



Comparison of Pulmo-guard™ PHM-1, Once PMH® SQ, and Non-Vaccinated Control Calves Following Direct Challenge with Virulent *Mannheimia haemolytica*

Mannheimia haemolytica continues to be a major cause of respiratory disease in cattle and commercial vaccines are frequently used to help control it.

OBJECTIVE

The objective of this study was to compare the efficacy of Pulmo-guard™ PHM-1 and Once PMH® SQ against each other and non-vaccinated controls following an intra-thoracic challenge with a virulent *M. haemolytica* isolate.

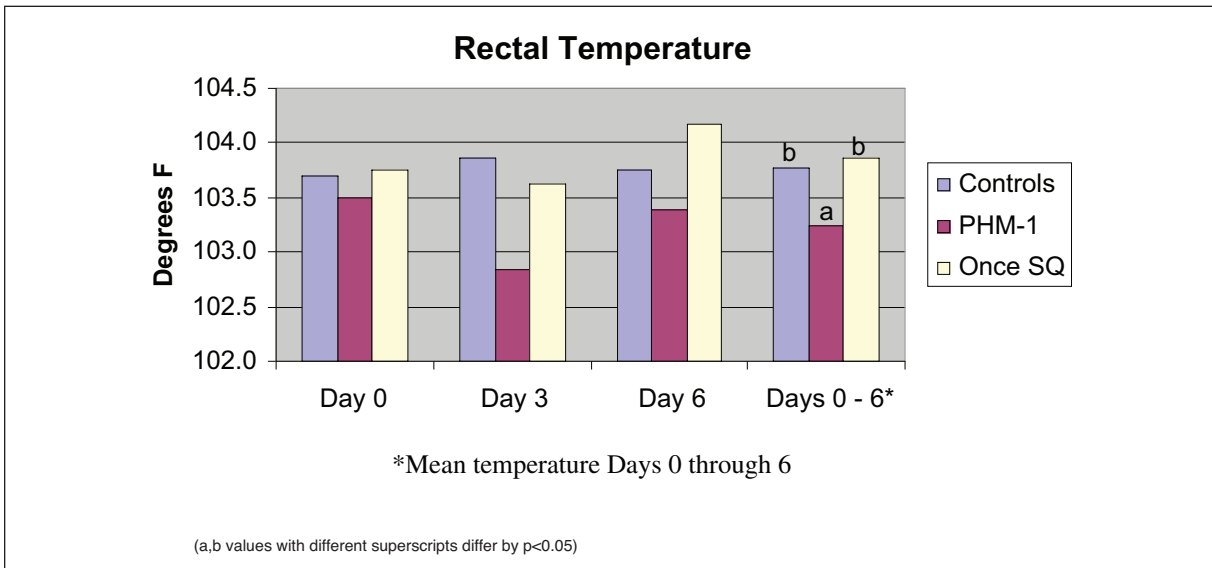
MATERIALS and METHODS

- Thirty newly weaned steers and heifers, averaging 352 pounds, and sero-negative for *M. haemolytica* whole cell and anti-leukotoxin antibody were used in the study.
- The calves were randomly assigned to three treatment groups (n=10/group):
 1. Pulmo-guard PHM-1
 2. Once PMH SQ
 3. Controls (non-vaccinated)
- The Pulmo-guard PHM-1 and Once PMH SQ calves received a single 2 ml subcutaneous dose of vaccine 28 days prior to challenge (Day -28). Vaccines were USDA licensed and obtained from inventory.
- All calves received a direct intra-thoracic *M. haemolytica* challenge on Day 0.
- Clinical scores (appetite, respiration, nasal discharge, depression, ocular discharge, death) were recorded on Days 0 through 6.
- Rectal temperatures were recorded on Days 0, 3, and 6.
- Serum was collected on Days -28, 0 and 6 for evaluation of *M. haemolytica* whole cell and anti-leukotoxin antibody.
- Calves were necropsied and lung lesions measured on Day 6 following challenge.
- The study was conducted at Agri Research Center, Canyon, TX.
- Necropsies and clinical observations were completed by Dr. David Bechtol, Agri Research Center.
- Challenge and lung lesion measurements were completed by Dr. Roger Panciera, Oklahoma State University.
- Serology was completed in Dr. Tony Confer's laboratory at Oklahoma State University.
- Statistical analysis was completed by Dr. David Renter, Kansas State University.
- Drs. Bechtol, Panciera and Confer were blinded to the treatments.

