

## Validation of vaccination programs for high risk calves raised in Swiss fatteners facilities

Diana Solinger<sup>1</sup>, Maren Feldmann<sup>1</sup>, Adrian Steiner<sup>1</sup>, Hans-Joachim Schuberth<sup>2</sup>, Martin Kaske<sup>1</sup>

<sup>1</sup>Swiss Bovine Health Service, Vetsuisse Faculty, Winterthurerstrasse 260, CH-8057 Zurich

<sup>2</sup>Department for Immunology, University of Veterinary Medicine, D-30173 Hannover

### Key words

Herd medicine, animal health, vaccination, prevention program, serology, veal calf, beef fattening

### Aim of the study

This study was performed (i) to assess the efficiency of vaccinations against enzootic bronchopneumonia based on studies published in literature, (ii) to compare the efficacy of modified live and inactivated vaccines being available on the Swiss market in young calves after transport to the facility of the fattener, (iii) to characterize the effect of a revaccination, (iv) to assess the return on investment of different vaccination protocols, and (v) to establish recommendations based on results of a study performed under typical conditions for the production system in Switzerland.

### Material and methods

The systematic literature review was 'a priori' individually created according to PRISMA statement following the PICOS scheme. Thereafter, a blinded prospective field study was conducted on four farms (each purchasing batches of 25-80 calves and practicing an all in-all out system). Three consecutive batches of calves were included from each farm. At arrival each calf was clinically assessed (N=488). All healthy calves (N=418) were randomly assigned to one of five treatment groups (each 80-85 calves). Each calf received two applications; the first one on day 1 and the second one on day 21 after arrival. Calves of the control group received saline solution in every application. The treatment groups received either a live vaccine (LV) intranasally twice (LV/LV), a LV followed by a killed vaccine (KV) subcutaneously (LV/KV), a KV twice (KV/KV) or a KV followed by a LV (KV/LV). Clinical status and application of antibiotics were assessed daily. Blood was collected from 50% of all the calves on day 1, 3, 21 and 28 in order to assess a differential hemogram, antibody titers and serum concentration of haptoglobin as an acute phase protein. The weight was recorded at arrival, day 28 and at slaughter together with carcass classification.

### Results and significance

The literature review based on 52 studies reporting on 131 experiments revealed a positive effect of vaccination on clinical outcome in the majority of all experiments. Studies published did not allow to make conclusions on a mandatory vaccination protocol in respect to type of vaccine, time of vaccination and booster strategy.

Results of the field study demonstrated that the mean daily weight gain of calves during various intervals within the fattening period did not differ significantly between the groups tested (on average about 1'460 g/day), i. e., the daily weight gain was not affected by the vaccination protocol. Carcass classification was affected by the gender of the calf, but not by the vaccination protocol. Neither the mean number of individual antibiotic treatments of calves, nor the proportion of relapses, nor the casualty rate differed significantly between the groups tested, i. e., there was no evidence for a practical advantage of vaccinated calves compared to control calves. Also the parameters of the differential hemogram did not point out striking differences between treatment groups. Surprisingly, more than 80% of the calves were seropositive for BRSV already at arrival. Although the proportion of seroconversion was lowest in the control group, the means did not differ significantly between the groups due to a considerable variation of BRSV antibody titers within each group. Serum haptoglobin concentrations were higher 21 days after arrival compared to the other time points, but did not vary between the treatment groups.

It is concluded that four different vaccination protocols using either killed or live vaccine applied after arrival of stressed calves on fattener facilities were not found to be effective in respect to routine clinical parameters, use of antibiotics, titers of BRSV antibodies and haptoglobin concentrations. Daily weight gain of the veal calves was not affected by any vaccination protocol, i. e., the return on investment of vaccinations of veal calves was found to be negative. Although based on literature, vaccination is considered as an intrinsically effective

prophylactic tool to improve the health status of veal calves, results of the present study do not allow to recommend vaccination of calves after arrival on the fattening facility under the specific conditions of the Swiss production system.

### **Publications, posters and presentations**

Solinger, D. (2019) Validierung von Impfprogrammen gegen EBP für junge Kälber auf Schweizer Mastbetrieben – aktueller Stand des Projekts. 09.10.2019; Projekttreffen „Kälbergesundheit“ in der Vetsuisse Fakultät Zürich

Solinger, D. (2019) Impfen gegen EBP auf Schweizer Mastbetrieben: Ergebnisse einer prospektiven Feldstudie. 29.10.2019; Seminarreihe der Nutztierklinik, Zürich

Solinger, D.; Feldmann, M.; Steiner, A.; Schuberth, H.J.; Kaske, M. (2020) Validation of vaccination programs for high risk calves raised in Swiss fatteners facilities. Prev. Vet. Med. (in preparation)

### ***Project 1.17.08AB***

**Project duration** *August 2017 – April 2020*