

Timing of Vaccination in Newly Arrived Feedlot Cattle

Brian Vander Ley, DVM
Great Plains Veterinary Educational Center



Vaccination in Feeder Cattle

- Standard practice
 - On-arrival or nearly so
- Questions: Is vaccination safe? Which cattle are safe to vaccinate? When?
- Assumption: Vaccination is at worst the loss of dollars used to purchase the vaccine



Background

- Vaccine labels (Taken straight from a vaccine label)
 - DIRECTIONS: General Directions: Vaccination of healthy cattle is recommended.
- Are newly received calves healthy?
 - Stress
 - Commingling
 - Transport



Impact of Weaning Stress on BRD

Table 6. Effects of weaning management on morbidity, mortality, and health costs¹

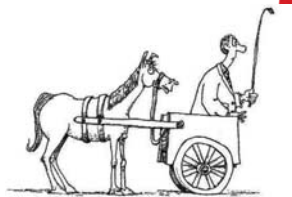
| Item | MARKET | RANCH | | | SEM ² | P > F |
|-------------------|-------------------|-------------------|------------------|------------------|------------------|--------|
| | | WEAN | WEAN45 | WEANVAC45 | | |
| Morbidity, % | 41.9 ^a | 35.1 ^a | 5.9 ^b | 9.2 ^b | 4.2 | <0.001 |
| Treated once, % |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

Step, D. L. et al. 2008. Effects of commingling beef calves from different sources and weaning protocols during a forty-two-day receiving period on performance and bovine respiratory disease. *Journal of Animal Science* 95: 3146-3158.



What Exactly Do We Expect from Vaccination?

- Vaccination=preparation
- What are cattle being prepared for by vaccinating on arrival?
- Have cattle already been exposed at the time of arrival?



Effects of on-arrival versus delayed modified live virus vaccination on health, performance, and serum infectious bovine rhinotracheitis titers of newly received beef calves¹

J. T. Richeson,^{*} P. A. Beck,[†] M. S. Gadberry,^{*} K. A. Gunter,^{*} T. W. Hess,^{*} D. S. Habelsh III,^{*} and C. Jones[†]

^{*}University of Arkansas, Division of Agriculture, Department of Animal Science, Fayetteville 72701; and [†]Hehringer-Sageheim Venomedien Inc., St. Joseph, MO 64501

ABSTRACT: Stress commonly associated with weaning, marketing, and shipment of feeder cattle can temporarily compromise immune function, thereby reducing the effective response to vaccination, increasing the risk of bovine respiratory disease (BRD). Two vaccination timing treatments were used to evaluate the effect of timing of a multivalent modified live virus (MLV) BRD vaccine on health, performance, and infectious bovine rhinotracheitis (IBR) antibody titers of newly received stocker cattle. Crossbred bull and steer calves (n = 320) were weighed (197 ± 2.4 kg) and randomly assigned to MLV vaccination treatment: 1) MLV vaccination upon arrival (AMLV); or 2) delayed (14-d) MLV vaccination (DMLV). All cattle were processed similarly according to routine procedures, with the exception of the initial MLV vaccination timing. Subsequently, BW were recorded on d 14, 28, and 42. Blood samples were collected on d 0, 14, 28, and 42 to determine serum IBR

titers, and comparisons were made between treatments on a receiving-day basis and an equivalent postvaccination-day basis. Daily BW gains were greater (P < 0.001) for DMLV calves from d 0 to 14 (1.16 vs. 0.88 ± 0.22 kg/d) and from d 0 to 42 (0.15 vs. 0.65 ± 0.09 kg/d). Days to first treatment, total treatment cost, percentage death loss, and pasture ADG after the 42-d receiving period did not differ (P > 0.15). Morbidity rates for BRD were high for both AMLV and DMLV (7.5 and 62.5%, respectively) and did not differ (P = 0.12). Positive IBR titer seroprevalence was greater (P < 0.01) for DMLV calves on d 42 of the study, and for the 28- and 42-d equivalent postvaccination basis. Delaying vaccination by 14 d may increase ADG during the receiving period compared with AMLV, and seroprevalence to IBR was greater in DMLV calves, indicating a possible improvement in acquired immune response when MLV vaccination is delayed.

