glucosida*, and *Pasteurella trehalosi* *Journal of Bacteriology*, January 2002, p. 266-277, Vol. 184, No. 1
2. Corinna Kehrenberg, Danièle Meunier, Hayette Targant, Axel Cloeckart, Stefan Schwarzl, Jean-Yves Madaec. Plasmid-mediated florfenicol resistance in *Pasteurella trehalosi* *Journal of Antimicrobial Chemotherapy* 2006 58(1):13-17

Clinical Signs

- First seen in dairy calves in CA, then adult cattle
- Peracute to Acute non responsive pneumonia high death loss and appears to spread (in sheep death within 6-8 hours)
- Primarily seen in start up, expansion or overcrowded dairies
- *Bibersteinia trehalosi* was isolated from several respiratory disease cases in both adult cattle and calves. Often a fibrinous bronchopneumonia with pleuritis has been reported. It has been isolated both in pure growth and in mixed growth. In one case from this quarter a three-year old Holstein Friesian cow that had been calved ten days showed a severe fibrinous bronchopneumonia affecting all lung lobes with fibrin tags on the visceral pleura. *B. trehalosi* was cultured from lung, spleen, mammary gland and uterine contents.¹



Efficacy of a multivalent modified-live virus vaccine containing a *Mannheimia haemolytica* toxoid in calves challenge exposed with *Bibersteinia trehalosi*

• Terry L. Bowersock, DVM, PhD; Brian E. Sobecki, BS; Sarah J. Terrill, MS; Nathalie C. Martinon, DVM;
• Todd R. Meinert, PhD; Randy D. Leyh, DVM, PhD

PEER REVIEWED

Case report – Peracute to acute fatal pneumonia in cattle caused by *Bibersteinia trehalosi*

Victor S. Cortese,^{1 DVM, PhD}; **Douglas A. Braun,**^{2 DVM, MBA}; **Dawn Crouch,**^{3 DVM};
Charles Townsend,^{4 DVM}; **Bob Zukowski,**^{5 DVM}

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Kory Stalsberg

University of Wisconsin—Extension



Kory Stalsberg serves both Grant and Lafayette Counties as the Dairy and Livestock Agriculture Agent. His current programs focus on dairy modernization, beef cattle management and young/beginning farmers. Kory grew up on a dairy and beef farm in southwest Wisconsin and earned his BS in Agriculture Education at UW-Platteville and his MS from UW-Lacrosse. Prior to working with UW-Extension, he taught high school agriculture for nine years. Kory resides in Fennimore, WI with his wife and two children.




Livestock Hauling *BQA Style*



Presentation prepared by
Kory Stalsberg, UW-Extension Grant & Lafayette Counties
Bill Halfman, UW-Extension Monroe County
Sandy Stuttgen, UW-Extension Taylor County
Cheryl A. Skjolaas, Agricultural Safety Specialist,
UW Center for Agricultural Safety and Health

1

Disclaimer

UW-Extension does not endorse or discourage use of any brands or companies shown throughout this presentation.

Pictures are used solely for examples.




2




Livestock Transportation Safety **13 Card**

Is your Truck and Trailer ready to Transport?

- **Truck** Investing your time prior to transporting livestock will pay off in
- **Trailer** road incidents and injury to livestock.

Before starting a trip:

- **Transportation Considerations**
 - Inspect your truck and trailer (see other side)
 - Know the route
 - Check weather conditions
 - Review insurance liabilities

For further information, see: fyi.uwex.edu/wbic

Make Every Trip Count. Save Lives. Save Profits.

Do you have ENOUGH TRUCK?




Source: <http://www.wilsontrailer.com>
Accessed July 8, 2016

4

Key Points for Towing Vehicles

Getting the load moving is not where the problems usually occur....



How Much Can a Truck Haul?

- Frame and Suspension
- Body Configuration
- Engine
- Transmission
- Rear Axle Gear Ratio
- Hitch Configuration



UW Extension Pro & Farm
Accessed July 8, 2016

Frame and Suspension

- Easy to determine
- Truck models usually provide a general idea of load capacity
For example, 150, 250, 350 or 1500, 2500, 3500
- Numbers correspond to different duty rating and towing ability based on size and strength of frame, suspension, powertrain, brakes

Body Configuration

2-wheel drive vs 4X4

- 2-wheel drive has a lighter base vehicle weight
 - which leads to higher maximum payload and towing capacity
 - but may limit ability to tow in less than ideal conditions

Body Configuration

Cab style

Larger or extended cabs have heavier base body weight which reduces additional payload and towing capacity.



Source: www.gmc.com
Accessed July 8, 2016

9

Engine and Transmission

- Provides power to pull and hold back the load
- Engines with maximum torque at lower RPM are easier to tow with than those that develop maximum torque at higher RPM
- Tow mode computers also adjust ignition curve and injection pumps for the task at hand
- Heavy duty cooling and lubrication systems



10

Transmission

- Newer technology automatic transmissions are better able to handle demands of towing and hauling.
- More speeds (gears) allow for improved optimization of engine efficiency
- Additional oil and transmission coolers on heavy duty trucks



Source: allisontransmission.com
Accessed July 8, 2016

11

Rear Axle Gear Ratio

- Lower gear ratio - higher fuel efficiency, lower towing capacity
Example 3.21 : 1
- Higher gear ratio - less fuel efficiency, higher towing capacity
Example 4.40 : 1



Source: differential.com
Accessed July 11, 2016

12

Rear Axle Ratio Example

1 - ton Diesel 4x4, dual rear tires, automatic transmission, mid-sized cab

Axle ratio	Maximum payload (lb)	Maximum towing load (lb)
3.42	5607	20,450
3.73	5607	24,950
4.10	5607	30,250



13

Hitch Categories

	Towing Capacity (lb)	Tongue Weight (lb)
Class I	2,000	200
Class II	3,500	350
Class III	6,000	600
Class IV	10,000	1,000
Class V	25,000	5 th wheel/ gooseneck



14

Weight Terms

- **Curb Weight**
Weight of truck with all fluids filled and no additional payload
- **Gross Vehicle Weight Rating (GVWR)**
Weight of vehicle plus payload
Includes tongue or gooseneck trailer weight applied to the truck
- **Gross Combined Weight Rating (GCWR)**
Maximum weight of loaded vehicle and loaded trailer
- **Maximum Trailer Weight Rating**
Maximum weight a loaded trailer the truck is safely rated to pull



15

Example:

¾ ton 4x4, gasoline engine, 3.73:1 rear axle ratio

Curb Weight	GVWR	Payload*	GCWR	Max Trailer Wt**
6,871	10,000	3,130	19,800	12,460

*Payload includes driver and passengers, tongue weight from trailer and weight of other items in the truck.

**Maximum Trailer Weight is weight of empty trailer plus all the cargo in or on the trailer.



16

Tires, Wheel Bearings & Brakes

- Use LT (Light Truck) or ST (Special Trailer) tires
- Replace worn or old tires
 - inspect for dry rot- cracks in sidewalls
 - tread depth: use the "penny test"
- Proper inflation



17

How to determine the age of tires?

This tire was made the 35th week of 2011.

First two numbers are week of the year



Second two numbers are the year



18

Penny Test Dimensions



19

Penny Test for Tread Depth

- Put penny in grooves with Abe in head first.
- If you can see top of his head and hair, less than 2/32" - replace tires
- Check multiple places across tread



20

Where to Store the Spare Tire?

Must be able to access spare tires for both the truck and trailer when the trailer is loaded

- bed of pickup truck
- tire racks on outside of trailer
- check spare tires regularly for dry rot and pressure



21

Wheel Bearings & Brakes

- Periodically inspect truck and trailer's wheel bearings
- Condition of truck and trailer brakes
- At a minimum- follow manufacturer's service and maintenance schedule
 - heavy use and rough conditions may require more frequent maintenance



22

Inspect Wiring and Lights

- make sure all lights and turn signals are working
- repair, replace and cover wires as needed



Source: etrailer.com
Accessed: July 11, 2016

23

Trailer Considerations



24

Loading Bumper Trailers

- Usually want 60% of weight in front of axle
- Approximately 10-15% of total weight on the hitch
- Bigger animals up front
- Not enough weight on the tongue or towards the front can result in sway or fishtailing when going down the road. Can result in loss of control.



