# TECHNICAL BULLETIN

## Evaluation of the treatment efficacy of generic enrofloxacin compared to pioneer enrofloxacin for first treatment of naturally occurring bovine respiratory disease in a commercial feedlot[1]


The primary objective of this study was to compare the treatment efficacy of Tenotryl™ (enrofloxacin) injection (TEN) to pioneer enrofloxacin, Baytril® 100 (enrofloxacin) injection (BAY) for first treatment of naturally occurring bovine respiratory disease (BRD) on subsequent health outcomes in a commercial feedlot in western Kansas. The secondary objective was to evaluate health outcomes in dairy-beef cross cattle compared to traditional beef breed beef cattle along with treatment group administration.

### Trial summary

- Five hundred cattle that met the following inclusion criteria were enrolled in the study: pulled for BRD by pen riders with rectal temperature ≥ 104.0°F, no previous treatments for disease, estimated > 60 days to harvest, clinical illness scores 1, 2, or 3[1], and absence of clinical signs of disease in other organ systems. Cattle were then randomly assigned to either TEN or the BAY treatment group in a 1:1 ratio within each lot.
- Cattle assigned to the TEN group received 4.50 mg/lb body weight (BW) corresponding to 4.5 mL/100 lb BW Tenotryl subcutaneously (SC) in the left neck, not exceeding 20 mL per injection site. Similarly, cattle in the BAY group received 4.50 mg/lb BW SC; 4.5 mL/100 lb BW Baytril 100 SC in the left neck.
- Cattle treated for BRD were weighted and categorized by type (dairy-beef cross or traditional beef breed) before being returned to their home pen (Table 1).
- Cattle were monitored by feedlot pen riders blinded to treatment group for 60 days, well beyond the 28 day-withdraw period, to observe for subsequent health outcomes.

**Table 1:** Characteristics of cattle at enrollment into treatment groups. Model-adjusted least square means (± SE) of health outcomes for first treatment of bovine respiratory disease (BRD) by treatment group. P value displayed is main effect of treatment group. Model included random effect for lot for continuous outcomes.

| Outcome | TEN[1] | BAY[2] | *P*—value |
|---|---|---|---|
| Number of observations, n | 245 | 248 | - |
| Days on feed at enrollment, d | 58.74 ± 2.87 | 58.40 ± 2.86 | 0.76 |
| Enrollment body weight, lb | 864.6 ± 17.26 | 858.6 ± 17.17 | 0.48 |
| Enrollment rectal temperature, °F | 104.9 ± 0.06 | 105.0 ± 0.06 | 0.34 |
| **Sex** | | | |
| Steer | 70.20 ± 2.92 | 72.17 ± 2.84 | 0.63 |
| Heifer | 29.80 ± 2.92 | 27.82 ± 2.84 | |
| **Clinical illness scores** | | | |
| 1 | 41.56 ± 3.76 | 44.75 ± 3.74 | 0.49 |
| 2 | 54.90 ± 3.53 | 52.14 ± 3.51 | |
| 3 | 3.54 ± 0.93 | 3.12 ± 0.83 | |
| **Metaphylaxis status** | | | |
| None | 88.57 ± 2.03 | 88.71 ± 2.01 | 0.96 |
| Tulathromycin | 11.43 ± 2.03 | 11.29 ± 2.01 | |
| **Cattle type** | | | |
| Native, % | 71.84 ± 2.87 | 70.97 ± 2.88 | 0.83 |
| Dairy-beef, % | 28.16 ± 2.87 | 29.03 ± 2.88 | |

[1] Tenotryl™, Virbac Corporation, Westlake, TX
[2] Baytril® 100, Elanco Animal Health, Greenfield, IN

*[1]Theurer ME, Fox JT, Newberry JR, Payot, F. Evaluation of the treatment efficacy of generic enrofloxacin compared to pioneer enrofloxacin for first treatment of naturally occurring bovine respiratory disease in a commercial feedlot. Bov Pract. 2023;57(2):29-35.*

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## Results:

There were no significant differences (P > 0.05) in enrollment characteristics (Table 1) or clinical health outcomes (Table 2) by treatment group. In addition, there were no statistical differences in first treatment success (64.29% vs 58.16%; P = 0.19) or case fatality risk (10.97% vs 10.65%; P = 0.91) comparing the TEN group to the BAY group respectively (Figure 1).

