

trations remained <2.0 ng/ml); five (17%) were delayed (P4 reached 1.0 ng/ml after d 5); two (7%) were delayed and stunted; and one (3%) was short (P4 >1.0 ng/ml for only seven days). In one (3%) event, progesterone remained basal. The conception rate was higher ( $P<0.01$ ) in the events when P4 profiles were normal than events with abnormal profiles (87% vs 33%, respectively). BCS

appeared to have no relationship with the AUC, but the AUC was negatively correlated with milk yield ( $r=-0.83$ ,  $P<0.01$ ), DMI ( $r=-0.81$ ,  $P<0.05$ ), TDN ( $r=-0.83$ ,  $P<0.05$ ) and DCP ( $r=-0.79$ ,  $P<0.05$ ).

In conclusion, high milk production and increased dietary intake might result in reduced P4 concentration, which might lead to reduced conception rate.

## Impact of Two Coliform Mastitis Immunization Schedules on Immune Response, Milk Yield, Intramammary Infection and Dry Matter Feed Intake in Holstein Dairy Cattle

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### Introduction

Although coliform mastitis immunization programs are widely implemented, several questions concerning the proper administration schedule remain unanswered. Thus, a comparison of two vaccination protocols was conducted to determine the effects on immune response, milk production, milk bacteriological status and dry matter intake (DMI).

### Materials and Methods

A total of 198 animals from two research herds were enrolled two weeks prior to drying-off (74 days before expected calving in heifers) and randomly assigned to one of two immunization protocols. The Standard group involved immunization at drying-off, three weeks before expected calving (transition) and 2-9 days after calving. In the Experimental group animals were immunized at two weeks prior to drying off, at drying off and at transition. Each immunization consisted of 5 ml of *Escherichia coli* J5 vaccine (Envirocor®) in conjunction with 0.001 grams ovalbumin (OVA) antigen dissolved in phosphate buffered saline. Blood was collected at weeks -10 (enrollment), -8, -3, 0, 2 and 9 relative to parturition. Serum was analyzed for anti-*E. coli* and anti-OVA antibody by ELISA. Daily milk production data were obtained for 60 days in milk (DIM) after parturition. Quarter milk samples for bacteriological culture were aseptically collected on days three through nine,

and prior to treatment for all clinical cases of mastitis. After calving, DMI was collected for the 24 hours before and 24, 48 and 72 hours after immunization in the Standard group, and the same dates for non-immunized animals in the Experimental group.

### Results

Milk bacteriological analysis of fresh cow quarter samples revealed 13 quarters with *E. coli* in the Standard group and 4 quarters in the Experimental group. There were 61 clinical mastitis cases cultured in the Standard group, of which 12 cultured positive for *E. coli*. Of 43 clinical mastitis cases identified in the Experimental group, 11 had *E. coli*. A total of 22 and 9 cases of clinical mastitis resulted in no bacterial pathogen growth in the Standard and Experimental groups, respectively. Multi-variable regression analysis on factors affecting the DMI for 144 animals on the day following immunization revealed that increasing parity, and the DMI value for the day prior to immunization had a significant positive effect ( $P<0.001$ ). Using a generalized linear model, analysis of the mean daily milk production to 60 DIM for 189 animals showed that immunization group had no effect when controlling for farm location, season and parity. Due to high background antibody levels, ELISA results for anti-*E. coli* antibody showed no difference between the two immunization protocols. Statistical analysis on

the total amount of antibody to OVA in the periparturient period was significantly influenced by calving season, parity, and the level of antibody to OVA at the start of the trial. However, immunization protocol did not significantly influence the amount of antibody to OVA in the periparturient period.

### Conclusions

In conclusion, a coliform vaccination protocol that has completed the immunization protocol prior to calv-

ing shows potential benefit. Numerical decreases in quarters cultured with *E. coli* at freshening, and less clinical *E. coli* infections were evident. However, these differences were not due to circulating anti-*E. coli* antibody. Furthermore, immunization protocol did not significantly affect 60-day milk production, total amount of anti-OVA antibody in the periparturient period, or DMI following immunization.

## Diagnosis of Subclinical Endometritis and its Effect on Reproductive Performance

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### Introduction

Chronic endometritis is a common disorder in post-partum dairy cows. It causes depressed reproductive performance in the current lactation and economic losses. In practice, rectal palpation and/or vaginoscopy are popular methods for the diagnosis of endometritis. The objective of this study was to evaluate a cytological method (cytobrush) as a diagnostic tool to detect sub-clinical endometritis (SE) in dairy cows and to quantify its effect on reproductive performance.

### Materials and Methods

Holstein cows were examined by rectal palpation 21 to 27 days in milk. Vaginal discharge was regarded as a sign for clinical endometritis. Cytological samples from the uterus of 389 clinically healthy cows were obtained by a modified cytobrush method (Kasimanickam *et al* 1999). Two weeks later, 289 cows were re-examined. A cytobrush mounted on the tip of a metal rod and protected by a plastic catheter was inserted into the cavum uteri via the cervix. Subsequently, the brush was rolled on a microscope slide. After fixation and staining all slides were evaluated for the number and type of

cells and the degree of bleeding. Three hundred cells were counted and classified as intact endometrial cells, dead cells, lymphocytes, polymorphonuclear neutrophils (PMN) and non-classifiable cells. Two categories were defined: cows with less than 5% PMN and cows with more than 5% PMN in the cytological sample. Animals in the first category were assumed to have a healthy endometrium. Cows with more than 5% PMN were considered to have subclinical endometritis (SE).

Reproductive performance was evaluated by days to first service, first service conception rate, days open, total conception rate and the percentage of cows culled for infertility.

### Results and Conclusions

At the first post-partum examination 41.1% (160/389) of the clinically healthy cows were diagnosed having SE. Fourteen days later only 17% (49/289) showed more than 5% PMN. First-service conception rate was 54.4% (98/180) and 46.1% (47/102) in categories one and two, respectively. There was no major difference in days open. Table 1 shows preliminary data of reproductive performance. The study will be continued.