Gooseneck Trailers

20 to 25% of load should be on the hitch

Example - 24 ft gooseneck trailer, two axles, each rated at 8,000 lbs.

- plate says gross weight of trailer is 20,000 lbs.
- maximum load distribution would be:
 - 16,000 lbs. on the trailer axles
 - 4,000 lbs. on the truck axle via the gooseneck

Inspect the Hitch

- Properly sized ball for the hitch, correct fit, greased
- Locks down correctly
- If using a hitch pin, make sure it has a safety pin
- Safety chains



Safety Chains

- Adequate to secure the trailer to the truck if the hitch fails
- Need on both gooseneck and bumper trailers
- Some trailers have brake safety cable too



Secure the Doors!

- Do NOT put padlock on livestock trailer doors
 - in emergency situation, may need to easily and efficiently unload livestock
- Safety chain on the trailer's door: want the door secured by two methods
 - *Do not want cattle stepping out into the highway during transport!!*



Inspect Inside of the Trailer

- Flooring
 - rusty, broken or weak spots
 - traction
 - cleanliness
- Cut Gates & Latches
 - open fully
 - self-locking latches preferred
 - make sure latches latch and hold!
- Side Walls and Roof
 - bent bracings
 - holes
 - sharp edges



Flooring Considerations

- Useful life of wooden floor probably < 10 years, if not cleaned regularly, even less.
- Must have non-slip flooring
 - cattle panel
 - rubber mats



31

Cleanliness

- Fresh manure weighs 62.4 lb per cubic ft
- 2 inches of manure in a 20 ft x 7 ft trailer area is 23.3 cubic feet
 - *1456 lb. against the total weight you can haul*
- Biosecurity considerations



32

Can you change a flat tire when the trailer is fully loaded?

- Needed tools:
 - jack capable of lifting loaded trailer, blocks, wrenches
 - warning triangle
 - Location: accessibility when trailer is loaded
 - Cellphone and numbers to call for help
- Do not leave cattle on a stationary trailer: welfare issue, losses due to shrink, overheating*



33

The Rules of the Road

- The following slides reflect our understanding from recent discussions with a WI State Patrol Motor Carrier Officer and not offered as legal advice
- Appropriate WI State Statues are cited
- **Rules are subject to change**
- Our best advice is to contact the state you are hauling in to determine what is legal for your circumstances



34

DOT Number

Exemptions from s.329.09(7) Wis. Stats. Motor Carrier Safety

Farm truck or dual purpose farm truck:

- For travel within WI
 - DOT number NOT REQUIRED when GCVW, registered weight, and actual weight do not exceed 26,000 lbs.
- For travel outside of WI
 - As soon as truck or truck/ trailer combination weighs over 10,000 lbs. or cross state lines, then US DOT number IS REQUIRED



35

How to Display DOT number

On both sides of the vehicle must have:

- Legal name or single trade name
- Motor carrier number preceded by "USDOT"
- In a color in sharp contrast to background color
- Readily legible from 50' away during daylight on stationary vehicle



36

When do you need a CDL?

s.343.055(1)(c) Wis. Stats. Commercial Driver License Waivers

NOT REQUIRED

When hauling your own animals...

- Includes farmer, family member, and farm employees
- With your farm's truck and trailer within the state of WI, CDL requirement is waived:
 - Map-21 extended to the whole state
 - When operating CMV over 26,000lbs. and/or cross state lines, then the 150 mile radius rule applies



37

When do you need a CDL?

s.343.055(1)(c) Wis. Stats. Commercial Driver License Waivers

REQUIRED

If Hauling someone else's Animals...

CDL with correct Class and Endorsements is REQUIRED
No matter what the distance of travel.



38

When to weigh over the scales?

s.312.04 Wisc. Stats. Trans Weigh Station Stopping Requirements

- Total weight of truck and trailer over 10,000 lbs.
actual weight when scale is open

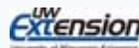
Operator shall stop and permit the truck/trailer and it's load to be weighed, measured or inspected



39

What do farm license plates allow?

- Can go beyond 150 miles if hauling own livestock
- When hauling your own livestock in vehicles that would normally require IRP (interstate travel)
 - Check with states traveling through to determine if need a trip permit. Not all farm plates are exempt from registration in other states
- **Cannot** not use farm plates if hauling another farmer's livestock



40

IFTA fuel tax for interstate travel:

Farm vehicles are NOT EXEMPT from IFTA.
 Either valid IFTA license and decals or a trip permit are REQUIRED with:

- Motor vehicle designed for hauling people or property with 2 axles and GVW or Registered GVW exceeding 26,000 lbs.
- Or vehicle having 3 or more axles regardless of weight
- Or used in combination when GVW or Registered GVW exceeds 26,000 lbs.



Transportation Considerations



Transportation Considerations

- Sort the load by size, sex, horns, special needs
- Space requirements

Recommended maximum number of cattle* for trailers of different lengths.**

Trailer size	Cattle weight, lbs						Total Wt.***	
	400	500	600	1000	1200	1400		1600
16 ft x 6 ft	10	12	5	7	6	5	4	< 7000
18 ft x 6 ft	21	14	10	8	7	6	5	< 8400
20 ft x 6 ft	33	15	12	9	8	7	6	< 9200
24 ft x 6 ft	38	18	14	11	9	8	7	< 11800
20 ft x 7 ft	27	18	13	11	9	8	7	< 10800
24 ft x 7 ft	32	22	16	13	11	9	8	< 13000
32 ft x 7 ft	43	29	22	17	14	12	11	< 17300

*This chart represents the maximum number of well-balanced cattle for trailers of different lengths when hauling headstayed cattle. Reduced the number of cattle by 5%.

**The number of cattle loaded during hot conditions should be reduced.

***Use maximum weight of cattle for each trailer size with these calculations. Do not exceed the Gross Vehicle Weight Rating for your truck and stock trailer.



Sorting

- Cow/calf pairs
 - separate cows from calves in the trailer to ensure the safety of calves.
- Bulls
 - separate bulls from each other
 - separate bulls from cows or calves.



Minimum square feet per head when loading in a trailer

Increase space per head during hot weather conditions.

Weight	Square Ft/ head
400	5.2
500	6.4
600	7.6
800	10.3
1000	12.75
1200	15
1400	17.5
1600	20



45

Loading Density

- Animals must be able to easily get up if they fall down.
- If hauling a small load put towards the front, and confined to compartments judiciously.



46

Weather

Summer: Heat Index: Haul early in the morning

High Temperatures °F

Heat Index

80F	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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230	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267</	

Cold Weather

Wind Speed	Air Temperature °F											
	105	100	95	90	85	80	75	70	65	60	55	50
5	105	104	103	102	101	100	99	98	97	96	95	94
10	101	100	99	98	97	96	95	94	93	92	91	90
15	97	96	95	94	93	92	91	90	89	88	87	86
20	93	92	91	90	89	88	87	86	85	84	83	82
25	89	88	87	86	85	84	83	82	81	80	79	78
30	85	84	83	82	81	80	79	78	77	76	75	74
35	81	80	79	78	77	76	75	74	73	72	71	70
40	77	76	75	74	73	72	71	70	69	68	67	66
45	73	72	71	70	69	68	67	66	65	64	63	62
50	69	68	67	66	65	64	63	62	61	60	59	58
55	65	64	63	62	61	60	59	58	57	56	55	54
60	61	60	59	58	57	56	55	54	53	52	51	50
65	57	56	55	54	53	52	51	50	49	48	47	46
70	53	52	51	50	49	48	47	46	45	44	43	42
75	49	48	47	46	45	44	43	42	41	40	39	38
80	45	44	43	42	41	40	39	38	37	36	35	34
85	41	40	39	38	37	36	35	34	33	32	31	30
90	37	36	35	34	33	32	31	30	29	28	27	26
95	33	32	31	30	29	28	27	26	25	24	23	22
100	29	28	27	26	25	24	23	22	21	20	19	18

