

# Significantly reduced use of antimicrobials with PCV2 and ileitis vaccination in a Danish herd

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## Abstract

The present study evaluated, whether vaccination against both PCV2 and *Lawsonia intracellularis* in the same herd could be economically beneficial for the farmer and at the same time reduce the antibiotic consumption. The study was carried out in a wean-to-finish herd receiving 1000 weaned pigs every 7th week. The herd experienced lowered average daily weight gain (ADWG), increased feed conversion rate (FCR), and high mortality in the finishers, and use of group medication with antibiotics for treatment of clinical disease was frequently necessary. Based on analysis of blood samples from several age groups of pigs, vaccination against PCV2 and ileitis (*Lawsonia intracellularis*) was initiated. Data for antibiotic use and performance was collected for one year before and after vaccination. The data showed that the antibiotic consumption, given as daily doses per produced pig, was reduced by 39% in the weaners and by 59% in the finishers. In the finishing unit, ADWG was increased with 44 g/day, FCR was reduced with 0.21 feeding units/kg gain, mortality was reduced with 1.79%, and antibiotic expenses was reduced with 1.15€/produced pig (p-values ANOVA 0.0133, 0.0005, <0.0001, and 0.0156). Economic evaluation showed a return on investment of 1:2.5. Thus, vaccination against PCV2 and ileitis was economically beneficial and reduced antibiotic consumption significantly.

## Introduction

The typical way to evaluate the value of pig vaccinations is to calculate the impact on the gross margin for the producer, but other parameters might influence the choice of disease control strategy. In Denmark, reduced use of antibiotics for pigs has high political priority, and even though Danish pig producers use a low amount of antibiotics compared to many other countries (1), Danish producers experience pressure from the public to reduce this amount. The use of vaccines to prevent disease before the pigs need treatment with antibiotics is a way to comply with the political demands, providing that the use of vaccines does not lower the gross margin for the producer.

The use of antibiotics are significantly lowered in herds vaccinating against ileitis (2) or PCV2 (3), and vaccination against either ileitis (4) or PCV2-virus (5) has proven to be efficient tools to increase performance. This study was designed to examine whether vaccination against ileitis and PCV2 in the same herd could significantly reduce the use of antibiotics and still be economically beneficial.



Figure 1. Before vaccination: 1-2 pigs per pen started to waste in the end of finishing Materials and methods

## Materials and methods

The study herd was a wean-to-finish herd. The herd received 1000 4 week old SPF weaners every 7th week, and they were moved to a finishing unit 7 weeks later. Antibiotics were used only when indicated by the clinical status of the pigs.

The study was a before-after study comparing selected parameters for the herd before and after initiation of vaccinations against PCV2 and ileitis. The vaccines were implemented based on clinical observations in the herd (fig. 1) and analyses of blood samples. The analyses showed moderate to high values for PCV2 in PCR analysis and seroconversion for *Lawsonia intracellularis* in the finishing period.

For description of the herd before and after, production parameters and the amount of antibiotics prescribed was collected. Efficacy reports was prepared every 7th week after emptying of the nursery, and data for antibiotic prescriptions were obtained from the Vetstat database. Vetstat data were collected 1 year before and 1 year after start of vaccination, leaving out 2 months as transition period, where both vaccinated and non-vaccinated pigs were present in the barn. Comparison of before and after was done with ANOVA (ADWG, FCR and antibiotics) or Fishers Exact test (mortality), using  $p < 0.05$  as significance level. Key values from the Danish Pig Producers (6) were used for economical calculations.