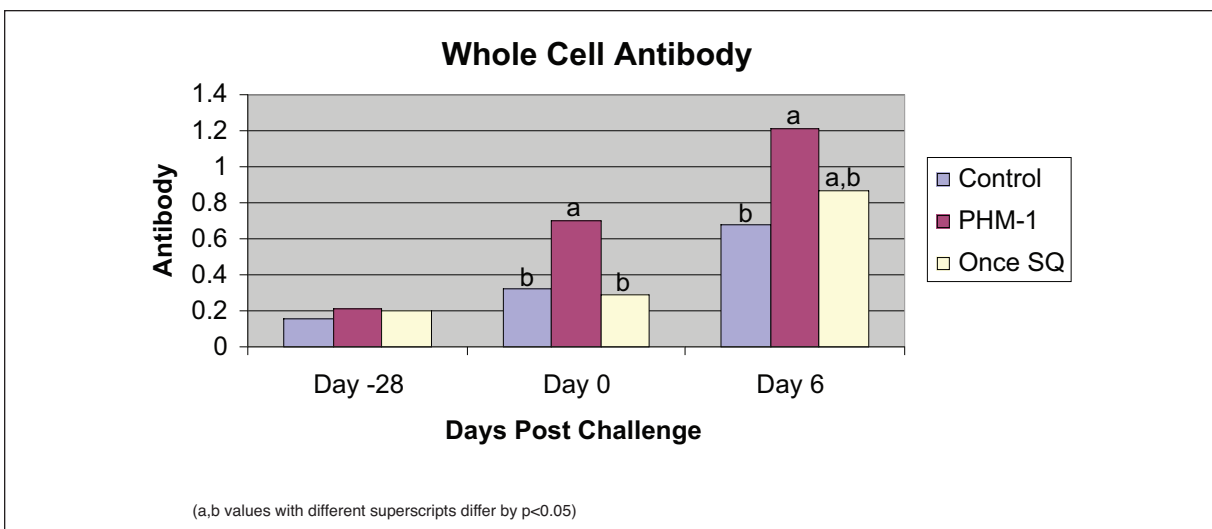
RESULTS

Clinical Scores: One calf in the Once PMH SQ group was dead on Day 6 following challenge. There was no significant difference in clinical scores (appetite, respiration, nasal discharge, depression, ocular discharge) between groups.

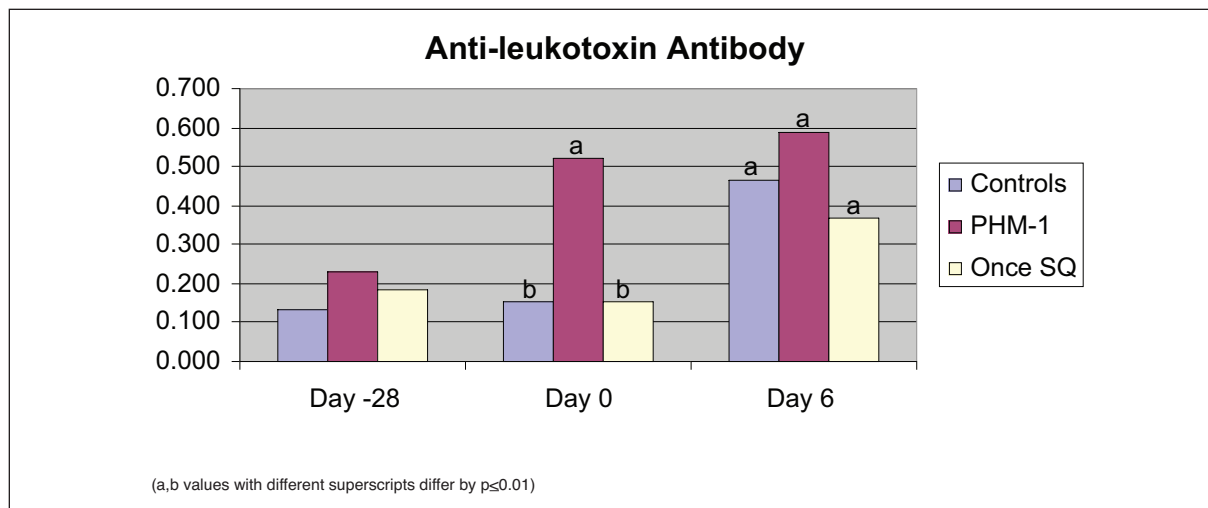
Rectal Temperature: Pulmo-guard™ PHM-1 vaccinates had a mean temperature (days 0-6) that was significantly lower than Once PMH® SQ vaccinates ($P = 0.02$) and Controls ($P < 0.05$).