Cold Weather: Wind Chill

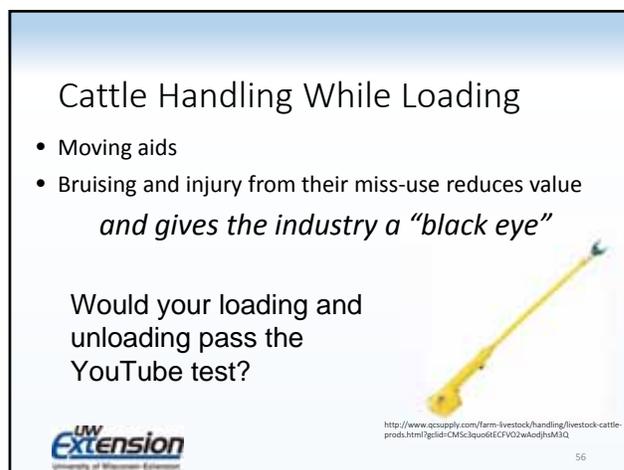
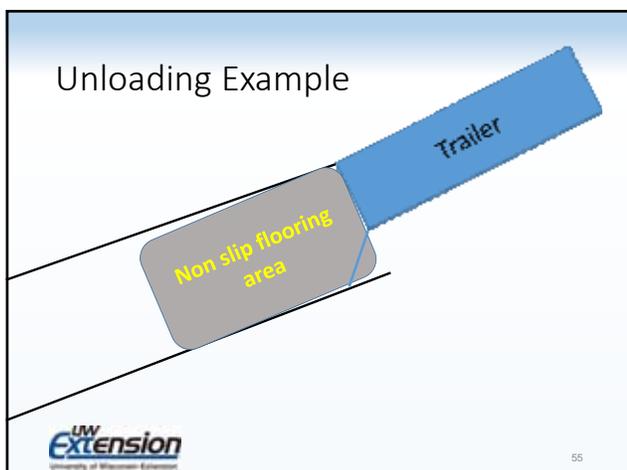
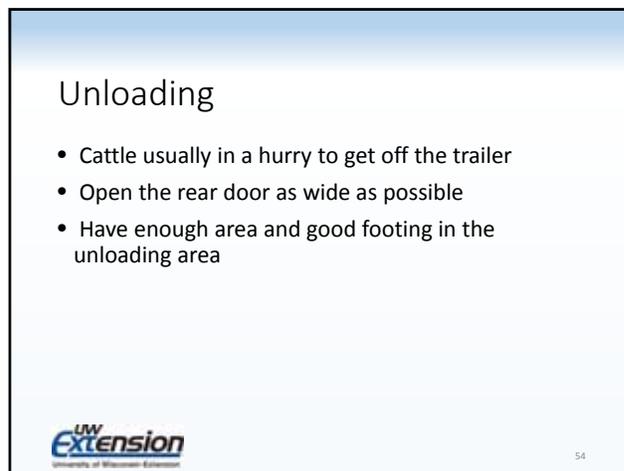
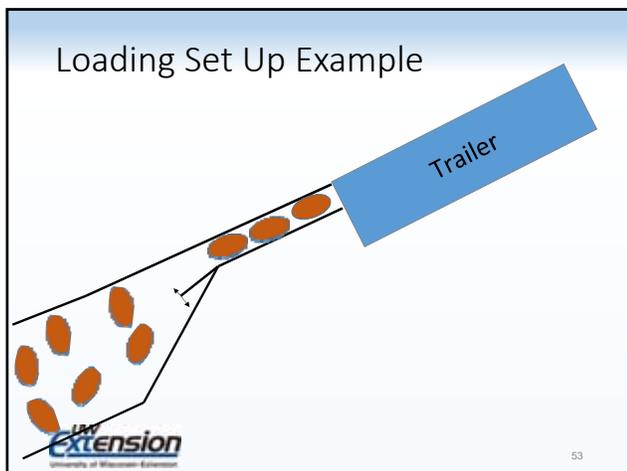
- Avoid hauling in extreme cold
- Avoid moving in the coldest part of the day
- Keep wind chill factor in mind
- If they must be moved in cold windy conditions, do so as quick and efficient as possible - do not stop
- Worst situation for hauling animals is cold wet conditions

Loading and Unloading

- Make step into and out of trailer minimal and easy for animals to do
- Let the cattle determine the flow into the trailer
 - this will reduce a lot of the stress

Setting Up to Load the Trailer

- Animals in a single file before the trailer door
- Load alley slightly narrower than trailer door
- Angle one side of crowd area
- Sort off enough to load each compartment at a time



Cattle Handling

- Reduce causes of cattle stalling
 - Shadows, distractions, poor light, slick flooring
- Being in a hurry always leads to problems
- Cattle can only think about one thing at a time

Special Needs Animals

- Should always be loaded last and first off
- **First determine:** Is the animal fit for transport?
 - rise and walk under their own power
 - survive entire transport and marketing process
 - no drug withdrawals
 - decision tree posters available

Lost \$\$

- Death or serious injury of one animal far surpasses the cost of an extra trip to haul the cattle.
- Example: Hauling cattle 40 miles at \$5.00 a loaded mile = \$200.00

Animal	Weight (lb)	Price (\$/lb)	Value (\$)	Income Loss
Feeder Calf	500	1.60	\$800	\$600
Finished Steer	1400	1.20	\$1680	\$1480
Cull Cow	1400	0.70	\$980	\$780

Plan and Know the Route

- Drive minimal traffic area
- Know road weight limits and abide by seasonal or special postings
- Check for detours or road work - WisDOT website
- Weather conditions
- Drive at a constant rate of speed
- Phone and phone numbers

Before Heading Out

- Make sure all animals are standing.
- On long hauls, check animals after 2 hours on the road, and every 4 hours after that.



Insurance

- Visit with **Your** Agent to make sure **Your** Policy covers what you are doing.
- Policies vary between and within companies
 - Trailer insurance
 - Property & Liability insurance
 - Commercial hauler's insurance
 - Hauling for friends....will you be covered?
 - Carry proof of insurance with vehicle



62

Livestock Transportation Safety



T3 Card



• Truck

• Trailer

Is your **Truck** and **Trailer** ready to **Transport**?

Investing your time prior to transporting livestock will pay off in

• **Transportation Considerations**

Before starting a trip:

- Inspect your truck and trailer (see other side)
- Know the route
- Check weather conditions
- Review insurance liabilities

Make Every Trip Count. Save Lives. Save Profits.

Thank you for your attention

Questions?

Contact us at:

Kory Stalsberg, UW-Extension Grant & Lafayette Counties

kory.stalsberg@ces.uwex.edu

Bill Halfman, UW-Extension Monroe County

bill.halfman@ces.uwex.edu

Sandy Stuttgen, UW-Extension Taylor County

sandy.stuttgen@ces.uwex.edu

Cheryl A. Skjolaas, Agricultural Safety Specialist,

UW Center for Agricultural Safety and Health

skjolass@wisc.edu



64

Emily Yeiser Stepp

National FARM Program



Emily Yeiser Stepp grew up just outside of Annapolis, Maryland. She began her involvement in the dairy industry through the 4-H dairy leasing program where she was able to “borrow” a calf from a local dairy farm to show at local, county and state fairs. Yeiser Stepp was involved in Maryland 4-H and the leasing program for over 10 years and went on to pursue a Bachelor’s of Science Degree in Animal Science with a minor in Agribusiness Management from Penn State University.

At Penn State, she was an active member of the Dairy Science Club, member of the collegiate dairy judging team, a sister of Alpha Zeta Fraternity and was President of the American Dairy Science Association-Student Affiliate Division.

Upon graduation from Penn State, Emily worked for ABS Global Inc. as their Young Sire Program Specialist in the Mid-Atlantic region. She then went on to attend graduate school at Virginia Tech and in 2011, obtained her Master’s of Science degree in Dairy Science. Her research was focused on how mastitis and metabolic diseases impact on dairy cow behavior.

Yeiser Stepp served as the Dairy Initiatives Manager for the Center for Dairy Excellence in Harrisburg, Pennsylvania for 4 ½ years. In this role, she was responsible for the execution of on-farm resource programs and the development and outreach to the industry’s next generation through the Center’s Foundation. Immediately prior to her role with the FARM Animal Care Program, she served as the Dairy and Beef Extension Coordinator at the University of Maryland.

