# Effect of *Salmonella* Dublin latent carrier dry cow vaccination on bacterial shedding and intrauterine transmission

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## Introduction

*Salmonella* Dublin latent carrier cows pose a significant risk for transmitting infection to newborn calves through intra-uterine transmission and bacterial shedding in feces and colostrum at calving. Vaccination of these latent carriers' dams during late gestation can enhance the immunity against *S.* Dublin. This could reduce the activation of the dormant bacterium during the periparturient immune dysfunction period, thereby reducing the risk of early-life infection in the offspring until vaccination is possible. This study aimed to evaluate the extent to which vaccinating *S.* Dublin latent carrier cows at dry-off with a commercial live bacterial vaccine (EnterVene®-d, Boehringer Ingelheim) reduces bacterial shedding at calving and intrauterine infection in calves.

## Materials and methods

To identify latent carriers, 1,084 cows were screened across 4 commercial Michigan dairy farms with a previous history of *S.* Dublin and no vaccination against *Salmonellae*. Cows were classified as latent carriers when they showed 3 consecutive positive milk antibody ELISA tests conducted every 2 months. Subsequently, 148 latent carriers were randomly assigned to the vaccine or control group. The vaccine group received the commercial vaccine subcutaneously (s.c.) at dry-off, followed by a booster 2 weeks later. The control cows received saline s.c. at the same intervals. At calving, we collected fecal and colostrum samples from the dam and a pre-colostral serum sample from the calf. Bacterial shedding was evaluated in feces and colostrum both qualitatively (Yes/No) and quantitatively, using the bacterial enrichment culture method ISO 6579-1:2017 and qPCR quantification of gene *vagC* copy numbers, respectively. Intrauterine transmission was defined when a calf tested positive for serum antibody ELISA at birth. Results were evaluated via logistic regression for qualitative shedding and intrauterine transmission. A t-test was used to compare the number of *S.* Dublin copies estimated via qPCR.

## Results

Vaccination resulted in a lower risk of calves being born with *S.* Dublin antibodies (Relative Risk [95%CI]) = 0.19 [0.04 – 0.84]). However, no *S.* Dublin-positive isolates were identified through either bacteriological culture or qPCR in feces or colostrum.

## Significance

Vaccination of *S.* Dublin latent carrier cows at dry-off reduced intrauterine transmission to their calves. This strategy could decrease the transmission of *S.* Dublin in dairy farms. Additionally, the absence of *S.* Dublin positive fecal and colostrum samples from latent carriers warrants further evaluation of the traditional methods for identification of latent carriers or *S.* Dublin isolation, as well as the role of latent carriers in infecting newborn calves in the maternity area at birth.

  