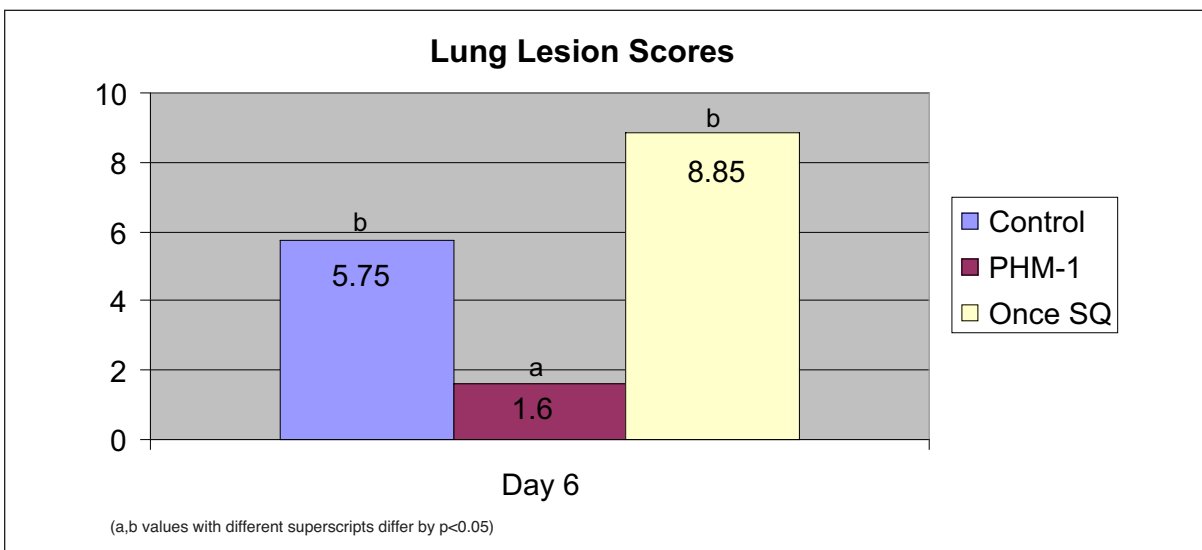
***M. haemolytica* Whole Cell Titers:** On the day of challenge, Pulmo-guard PHM-1 calves had a significantly higher increase in titer from pre-vaccinate level *versus* the Once PMH SQ calves ($P = 0.01$) and Control calves ($P = 0.05$). By day 6, the whole cell titer change from the pre-vaccinate level was not different between the Control and Once PMH SQ calves ($P = 0.99$), or PHM-1 and Once PMH SQ Calves ($P = 0.08$), but was still higher for PHM-1 calves *versus* Controls ($P = 0.03$).



***M. haemolytica* Leukotoxin Titers:** On the day of challenge, Pulmo-guard PHM-1 calves had a significantly higher increase in titer from pre-vaccinate levels *versus* the Once PMH SQ calves (P = 0.01) and Control calves (P = 0.01).



Lung Scores: Pulmo-guard PHM-1 calves had significantly lower lung scores than Once PMH SQ calves (P = 0.01) and Control calves (P = 0.04)



CONCLUSIONS

Calves vaccinated with Pulmo-guard PHM-1 at weaning (28 days prior to a severe *M. haemolytica* intra-thoracic challenge) showed significantly lower temperatures, higher whole cell and anti-leukotoxin titers, and dramatically reduced lung lesions when compared to non-vaccinated controls and to calves vaccinated with Once PMH SQ.