Emily and her family maintain a small herd of 25 registered Holsteins and Brown Swiss under the Spots-Pride prefix, that are housed at Palmyra Farm in Maryland. Emily and her husband currently reside in Northern Virginia.



The National Dairy FARM Program

DEMONSTRATING FARMERS COMMITMENT TO BEST PRACTICES

EMILY YEISER STEPP

NMPF, DIRECTOR FARM ANIMAL CARE PROGRAM

PROGRAM BACKGROUND

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WHAT IS FARM?

- The dairy industry, through National Milk Producers Federation (NMPF) with support from Dairy Management, Inc. initiated a voluntary program named FARM: Farmers Assuring Responsible Management in 2009
 - Began with animal care and has since expanded

- **Program Goal:**

- Assure to **CONSUMERS & CUSTOMERS** that dairy farmers raise and care for their animals and land in a humane and ethical manner.

<http://www.nationaldairyfarm.com/>



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FARM PROGRAM HAS GROWN



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WHY DOES THE FARM PROGRAM MATTER?

- We know that the dairy industry has a great story to tell.
- The FARM Program helps provide the data and proof points to back up these positive stories on America's dairies.
- The FARM Program also helps provide one, consistent, unified program for the entire dairy industry to follow.

<http://www.nationaldairyfarm.com/>



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FARM ANIMAL CARE



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HOW DOES IT WORK?



<http://www.nationaldairyfarm.com/>



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NATIONAL DAIRY FARM ANIMAL CARE BACKGROUND

- FARM offers a *continuous improvement* process to ensure a high level of on-farm animal care.
- FARM sets the highest standards that encourages dairy farmers to *continually improve*.



<http://www.nationaldairyfarm.com/>



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FARM AC PROGRAM BY THE NUMBERS

- **105** Participating Co-ops and/or Proprietary Processors
- Covers **98%** of the domestic milk supply in **48** states
- > **45,000** 2nd party evaluations completed to date
- > **370** trained FARM Evaluators



<http://www.nationaldairyfarm.com/>



WHO MAKES DECISIONS ABOUT FARM ANIMAL CARE?

- The FARM Program is updated **every 3 years** by a group of:
 - Farmers
 - Academics
 - Veterinarians
 - Cooperative staff
- These individuals comprise the FARM Technical Writing Group.



<http://www.nationaldairyfarm.com/>



FARM ANIMAL CARE PROGRAM COMPONENTS



<http://www.nationaldairyfarm.com/>



PRODUCERS CONTINUE TO IMPROVE THANKS TO FARM ANIMAL CARE

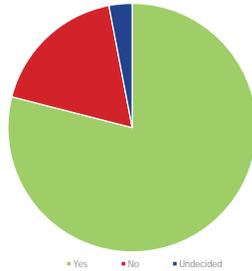
We asked: *What did you change on your dairy as a result of your evaluation?*

- "Worked on a herd health plan."
- "Insured that all employees were trained in animal care"
- "Bedding frequency increase for hygiene scores"
- "Improved heifer living conditions"
- "Added training"
- "We made a carrier for baby calves. We also have done a better job of putting SOPs into Spanish."



FARMERS VALUE FARM AC!

We asked: *Does FARM add value to your operation?*



• Yes • No • Undecided



FARM CONTINUES TO BUILD CUSTOMER SUPPORT



FOOD CHAIN ENDORSERS OF FARM ANIMAL CARE



- "Industry Standards or Codes of Practice that are recognized by Saputo in the countries where we have operations are: United States of America, **Farmers Assuring Responsible Management**"
- "We require all Great Lakes Cheese suppliers to meet animal care guidelines outlined in the National Milk Producers Federation's **FARM (Farmers Assuring Responsible Management) Program** or comparable state programs."
- "**Enrollment in FARM** (United States Suppliers) or the Red Tractor Scheme (United Kingdom and Republic of Ireland Suppliers) shall be complete by December 31, 2015."





- Chobani supports the **Farmer's Assuring Responsible Management (FARM)** animal welfare program. All farms supplying milk to Chobani must participate in the program. **FARM** encourages continuous improvement and use of best management practices.
- Kroger has requested that the dairy co-ops that supply us are, at a minimum, enrolled in The **National Dairy F.A.R.M. Program: Farmers Assuring Responsible Management™**, which provides consistency and uniformity of best practices in animal care and quality assurance in the dairy industry.
- ALDI encourages the dairy farms from which we source our milk and dairy products to participate in the **National Dairy FARM Program: Farmers Assuring Responsible Management**. This program provides best practices on animal care topics in the dairy industry.



FARM ANIMAL CARE VERSION 3.0



FARM ANIMAL CARE VERSION 3.0 TIMELINE

- **Process**
 - Animal Health & Well-being Committee (AHWC) Draft
 - Public Comment Period
 - Nearly 400 comments
 - Internal FARM Program staff review
 - Animal Health & Well-being Committee Final Approval
 - NMPF BOD approval of AHWC recommendations
 - Work with Co-ops and Processors to help dairy farmers prepare for Version 3.0
- **To do:**
 - Continue to build **SUPPORT** for FARM Animal Care Program



VERSION 3.0 PRIORITY AREAS

Phase One Priority Areas

- Veterinary Client Patient Relationship**
 - Official form signed by Veterinarian of Record
- Dairy Cattle Care Ethics & Training Form**
 - Signed by all employees with animal care responsibilities
 - Signed annually
 - Indicates:
 - Received training in stockmanship AND area of responsibility;
 - Will not abuse animals/Will report any mistreatment that occurs
- No Tail Docking**



VERSION 3.0 PRIORITY AREAS

Phase Two Priority Areas

□ Herd Health Plan

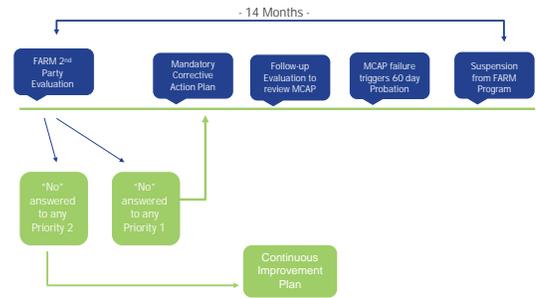
- o Protocols for newborn and milk-fed dairy calves.
- o Protocols for pain management.
- o Protocols and training for non-ambulatory animal management.
- o Protocols for euthanasia.

□ Animal Observations

- o Lameness
- o Body Condition
- o Hock/Knee



FARM 3.0 ACCOUNTABILITY MEASURES



VETERINARIAN CLIENT PATIENT RELATIONSHIP

- VCPR
 - Form, signed annually by farm owner or manager and Veterinarian of Record
- Having a established VCPR and a signed form helps bolster our arguments against additional regulation of drug use on dairy farms
 - Customers want to be ensured that there is veterinarian oversight/involvement on dairies
 - Expectation by consumers that veterinarians are playing a part in health-care decisions
- Veterinarians are trusted 3rd party experts who can come to the Industry's defense if relationships are established in advance



DAIRY CATTLE CARE ETHICS AND TRAINING AGREEMENT



- Signed annually by all employees with animal care responsibilities
 - Will not abuse animals
 - Will report any abuse if witnessed
 - Have received training in stockmanship AND their assigned area of responsibility
- Provides insurance for your dairy should there ever be an animal care allegation by demonstrating that employees understood your expectations and received training.
 - No employees implicated in undercover videos have signed this type of document
- Customers expect that employees are trained in how to handle and care for animals.



NO TAIL DOCKING

- **No tail docking after January 1, 2017.**
 - Farms should not be sending calves off dairies after this date to be docked.
 - Focused on routine tail docking NOT emergent issues.
 - Switch trimming recommended alternative.
- **No science to support practice, thus no experts to come to our defense.**
- **Customers do not support practice and had begun to impose their own deadlines.**
 - Not a change in FARM Program policy; change in phase-out deadline.



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HOW TO PREPARE FOR YOUR FARM EVALUATION



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PRIMARY AREAS OF EVALUATION

- Management SOPs and Records
- Newborn and Milk-Fed Calves
- Animal Nutrition
- Animal Health
- Environment and Facilities
- Handling, Movement and Transportation



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WHAT DOES THE EVALUATION ENTAIL?