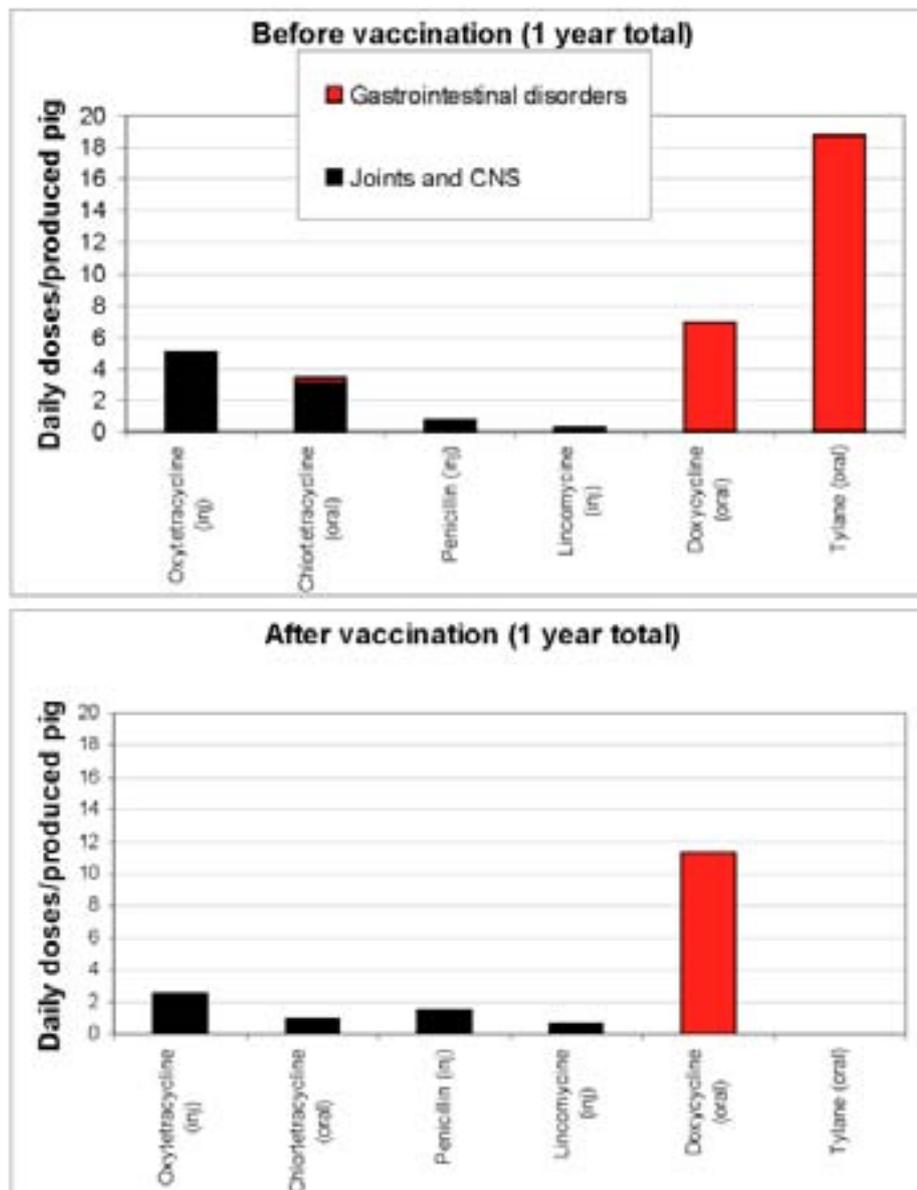
## Results

The number of daily doses of antimicrobials for vaccinated pigs was reduced with 39% in the weaning unit and with 52% in the finishing unit after start of vaccination. Details regarding the choice of antibiotics showed that the reduction mainly was seen in oral medication, both in the weaning unit and in the fattening unit. The products used for the finishers before and after vaccination is shown in figure 2.

Comparison of performance before and after vaccination showed no differences in the weaning unit, but in the finishing unit, a significant improvement was seen regarding ADWG, FCR and mortality (table 1). The development in performance of the finishers is illustrated in fig. 3 and 4. The return on investment was 1:2.5, meaning that one € spent on vaccine was paid back 2.5 times in improved production and saved antibiotic expences.

Mean/period	Non-vacc	Vacc.	Diff.	Value (€/pig)
ADWG (g/day)	928	972	+44*	0.59
FCR (FE/kg)	2.85	2.72	-0.13*	2.43
Mortality (%)	3.4	1.6	-1.79*	1.34
Antibiotics (€/pig)	2.18	1.02	-1.15*	1.15
<b>Total value</b>		<b>5.50€/pig</b>		

\*= Values with a significant difference ( $p \leq 0.05$ ).



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Figure 1: Antibiotic use in finishers without or with vaccination against PCV2 and ileitis  
The total amount was reduced by 59% in the year before vaccination compared to the year after.

## Discussion

A large part of the antibiotics used to treat herds infected with PCV2 and ileitis will be given to all pigs in the herd. This was reflected in the results of this study, where the main reduction in the number of daily doses per produced pigs was seen in oral medication. However, injections given to individual pigs were also reduced. Though this will affect the overall antibiotic use to a lower extent, it is still important to the farmer, because it will reduce the daily workload for identifying and treating diseased pigs.