Key words: cattle, performance, stress, timing, vaccination



Study Design

- 528 Steers and Bulls
 - Highly Commingled
 - “High Risk Calves”
- Two treatments
 - Arrival Vaccination (Day after arrival)
 - Delayed Vaccination (Day 14 after arrival)
- No metaphylaxis



Results

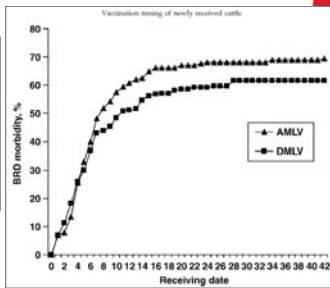
Table 1. Effect of bovine respiratory disease vaccination timing on performance of newly received cattle

| Item | AMLV ¹ | DMLV ¹ | SE ² | P-value |
|------------------------------|-------------------|-------------------|-----------------|--------------|
| BW, ³ kg | | | | |
| d 0 | 197.7 | 195.9 | 2.42 | 0.33 |
| d 14 | 208.6 | 212.7 | 3.03 | 0.007 |
| d 28 | 217.4 | 219.9 | 2.93 | 0.16 |
| d 42 | 224.4 | 228.1 | 4.08 | 0.07 |
| ADG, ³ kg | | | | |
| d 0 to 14 | 0.88 | 1.16 | 0.22 | 0.007 |
| d 14 to 28 | 0.61 | 0.53 | 0.15 | 0.45 |
| d 28 to 42 | 0.45 | 0.56 | 0.10 | 0.12 |
| d 0 to 42 | 0.65 | 0.75 | 0.09 | 0.05 |
| Pasture ADG, ⁴ kg | 0.89 | 0.84 | 0.08 | 0.15 |



Table 2. Effect of bovine respiratory disease (BRD) vaccination timing on morbidity, mortality, and treatment cost of newly received cattle

| Item | AMLV ¹ | DMLV ¹ | SE ² | P-value |
|-------------------------------------|-------------------|-------------------|-----------------|---------|
| Rectal temperature on d 0, °C | 39.6 | 39.6 | 0.23 | 0.83 |
| BRD treatment, ³ % | | | | |
| Initial ⁴ | 71.5 | 63.5 | 7.61 | 0.12 |
| Retreat ⁵ | 25.1 | 30.8 | 9.80 | 0.17 |
| Days to first treatment | 7.2 | 7.7 | 1.34 | 0.72 |
| Death loss, % | 2.3 | 0.8 | 0.75 | 0.16 |
| BRD treatment cost, ⁶ \$ | 9.00 | 8.75 | 2.09 | 0.76 |



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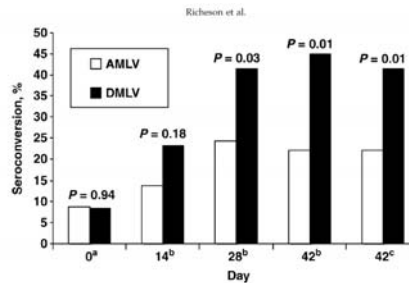


Figure 2. Percentage of infectious bovine rhinotracheitis seroconversion for calves receiving arrival modified live virus vaccination (AMLV) or delayed modified live virus vaccination (DMLV) on arrival (d 0), on equivalent days past the initial vaccination, and at the end of the receiving period (d 42).



Another, Bigger Study

Effects of delayed respiratory viral vaccine and/or inclusion of an immunostimulant on feedlot health, performance, and carcass merits of auction-market derived feeder heifers

K.C. Rogers,¹ DVM, MS; D.G. Miles,¹ DVM, MS; D.G. Renter,² DVM, PhD; J.E. Sears,³ DVM; J.L. Woodruff,⁴ DVM
¹Veterinary Research and Consulting Services, LLC, Greeley, CO 80634
²Center for Outcomes Research and Education, Kansas State University, Manhattan, KS 66506
³Bayer Animal Health, Shawnee Mission, KS 66216
⁴Boehringer Ingelheim Vetmedica, Inc., St. Joseph, MO 64506
 Corresponding author: Dr. K.C. Rogers, vrcs@ksu.edu



Study Design

- 5,179 heifer calves
- 60 pens
- OK and TX origin
- Treatments
 - Arrival Vaccination, No Immunostimulant
 - Delayed Vaccination, No Immunostimulant
 - Arrival Vaccination, Immunostimulant
 - Delayed Vaccination, Immunostimulant
- Metaphylaxis
- Followed to Finish