1. Pre-Evaluation
 - Self-Assessment
 - Pre-Evaluation Checklist
2. Interview Questions
3. Animal/Facility Observations
4. Closing Meeting & Follow-up



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FARM EVALUATION CHECKLIST

- Documents
 - Veterinarian-Client-Patient Relationship
 - Dairy Cattle Care and Ethics Agreement
 - Training for those with animal care responsibilities
 - Stockmanship
 - Calf Care
 - Non-Ambulatory Animals
 - Euthanasia
 - Emergency Contacts
 - Drug Treatment Records
 - Mortality Records



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FARM EVALUATION CHECKLIST

- Herd Health Plan
 - Written Protocol Priority Areas (Trigger Continuous Improvement Plans)
 - Calf Care
 - Diseased/Injured Cattle with Pain Management
 - Non-Ambulatory Animals
 - Euthanasia
 - Total of 14 Written Protocols needed



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FARM EVALUATION CHECKLIST

- Herd Health Plan
 - Milking routine and procedures
 - Common disease treatment
 - Vaccination
 - Daily Observation
 - Treatment
 - Parasite, pest and fly control
 - Air quality
 - Lameness
 - Dystocia
 - Culling and Transport to Slaughter



FARM EVALUATION CHECKLIST

- Animal Observations
 - Identification
 - Body Condition Score
 - Hock and Knee Lesions
 - Locomotion
 - Hygiene
- Additional Observations
 - Water
 - Feed
 - Facilities
 - Protection from heat and cold
 - Proper and adequate bedding
 - Area to stand and lie down
 - Flooring
 - Clean, dry, ventilated calving area



RESOURCES TO HELP MEET EVALUATION AREAS

- Animal Care Reference Manual
- FARM Self Assessment Tool
- Sample VCPR
- Sample Dairy Cattle Care Ethics Agreement
- Training Log
- Emergency Contacts Poster
- Culling Poster
- Fillable Herd Health Plan Protocols
- Example Herd Health Plan
- Training Resources

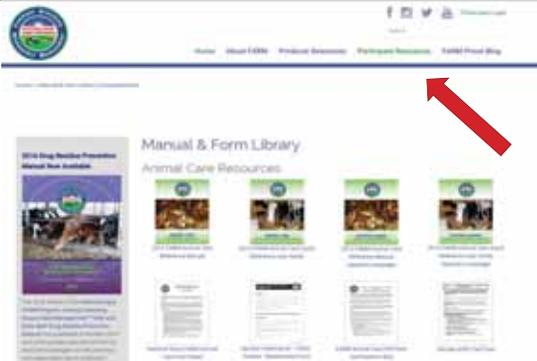


Can use FARM templates or your own versions of all documents, records and training



FARM TRAINING OPPORTUNITIES

- Stockmanship
- Calf Care
- Euthanasia
- Non-Ambulatory Animals
- Pain Management
- Crisis Preparedness
- Emerging Issues
- Culling Decisions
- Antibiotic Stewardship Webinars



HELP BUILD SUPPORT FOR FARM



SHARE YOUR FARM STORY!

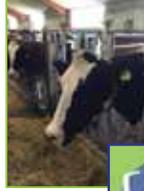
- Follow FARM on social media!

 • National Dairy FARM Program

 • @FARMProgram

 • @FARMProgram

- Share your questions about dairy animal care using #FARMProud



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CONTRIBUTE TO OUR FARM PROUD BLOG

Meet a FARM Evaluator Fabian Barrios, Dairy Farmers of America, Inc.



Myth Busting: Polled Genetics



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Thank you!

<http://www.nationaldairyfarm.com/>

Dr. Ron Gill

Texas A&M University

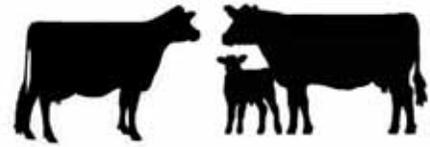


Dr. Ron Gill is professor and Extension livestock specialist for Texas A&M AgriLife Extension and also currently serves as Associate Department Head and Program Leader for Extension within the Animal Science Department at Texas A&M University.

Gill provides leadership in Extension programming related to animal well-being, stockmanship and low-stress livestock handling and helped develop the Stockmanship and Stewardship program he now delivers through collaboration with NCBA and the National BQA program. He also assists in providing leadership to statewide and national programming efforts for Beef Safety and Quality Assurance.

Gill serves on the Cattle Health and Well-Being Committee for the National Cattleman's Beef Association and to also serves on NCBA's Animal Welfare Advisory Group.

Dr. Ron Gill
Texas A&M University



Notes

Cattle Handling Pointers

Stockmanship and Low-Stress Handling

Ron Gill, PhD, Rick Machen, PhD, Professor and Extension Specialists, Texas A&M AgriLife Extension, Professor and Paul Genho Endowed Chair, King Ranch Institute for Ranch Management, Texas A&M University, respectively

Understanding Cattle Behavior

There are three basic means of communicating with livestock. Very simply they are:

- **Sight**
- **Sound**
- **Touch**

Cattle prefer to communicate through line of sight. Good stockmanship and low-stress handling can only be accomplished when a complete understanding of how a prey animal responds to line of sight and adoption of these in livestock handling are in place. Understanding the link between cattle's eyesight and their movement and behavior is critical in handling and in facility design.

Noise of any kind, but in particular the human voice, is usually stressful and marginally successful in getting the desired result. Sound should be used as a secondary method of communication and preferably only used when sight and position is not adequate. Distracting sounds shift cattle's focus away from the desired direction.

Touch is really only useful in situations where animals are confined and additional stimulus is needed to get cattle to move or respond. Effective touch does not include the use of driving aids such as hotshots or sorting sticks or paddles.

There are five basic principles of cattle behavior that when used properly can improve the ease and speed of working cattle while reducing stress and increasing efficiency. Those principles are:

1. Cattle want to see you.

Understanding vision is foundational to handler positioning and cattle response. Cattle have excellent peripheral vision with the exceptions of blind spots directly behind (large) and in front of (small) them. When working from behind and to keep cattle from turning, it is important to stay in their sight by moving from side to side.

2. Cattle want to go around you.

This is also related to the desire to maintain visual contact allowing the handler to get in a position such that, when cattle do go around them, the cattle are pointed directly at the intended gate or destination. They'll think it was their idea to go there.

Designing a “Bud Box”

Ron Gill, Ph.D., Rick Machen, Ph.D., Professor and Extension Livestock Specialists

There is nothing magical or mystical about a Bud Box. It is a facility design that allows the handler to position themselves correctly to facilitate cattle flow out of the box into either the crowd alley leading to a chute or to a trailer load out. Always keep in mind that the Box is a flow-through part of the facility. Cattle should never be stored in the Box waiting to be sent into the crowd alley or to a trailer. Bring them in and let them flow back out immediately.

Dimensions are important to successful use of a Box but not as critical as handler position in relation to the stock leaving the Box. Without proper position and attention to detail a Box will only confuse the stock and frustrate the handler.

The Box should be large enough to accommodate a volume of cattle to fill the crowd alley or fill a trailer compartment. A crowd alley to a squeeze chute should hold a minimum of 4 cows and might need to hold 20 head depending on the speed of processing. Crowd alleys on cow-calf operations will typically hold 5 to 6 cows. Facilities working calves or yearlings routinely need crowd alleys for 12 to 20 head of cattle.

Remember, the crowd alley will normally not be empty when additional cattle are brought through the Box. To maintain flow it will be necessary to add additional cattle while one or two stand in the crowd alley awaiting processing. Consequently the length of the crowd alley is important. Ideally the crowd alley would be long enough to hold an adequate number of cattle for processing while more cattle are brought through the Box - without disrupting flow. A short crowd alley may result in frequent interruptions of cattle flow and processing.

For some reason the industry has migrated toward the crowd alley starting to curve at the entrance from the tub or Box. The exit from a tub or a Box and entrance into the crowd alley should be straight for at least two mature cow body lengths. This allows flow to become established without the appearance of entering a dead end crowd alley. Keep it straight for at least 12 feet and then start a curve if warranted (ex. space is limited). Otherwise a long straight crowd alley works very well for processing cattle.