For the production parameters, an error in the feed composition disturbed the calculations. In a short period after the transition period, the pigs were fed 13% less protein than expected, and this had a negative influence on the average daily gain (ADWG) and the feed conversion rate (FCR) for the first two periods with vaccinated pigs, as seen in figure 3. Therefore, these two observations were excluded from the statistical calculations regarding these two parameters. The mortality was not affected by the erroneous feed composition, but decreased immediately as a response to vaccination against PCV2 and ileitis (fig. 4).

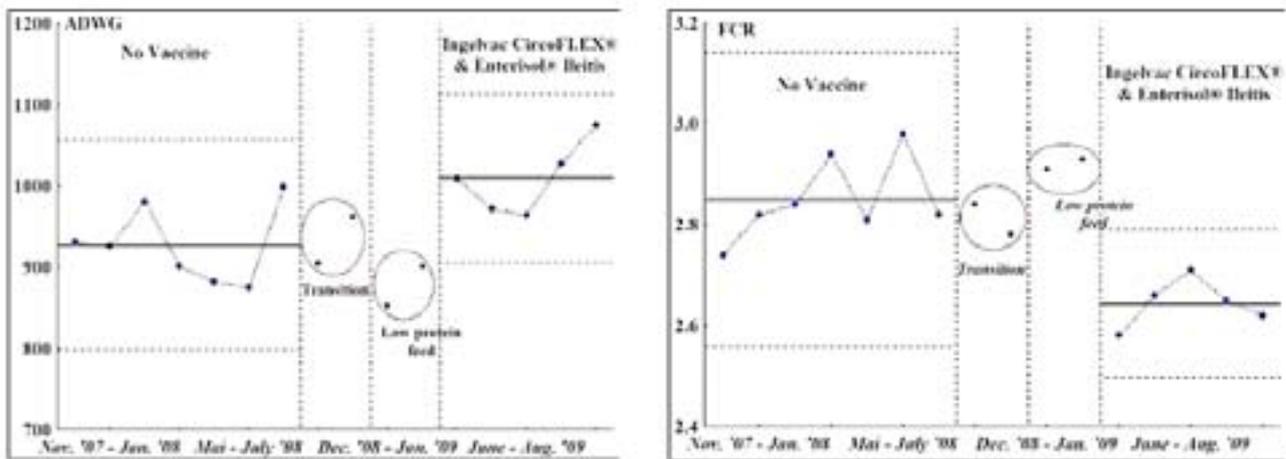


Figure 3: ADWG and feed conversion rate in finishing unit before and after vaccination against PCV2 and ileitis. Each point on the graph represents one efficacy report covering 2000 finishers

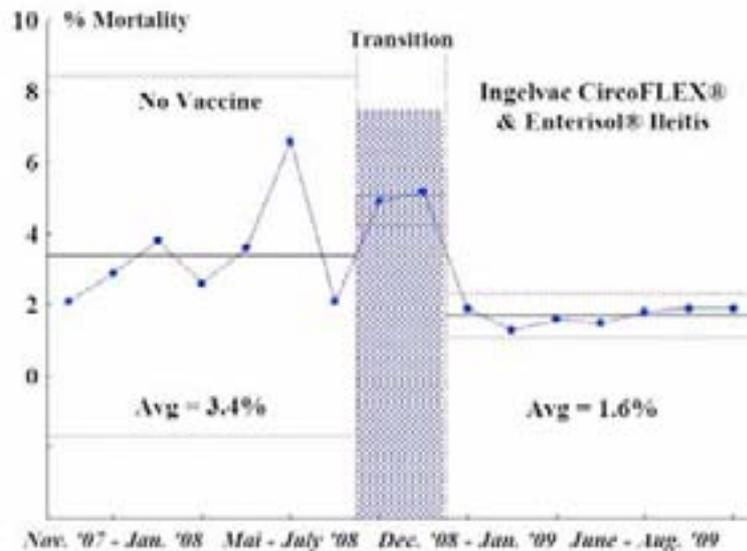


Figure 4: Mortality in finishing unit before and after vaccination against PCV2 and ileitis. Each point on the graph represents one efficacy report covering 2000 finishers

## Conclusion

Vaccination against ileitis and PCV2 in the same herd successfully decreased the need for antibiotic treatment, especially regarding oral medications. With this reduced use of antibiotics, the vaccinated pigs grew faster and had a better FCR than non-vaccinated pigs getting more antibiotics, thus demonstrating, that prevention (vaccination) is better than cure (antibiotics), also from an economical point of view.

Hence, the use of vaccines can help pig producers to maintain a sustainable production system, by improving the gross margin per pig at the same time as the use of antibiotics is decreased to meet the increasingly higher demands from politicians and consumers.

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