

# The effect of vaccination with a *Mannheimia haemolytica* subunit vaccine on milk yield in lactating dairy cows

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## Introduction

Many herds in the US use a mannheimia vaccine in lactating dairy cows as an aid in reducing the impact of bovine respiratory disease (BRD). Producers often report significant post-vaccination milk drop following the use of some mannheimia vaccines. A review of the literature found no reports documenting milk loss following administration of mannheimia vaccines, but there were reports documenting milk loss from other vaccines of up to 4 lb (1.8 kg)/d for 3 d. This adds to the cost of vaccinating the lactating herd and should be considered when developing vaccination programs. If milk income over feed cost is \$0.13/lb (\$0.28/kg) then the 3-d milk loss can add up to decreased revenue from milk sales of \$1.56 per cow. The objective of this study was to quantify the milk loss associated with the use of *Mannheimia haemolytica* subunit vaccine\* (MHSV) in lactating dairy cows.

## Materials and Methods

A prospective, randomized clinical trial was conducted to evaluate the potential milk loss associated with the administration of a (MHSV) in order to better understand its impact on post-vaccination milk yield. A total of 991 lactating Holstein dairy cows ranging from 31 to 397 DIM were randomized into 1 of 3 study groups on a Midwestern dairy that had daily milk meters. Daily milk production during the 7 d prior to treatment was averaged and used as the baseline for comparison. Lactation Group (1, 2, or 3+), DIM, and 7-d pre-treatment average milk production (91.9 lb; 41.7 kg) was not different across the groups. Cows were treated at the end of the morning milking on vaccination day according to group assignment of MHSV, saline, or negative control (no injection). Cow-level milk production was then averaged for vaccination day (d 0) and the following 2 d. The 3-d post-treatment milk average was then compared to the baseline 7-d average milk yield for each group. Cows that experienced a pen move or had missing daily milk weights (19 total) were removed,

leaving 315 vaccinated with MHSV, 342 treated with saline, and 315 negative control cows. The association between vaccination with MHSV and subsequent milk production changes while controlling for explanatory factors was compared to both the saline and negative control groups using analysis of variance and fitting least squares using JMP Pro 14.3.0. Negative control cows served as the reference value.

## Results

The association between vaccination with MHSV and subsequent milk production changes while controlling for other explanatory factors was compared to both the placebo-treated control (saline) and a negative control group (no injections.) The saline group's decline in milk was 0.54 lb (0.25 kg) greater than the negative control cows, but the difference was not significant ( $p=0.57$ ). The MHSV group's decline in milk was 1.54 lb (0.70 kg) more than the negative control, ( $p=0.02$ ), but the saline group's decline of 0.54 lb (0.25 kg) and MHSV's decline of 1.54 lb (0.70 kg) were not significantly different ( $p=0.17$ ).

Additional models were created using the previously described approach to compare each post-vaccination daily milk to the baseline values. On d 1, the MHSV group loss was 2.6 lb (1.18 kg) more than the negative control cows ( $p<0.01$ ), but the saline group's loss of 0.29 lb (0.13 kg) was not different from negative control ( $p=0.92$ ) cows. On d 0 and d 2, there were no significant differences between groups.

## Significance

These results demonstrate a post-vaccinal milk loss that is at the low end of the range reported in the literature. The lost milk sales with a 1.54 lb (0.70 kg) of milk loss per day for 3 d would be \$0.60 in total assuming an income over feed value of \$0.13/lb (\$0.28/kg).