Most cow-calf operations will need a Box that is **at least** 12 feet wide and 20 feet deep. It can be 14 feet wide and should be if the handler will be horseback. Depending on the size of the cattle being worked it could be 16 feet wide if the handler in the Box will always be horseback. Both the 14 and 16 foot widths are too wide for comfortably working most stock on foot.

A Box can certainly be wider than an alley leading up to it. In fact, going from a 10 or 12 foot alleyway into a 14 foot wide Box will normally allow the cattle entering the Box to do so faster setting up the transition even better. Do not let the width of an alley dictate the width of the Box.

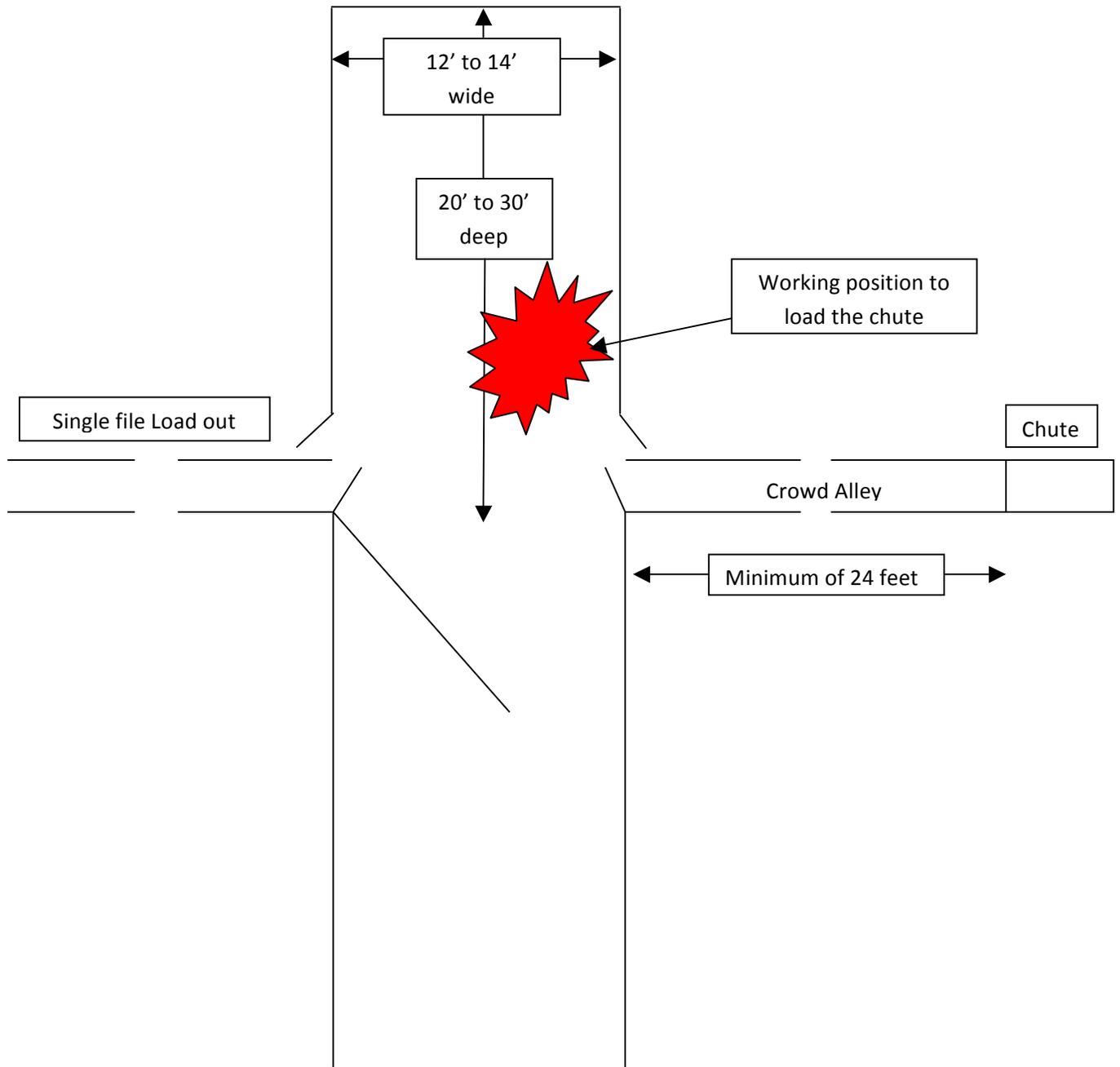
The length/depth needed is determined by the size of the group handled. Again, group size is dictated by the capacity of the crowd alley or trailer compartment being loaded. The Box needs to be deep enough to allow the cattle to flow to the back of the Box, let the handler close the gate and get in position before the cattle transition out of the back of the Box. Just like a tub system never overfill the Box. Success depends on the flow into, transition, and flow out of the Box.

For most crowd alleys a 20 to 24 foot Box is adequate depth. Any deeper may force the handler working in the Box to move too deep in the Box to initiate flow. As the handler returns to the correct position, their movement with the cattle will stop flow and turn the cattle back. Going with movement slows it or stops it. Neither response is desirable in getting cattle to flow out of the Box.

Other aspects of a Box design that are critical to success relate to whether or not the sides are enclosed. It is absolutely essential to have the end of the Box open sided so cattle are going to light and will build speed as they enter the Box. Entry speed facilitates the transition and correct flow out of the box. Solid (opaque) panels should be limited to the Box's entry gate and the sides of the box closest to the crowd alley and load out exits. Note - solid sides in these areas are not required but may minimize distractions. Load out and crowd alley exit gates must open back flat against the sides of the Box.

A Box used in loading semi-trailers may require additional depth (30 feet maximum) to facilitate filling compartments quickly. If using this same large box for a crowd alley, the addition of a block gate in the Box to shorten it might be a good solution.

In summary, a Box needs to be 12 to 14 feet wide for most operations and 20 to 30 feet deep depending on the number of cattle needed to flow through the system at any given time. Leave the back open (translucent); cover the sides and entrance gate if necessary.



Bud Box Dimensions		
Handler	Width	Depth*
Always on foot	12'	minimum 20'
Afoot and horseback	14'	20-30'
Always horseback	16'	maximum 30'
*Dictated by size of groups handled.		

3. Cattle want to be with and will go to other cattle.

A herding instinct is natural among 'prey' animals. Stockmen can take advantage of this natural instinct as they work from the front of cattle. Start the front - the back will follow.

4. Cattle want to remove pressure.

The natural instinct of a cow is to return to the last known safe or comfortable place. This behavior is in response to pressure and their desire to remove pressure. Handlers use this to their advantage when sorting and moving cattle from one corral to another. The simple principle of the return box or "Bud Box" takes advantage of this instinct.

5. Cattle can only process one main thought at a time.

If cattle are thinking about anything other than what you are asking them to do, change their focus *before* putting pressure on them.

Handling Cattle In Corrals

Handling cattle in corrals is somewhat different than handling cattle in open pastures or large feeding pens. The main difference is the cattle's inability to remove pressure by moving away from human pressure. Because the entire basis of stockmanship and low-stress handling is pressure and release the handler must be aware that cattle confined in corrals may not be able to move far enough away from the handler to completely remove pressure. If they cannot then the stress level increases in the cattle.

Effective stockmanship skills are based on pressure and release. An animal will quickly learn to tolerate pressure and not develop stress if they perceive a way for pressure to be released. It is critical that cattle are trained while in a pasture setting or at least in a large corral until the flight zone is reduced to a point the cattle can become content while confined in a corral.

Cattle are intelligent and usually do what they are asked to do. However, if asked incorrectly cattle will likely not respond as the handler intended. When this happens we have come to rely on facilities, equipment or manpower to force cattle to do what is needed. This results in increased stress on cattle and handlers and results in cattle becoming more and more difficult to handle. The job of a handler is to teach an animal to tolerate pressure and stress for short periods of time.

The role of a handler in stockmanship is to create movement in cattle and then use position to control and manage that movement to the desired result. When cattle loose movement they become reluctant to work. When movement is lost, excessive pressure, force and driving aids are more likely to be used. Creating and managing movement is key to achieving effective stockmanship.