There were no statistically significant interactions between treatment group and cattle type. Traditional beef breed cattle had greater body weight at time of enrollment (P < 0.01) and greater third treatment success (P < 0.01) compared to the dairy-beef cross cattle.

**Table 2:** Outcome means (± SEM) by treatment group from generalized linear mixed models with a random intercept to account for clustering within lots.

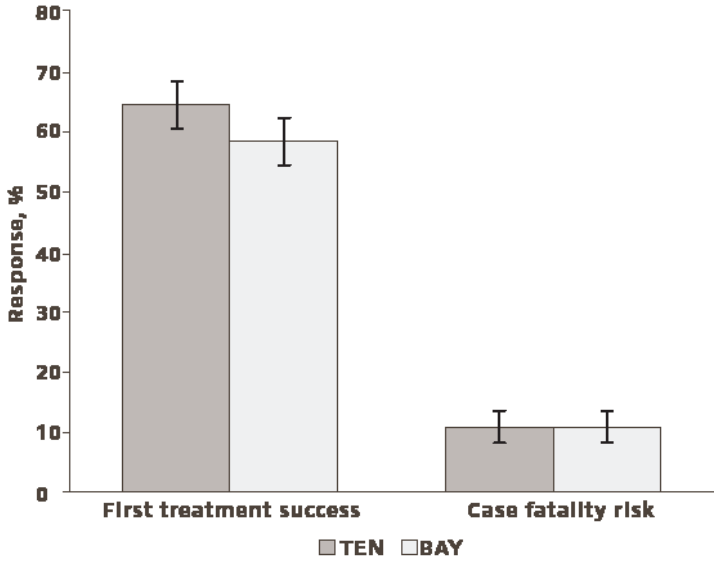
| Outcome | TEN[1] | BAY[2] | *P*—value |
|---|---|---|---|
| First treatment success,[3] % | 64.29 ± 3.92 | 58.16 ± 4.00 | 0.19 |
| BRD second treatment, % | 28.13 ± 3.31 | 35.22 ± 3.51 | 0.10 |
| Second treatment success,[3] % | 51.39 ± 5.89 | 56.67 ± 5.22 | 0.50 |
| BRD third treatment, % | 9.94 ± 2.56 | 10.16 ± 2.59 | 0.93 |
| Third treatment success,[3] % | 75.00 ± 8.18 | 75.86 ± 7.94 | 0.94 |
| BRD case fatality risk, % | 10.97 ± 2.66 | 10.65 ± 2.62 | 0.91 |
| Treatment death interval, d | 12.80 ± 2.54 | 11.43 ± 2.48 | 0.11 |

[1] Tenotryl™, Virbac Corporation, Westlake, TX

[2] Baytril® 100, Elanco Animal Health, Greenfield, IN

[3] Treatment success defined as not requiring additional treatment for BRD and not dying within the 60-day monitoring period due to BRD.

**Figure 1:** Outcome means (± standard error) by treatment group (TEN-dark gray, Tenotryl™ [Virbac Corporation]; BAY-light gray, Baytril® 100 [Elanco Animal Health]) from generalized linear mixed models with a random intercept to account for clustering within lots. First BRD treatment success and case fatality risk were not different between treatment groups (P = 0.19 and P = 0.91, respectively).




## Conclusion

There were no statistically significant differences in health outcomes in cattle which were administered Tenotryl compared to Baytril 100 for first treatment of BRD in commercial feedlot cattle. Practitioners should be able to use these products interchangeably in beef cattle or dairy cattle less than 20 months of age as the FDA approved the generic product as bioequivalent, and the study reported here found no statistically significant differences between generic and pioneer enrofloxacin in case fatality risk and other outcomes.

**For full prescribing information, scan the QR code.**

### CATTLE IMPORTANT SAFETY INFORMATION

**Tenotryl™ (enrofloxacin) 100 mg/ml Antimicrobial Injectable Solution:** Animals intended for human consumption must not be slaughtered within 28 days from the last treatment. This product is not approved for use in female dairy cattle 20 months of age or older, including dry dairy cows. Use in these cattle may cause drug residues in milk and/or in the calves born to these cows. A withdrawal period has not been established for this product in pre-ruminating calves. Do not exceed a 20 mL dose per injection site. Federal (USA) law prohibits the extra-label use of this drug in food producing animals.



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