

## Significance

Conventional wisdom holds that BVDV outbreaks are subclinical in healthy animals, can nearly always be traced to contact with a persistently infected animal, and that transmission of the virus following acute infection is insignificant to the spread of virus. Thus the observation that outbreaks of severe acute BVDV observed in Quebec, Ontario and New York State were due to a single strain of BVDV that spread explosively following acute infection requires a paradigm shift in our concepts of BVDV transmission. The spread of low virulence within a population is most likely the result of contact with a persistently infected (PI) animal, and thus the number of contacts available to the PI animal limits its spread. The spread of highly virulent BVDV strains

within cattle populations is more similar to that of classical swine fever viruses. Transmission by acutely infected animals is significant and the sources of virus increase as the number of infected animals increases. Thus management to control outbreaks of severe acute BVD requires a different approach than that used for subclinical BVD. A number of studies have been undertaken to search for virulence markers. Failure to recognize that 1373, 24515, IAF 103 and NY 93 are all the same strain may lead to misinterpretation of results. There are virulent viruses, such as 890 and CD 87, that are not related to 1373. When looking for commonalities among virulent strains that may be related to virulence it is important to compare divergent rather than identical strains.

## Effect of Cow Comfort on Herd Health and Milk Production on a Large Commercial Dairy

**R.M. Stockler, DVM; L.M. Neuder, DVM; P.M. Sears, DVM, PhD**

*Department of Large Animal Clinical Science, Michigan State University, East Lansing, MI*

### Introduction

Lameness at calving can have a lasting effect on heifers and cows as they begin their lactation. If they are reluctant to lie down in the stall or get up, it can affect their normal daily activity and reduce feed intake, milk production and possible health of the animal. The objective of this study was to assess the differences in milk production and fresh cow health between two groups of cows. Half of the cows were fitted with rubber boots before calving, and their performance was compared to control cows as they walked on a normal freestall barn hard floor surface.

### Materials and Methods

Cows were paired five to seven days before calving and rubber boots were fitted on all four feet of 20 cows in a 40-cow trial. These cows were paired by lactation and 305 ME with no history or signs of lameness. All cows went through the maternity and fresh pens without any special care, and boots were kept on the cows for 60 days after calving. Using the farm Dairy Comp 305 database, milk production was analyzed at 14, 28, 42 and 56 days-in-milk and by the first DHIA 305 ME

test day using Chi square, t-test and ANOVA in Microsoft Excel and SAS programs. Fresh cow health was evaluated for the first month after calving. Cows were evaluated for lameness, displaced abomasums (DA), ketosis, metritis or retained placenta.

### Results

In the 30 cows (15 with boots and 15 without boots) that had complete health records for the trial period, there were no differences in any of the health parameters, although three of the 15 controls had a DA as compared to only one of the 15 cows with boots. This difference was not significant, and there were no differences in any other health category. However, production did differ. Cows fitted with boots produced an average of 10 lb (4.5 kg) more milk in the first 45 days after calving than cows without boots (89.1 lb [40.5 kg] of milk to 79.0 lb [35.9 kg] of milk, respectively). Cows with boots had the greatest increase in production in the first 28 days, reaching 100 lb (45 kg) of milk in that period. The control group took 42 days to reach 100 lb (45 kg) of milk. The two groups' differences were not as great after 42 days, but the first 305 ME was 2005 lb (911 kg) greater for cows with boots, with a ME of 23,408

lb (10,640 kg) of milk and 21,403 lb (9,729 kg) of milk for the controls.

### Significance

Although cows may not be showing any overt lameness, hard surfaces may affect their overall milk production. There wasn't any difference in any of the health categories for cows with and without boots, but the number of animals in the trial may not have been large enough to detect such a difference. But because any difference will be small, from a practical herd health evalu-

ation, boots placed on non-lame cows will probably have little effect on the overall health of the animal in the first 60 days of transition. However, this study did demonstrate a significant milk production advantage to cows in the first 42 days, with a significant increase in early milk production for cows with boots even when lameness was not an issue. Therefore, the hard surfaces of many of our modern commercial dairies may be having an effect on early peak milk, and it may be worth evaluating surfaces to promote better foot health and comfort. Feet and leg health is both a welfare and economic issues for most commercial dairies.

## Reproducible Challenge Model for BVDV Vaccine Efficacy Studies

**J. Ridpath, PhD<sup>1</sup>; J. Neill, PhD<sup>1</sup>; V. Becerra, DVM, PhD<sup>2</sup>; K. Eernisse<sup>2</sup>; D. Gatewood, DVM<sup>2</sup>**

<sup>1</sup>National Animal Disease Center/ARS/USDA, Ames, IA

<sup>2</sup>Center of Veterinary Biologics and Product Licensing/APHIS/USDA, Ames, IA

### Introduction

Accurate determination of vaccine efficacy is dependent upon the use of challenge viruses that reproducibly cause notable clinical disease. Historically the challenge virus, made available by the Center for Veterinary Biologics, for vaccine efficacy studies and licensing is the BVDV type 1 strain NY-1. Clinical signs following infection with this strain are minimal and consist of a small rise in temperature, usually lasting less than 48 hours, and a 20% or less transient drop in circulating lymphocytes. Because the clinical signs following infection are so mild, it is difficult to assess disease protection after vaccination when this virus is used as the challenge. In this study we provide documentation of the clinical presentation following infection with a highly virulent type 2 BVDV. This virus, 1373, was isolated following an outbreak of severe acute BVDV in Ontario, Canada in 1993. Acute, uncomplicated infection with this virus reproducibly results in clinically severe disease as described below.

### Materials and Methods

Two studies were performed. In the first study 10 colostrum deprived calves two to four months of age, free of BVDV and antibodies against BVDV, were infected with 1373. Four non-infected age-matched animals served as controls. Animals were housed in individual pens and were inoculated by placing 2.5 ml

of  $1 \times 10^6$  TCID/ml 1373 in each nostril using a needleless syringe. In the second study, 40 three-to five-month-old colostrum-deprived calves, free of BVDV and antibodies to BVDV, were randomly divided into three groups. Group 1 consisted of 30 cattle exposed on day 0 to BVDV by aerosolization with 4 ml of  $1 \times 10^6$  TCID 1373. Group 2 included five cattle vaccinated two to three weeks prior with a commercial modified-live vaccine containing both BVDV1 and BVDV2 strains. Animals in Group 2 were inoculated on the same day and with the same dose of 1373 as the animals in Group 1. Group 3 consisted of five calves that were not vaccinated or inoculated. Basal temperatures were recorded daily and serum, whole blood and buffy coat samples were collected pre-inoculation and at several time points between day 0 and day 21 post-infection. Samples were used to determine lymphocyte count, platelet count, serum antibody titer, viremia and blood chemistry.

### Results

All non-vaccinated animals exposed to 1373 developed clinically severe disease characterized by prolonged fever, lymphopenia and thrombocytopenia. In the first study 30% of the animals died or were euthanized by day 20. In the second study, 73% of the animals died or were euthanized by day 20. All infected animals had increased serum levels of alkaline phosphatase, AST and BUN in the acute phase of infection. Animals that died or became moribund also had increased creatine, CK,