However, when cattle are confined into crowded corrals there is an inherent loss in movement that makes stockmanship and handling somewhat more difficult. Although working pens are smaller there is more than adequate room to get cattle to establish some movement as a group. It is important to not overcrowd any corral, pen, or crowding area with too many cattle. The key will be to work cattle in smaller groups as you get into smaller pens and processing areas.

Understanding behavior and handler position can make this much less of a problem when moving cattle out of holding pens and to processing and shipping facilities. These same principles apply when

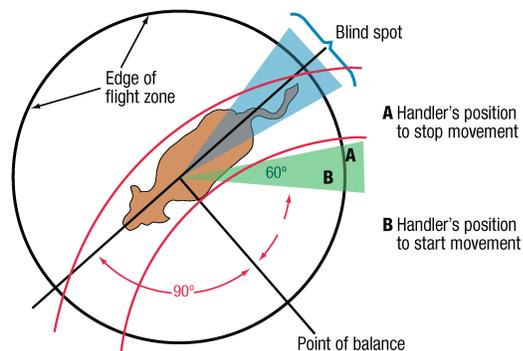
pulling one animal from the pen or when sorting cattle out of pens. The entire premise of low-stress handling is keeping stress to a minimum.

In a very simple explanation of *stress*... *If you decide to do something it is not stressful; if you are forced to do something it will be stressful.* Sound stockmanship involves convincing an animal the intended movement is their idea. *Force* is avoided and *stress* is reduced. The handler has to understand behavior before this can work. To understand behavior a sound understanding of flight zone and point of balance is needed.

Flight zone

The flight zone or “pressure zone” refers to the area around an animal where it begins to feel uncomfortable and perceives pressure. Movement by animal or human into that zone will elicit a response away from that intrusion. Use of the zone allows humans to manage movement in cattle. The most common figure depicting the concept of flight zone and point of balance is shown below.

The most important point to remember about the flight zone is not the zone; it is the area immediately outside the flight zone. Stockmen must learn to anticipate, read and manage this ‘boundary’ area. When approaching an animal it is important to predict the response to your approaching the flight zone. If the desired movement is not going to occur, the handler should retreat, reposition and return from a different angle.



Point of Balance

Another key part of effective stockmanship is understanding and manipulating the point of balance. The diagram above indicates the point of balance to be the point of the shoulder. Point of balance varies greatly among animals and is influenced by pressure from front or behind, draw of cattle ahead, push of cattle behind and whether or not they are comfortable going by the handler.

Suffice it to say that the point of balance on any given animal is not necessarily where it is drawn on the diagram above. The point of balance is not static and is actually related to handler position relative to the animal's eye.

Flight zone and point of balance are not static and can be manipulated and changed by human management. Flight zones need to be reduced on wild or nervous cattle and point of balance needs to be moved forward. Both can and should be done with proper handling.

Handling Pointers

Keeping these behavioral principles and methods of communicating in mind, following is a list of ten handling pointers to keep in mind and a few suggestions that will improve the ease of handling cattle, whether they are being gathered from the pasture or processed through the corrals.

1. Slow down so you can be fast. "Never mistake motion for accomplishment"

Patience is a great virtue when moving or working cattle. When handlers get in a hurry, inevitably excessive or incorrect pressure is placed on cattle, which usually results in an unintended reaction from the cattle that must be corrected before work can continue.

Most handlers have the mind set that as they go to a pen they are going through the gate and to the back of the pen to push the cattle out. Often little attention is paid as they enter the gate or move to the back of the pen. *Nothing could be further from what needs to be done when handling cattle effectively.*

It is critical that handlers slow down as they approach cattle. Pay attention to cattle's reaction to your presence and use that to set up the next move.

2. Work from the front to draw cattle to you.

This goes back to the basic principle #1. Cattle can be easily controlled from the front if they are not afraid of a human. (If they are afraid you are a long way from being able to handle cattle using low stress principles). Working from the front maintains their focus on the intended direction of movement. By moving in and out of the flight zone and across the point of balance, cattle can be easily drawn forward and past the handler.

This is a key point in working with cattle in confinement. Pushing cattle out of confinement pens can be difficult and stressful on cattle and handlers. When moving cattle from a pen work from the front and draw the cattle toward the gate or opening. Start flow out into the alleyway and then work from the side of the group to keep flow going out the gate.

3. Cattle must be comfortable to go by you and stay straight.

If cattle are not comfortable going by the handler, they will not work very well. Working from the front requires cattle to be comfortable passing by without balking or spooking. This simple principle facilitates penning, sorting and processing cattle.

As point of balance moves forward (with training), moving, sorting and working cattle gets easier. Thus using the draw of other cattle makes it easier to work and sort cattle in an alley or from one corral to another.

4. Apply pressure when cattle have a place to go.

Success of handling cattle depends on knowing when and where to apply pressure and how much pressure to apply. The other key component to effective stockmanship is setting the cattle up to go where you want them to go *before* you apply pressure. Equally important is

the release of pressure as soon as the desired result is achieved. Low stress livestock handling is not about handling cattle without pressure. In reality it often requires a lot of pressure for a short period of time.

5. Pressure cattle from behind only when absolutely necessary.

Like any 'prey' animal, cattle cannot see directly behind. If you assume a position directly behind cattle (in their blind spot), they will turn to one side or the other in order to see you. To 'drive' cattle in a straight line, assume a position behind their point of balance (shoulder) and off to either side. You can also work in a zigzag fashion behind the cattle causing them to switch eyes and move straight forward.

Note: Move cattle in smaller groups. Larger groups are difficult to drive behind when motion is lost in the front of the cattle. Excess pressure has to be placed on the cattle in the rear in order to force movement to resume throughout the group.

6. Pressure from the side.

This relates back to working from the front and down the side of an animal and not working from directly behind (in their largest blind spot). By working from the side the eye can be manipulated as needed to move an animal in any direction

7. Going with the flow of cattle slows them down or stops their movement.

It's all about that point of balance – as you move in the same direction cattle are traveling, when you approach a position parallel to their point of balance, they will slow down, and as you pass the point of balance they will stop. The important part in this process is to get the cattle to stop without reversing their direction. Teach them to stop and stay pointed in the direction they were headed.

8. Going against the flow of cattle initiates or accelerates their movement.

Using the point of balance as the tool to initiate movement passing from the front to the back signals an animal to move forward. Once movement is initiated it will normally continue until it is stopped by someone passing the point of balance by moving in front of the point of balance. The ability to start and stop movement works whether in a pasture setting or in the confinement of a crowd alley.

9. When working cattle, move in triangles.

Working in an arch pattern around cattle will simulate movements of a predator, which will elicit a response of fight or flight. Move in straight lines when asking for a response from cattle. Move straight toward a point on an animal to get a response. Once movement is initiated the handlers' next movement to reposition needs to be in a straight line at an angle away from the movement. Handler movement in the same direction as cattle flow will stop the movement just gained.

Once repositioned the handler can then take a straight direct path back to the cattle to change movement. Move into their flight zone to create or correct movement. Retreating straight away from the flight zone slows or stops movement.

10. Cattle work best when *they* are ready - You have to get them there.

Cattle have to be taught, conditioned and prepared to work. Unfortunately, today's cattle owners are short on time and experienced labor, and consequently, don't spend time acclimating cattle to new production settings. It is a process that will pay dividends for those who do spend the time.

Numerous others will handle your cattle after they have left your care. Bad habits and unruly behavior in cattle and humans is learned. Shouting, whistling, poking and prodding cattle is unnecessary and counterproductive. In fact, they distract cattle from the intended movement. Development of effective stockmanship skills improves worker safety, animal performance and potentially increases income on each individual operation.

Facilities

In working cattle in any processing facility it is important to keep the principles of behavior in mind as facilities are designed. Anytime we can **create cattle flow where they can go past where we need them to end up** it will make handling and processing easier. Also remember cattle do not like being moved toward a solid sided or closed in area, as they do not perceive a way out of. If it is necessary or desirable to use closed sided processing areas then the design must be large enough for cattle to go past where they need to come back to without putting too much pressure on the cattle.