Table 3. Health performance of feedlot heifers at close-out for the effects of vaccination timing and immunostimulant inclusion (model-adjusted means, (SEM)).

| Item | Experimental group* | | | | P-value P [§] | P-value Z | P-value P x Z [¶] |
|--------------------------------|---------------------|-----------------|------------------|-----------------|------------------------|-------------------------|----------------------------|
| | DP [†] | AP | DPZ [‡] | APZ | | | |
| BRD | 26.03 (2.09) | 25.50 (2.07) | 25.18 (2.05) | 25.16 (2.05) | 0.82 | 0.63 | 0.83 |
| BRD 1 treatment, % | 9.64 (1.11) | 11.05 (1.33) | 8.93 (1.15) | 11.01 (1.32) | 0.04 | 0.63 | 0.66 |
| BRD 2 treatments, % | 5.53 (0.79) | 5.79 (0.82) | 4.35 (0.68) | 5.50 (0.79) | 0.24 | 0.22 | 0.42 |
| BRD 3 treatments, % | 37.95 (3.09) | 43.59 (3.20) | 36.17 (3.09) | 44.35 (3.22) | 0.01 | 0.84 | 0.64 |
| BRD re-treatment risk, # % | 13.44 (1.90) | 16.06 (2.08) | 10.28 (1.71) | 13.11 (1.90) | 0.14 | 0.10 | 0.85 |
| BRD case fatality, % | 3.61 (0.64) | 4.36 (0.73) | 2.65 (0.53) | 3.36 (0.61) | 0.15 | 0.06 | 0.88 |
| BRD mortality, % | 5.35 (0.80) | 5.88 (0.88) | 3.79 (0.64) | 5.02 (0.77) | 0.13 | 0.04 | 0.45 |
| Overall mortality, % | 4.17 (0.78) | 4.96 (0.89) | 3.47 (0.64) | 4.21 (0.79) | 0.16 | 0.18 | 0.95 |
| BRD outs (deads + removals), % | 6.34 (0.96) | 6.88 (1.01) | 5.26 (0.84) | 6.16 (0.94) | 0.27 | 0.17 | 0.73 |



Figure 2. Model-adjusted means (and standard errors of the means) for BRD retreatment risk at close-out, demonstrating the statistically significant reductions due to delaying MLV vaccine* administration (P=0.01).

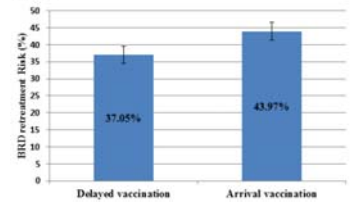


Table 4. Live performance of feedlot heifers at close-out for the effects of vaccination timing and immunostimulant inclusion (model-adjusted means, (SEM)).

| Item | Experimental group* | | | | P-value P [§] | P-value Z | P-value P x Z [¶] |
|-----------------------|---------------------|--------------|------------------|--------------|------------------------|-------------------------|----------------------------|
| | DP [†] | AP | DPZ [‡] | APZ | | | |
| Final body weight, lb | 1234 (7.94) | 1242 (7.94) | 1235 (7.94) | 1243 (7.94) | 0.08 | 0.85 | 0.95 |
| HCV, lb | 794 (6.04) | 799 (6.04) | 794 (6.04) | 802 (6.04) | 0.07 | 0.62 | 0.74 |
| ADG | 2.67 (0.06) | 2.68 (0.06) | 2.71 (0.06) | 2.72 (0.06) | 0.96 | 0.30 | 0.82 |
| ADG, deads out** | 2.92 (0.03) | 2.95 (0.03) | 2.92 (0.03) | 2.95 (0.03) | 0.16 | 0.90 | 0.83 |
| DMI, lb | 17.63 (0.19) | 17.84 (0.19) | 17.58 (0.19) | 17.87 (0.19) | 0.12 | 0.96 | 0.82 |
| F:G:R (deads in) | 6.64 (0.11) | 6.69 (0.11) | 6.48 (0.11) | 6.60 (0.11) | 0.33 | 0.12 | 0.64 |



Questions to Consider

- Does every calf need a respiratory viral vaccine at arrival?
 - Do some of them ever need a vaccine (Ranch Calves)?
- Are there other, more important considerations?
 - Stress level
 - Risk categorization



Questions, Comments

- Brian Vander Ley
- Phone: 515-450-8620
- Email: bvanderley2@unl.edu