Many current designs have short changed that last requirement and simply try to rely on forcing cattle to enter the crowding area and using a forcing gate to push them around to the opening into the processing lead up.

There are two basic designs that allow cattle flow to work correctly into the processing area. One is designed using a forcing pen commonly called a circular tub or simply "Tub" design. There are literally dozens of variations of tub designs however few work as smoothly as the two below.

The other design is a "Bud Box". The Bud Box is the simplest to design but requires the better understanding of cattle behavior because there is no way to force an animal out of the Box and into the crowd alley. If handlers/processors of cattle are unwilling or unable to develop and adopt this understanding they should not build or try to use a Bud Box. They should stick to the more expensive designs that will allow people who do not completely understand behavior to get cattle through the facility.

There is nothing magical or mystical about a Bud Box. It is a facility design that allows the handlers to position themselves correctly to facilitate cattle flow out of the box into either the crowd alley leading to a chute or to a trailer load out. Dimensions are important to successful use of a Box but not as critical as handler position in relation to the stock leaving the Box. Without proper position and attention to detail a Box will only confuse the stock and frustrate the handler.

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A Box can certainly be wider than an alley leading up to it. In fact, going from a 10 or 12-foot alleyway into a wider Box will normally allow the cattle entering the Box to do so faster setting up the transition even better. Do not let the width of an alley dictate the width of the Box.

The length/depth needed is determined by the size of the group handled. Again, group size is dictated by the capacity of the crowd alley or trailer compartment being loaded. The Box needs to be deep enough to allow the cattle to flow to the back of the Box, let the handler close the gate and get in position before the cattle transition out of the back of the Box. Just like a tub system never overfill the Box. Success depends on the flow into, transition, and flow out of the Box.

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In summary, a Box needs to be 12 to 14 feet wide for most operations and 20 to 30 feet deep depending on the number of cattle needed to flow through the system at any given time. Leave the back open (translucent); cover the sides and entrance gate if necessary.

Continually look for ways and opportunities to improve your skills as a stockman. For more information and additional training opportunities go to:

- Hands on and live demonstrations and trainings at <http://www.effectivestockmanship.com>
- Videos demonstrating these principles found on at: <https://www.youtube.com/user/ronaldjgill>
 - on the **Stockmanship** Playlist.
- Publications can be found on Resource page of <http://www.effectivestockmanship.com>
 - Designing a Bud Box
 - Cattle Handling Pointers

Contact information: Ron Gill, Ph.D., College Station, Texas: Email: effectivestockmanship@gmail.com or rgill@tamu.edu; Rick Machen, PhD, Kingsville, Texas, Email rick.machen@tamuk.edu

Understanding Animal Well-Being

Please circle your answer.

In the context of today's conference, the term 'well-being' means:

- humanely handling dairy and beef animals.
- using production practices which benefit the health, comfort and emotional status of cattle.
- using production practices which benefit the safety of ourselves, the workers on our farms or ranches, and our consumers.
- all of the above
- I don't understand what this term means.

What is the most important step of advocating for agriculture?

- Being active on social media
- Writing letters to newspaper editors
- Taking the initiative to advocate
- Responding to comments
- I don't know

True or False or I don't know Stockmanship is a key component in Beef, Dairy Beef Quality Assurance and FARM programs

What are the three things involved with perinatal programming?

- Dry cow nutrition, timed colostrum, clean calving environment.
- Timed colostrum, timed vaccination, nutrition to double the calf's birth weight by 90 days of age.
- Dry cow nutrition, dry cow vaccination, early calf vaccination.
- Time colostrum from adequately vaccinated dams, timed calf vaccination, nutrition to double the calf's birth weight by 56 days of age
- I don't know

When hauling livestock with a pick-up truck and stock trailer, which of the following statements is correct?

- You can only gauge a tire's age by its condition.
- It's a good idea to paddle lock trailer doors closed so animals can't escape during travel.
- Set up the load alley so it's slightly wider than the trailer door.
- None of the above
- I don't know

True or False or I don't know The FARM Program provides value to the entire dairy supply chain, from producer to customers/consumers.

The Prime Boost strategy involves priming the immune system with one target agent (bacteria or virus) delivered by a specific route or mechanism and then boosting the immune system's response by:

- re-administering at a later date, the same product.
- re-administrating at a later date, the target bacteria or virus using another distinct route or mechanism.
- selecting products which never need to be re-administered.
- I don't know how to complete this sentence.

(over)

2017 POST-Conference WI Dairy & Beef Well-Being Survey



What management practices do you plan to add or change as a result of what you learned about today regarding cattle stockmanship and transportation?

Please list content which you learned about today that you expect to use on your farm, in your practice, or in your business.

Please share what could be improved for this conference.

Is more education concerning animal well-being needed in Wisconsin? Y N

If so, what topics would like to learn about?

Any speakers you would recommend?

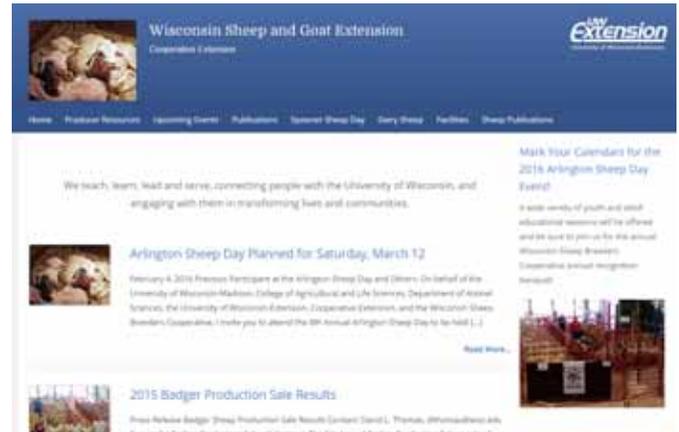
Optional: If you want to attend or support more educational programs related to animal welfare on Wisconsin farms, please print your name and contact information (address, email, phone).

Check out the UW Extension Livestock Resources On the Web!!!

Your source for research based unbiased information



<http://fyi.uwex.edu/smallfarms/>



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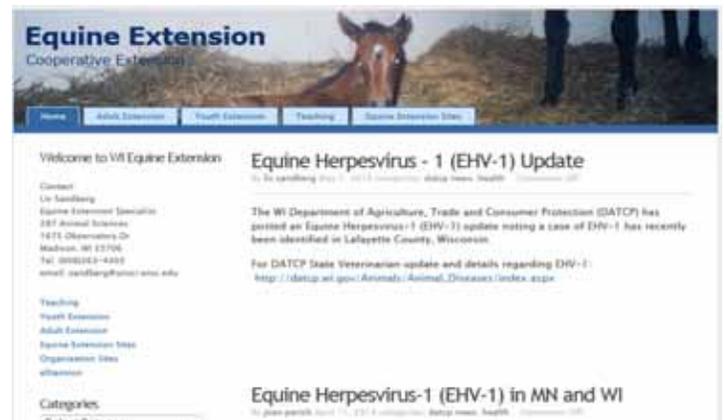
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CALENDAR OF EVENTS BADGER DAIRY CAMP ACTIVITIES > YOUTH AWARDS > CONTACT US

Upcoming events and topics important to 4-H and FFA members in Wisconsin

4-H DAIRY QUIZ BOWL AND MANAGEMENT CONTEST RESULTS

Barron County's senior dairy bowl team and Sheboygan County's senior dairy management team topped the State 4-H Dairy Quiz Bowl and Management Contests on January 30 in Madison. The quiz bowl team will represent Wisconsin in November at the national contest in Louisville, KY and the Management Contest team will represent Wisconsin at the All [...]

[Read More...](#)

New Later Start Time and New Location for 4-H Dairy Quiz Bowl and Management Contests

4-H Dairy Quiz Bowl and Management Contest Moving to Madison and Scheduled for Saturday January 30th, 2016 In 2016 the Wisconsin 4-H Dairy Quiz Bowl and Management contests will move to the UW Madison campus and will be held on Saturday January 30, 2016. Entries for the Wisconsin 4-H Dairy Quiz Bowl and Management contests [...]

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[4-H Dairy Quiz Bowl &](#)

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