

Streptococcus suis autogenous vaccines in Dutch farms: Effect of sow vaccination on total mortality and antimicrobial usage in piglets after weaning

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Introduction

Streptococcus suis infections have a huge impact on animal welfare and economical performance in pig farms worldwide. Furthermore, they hinder the restrictive use of antimicrobials because oral group treatment is an important tool to control the disease.

Epidemiological studies have shown a high level of diversity in *S. suis* serotypes between geographical regions and within farms. This heterogeneity in pathogenic strains has hampered the development and availability of effective commercial vaccines. Therefore, veterinarians also prescribe autogenous vaccines for this disease.

Only few experimental and even less field trials have been performed to study the efficacy of autogenous vaccines and the results are inconsistent¹. Extrapolation to an expected effect in a new field case is difficult because of the great variability in production methods, adjuvants, methods of isolation and selection of strains and vaccination protocols. In addition most studies concern serotype 2 strains while serotype 9 strains are most prevalent on European farms.

The objective of this multicentre retrospective cohort study is to investigate the effects of autogenous *S. suis* sow vaccination on total mortality and antimicrobial use in weaned piglets, using a standardized protocol.

Materials and Methods

All pig farms, attended by veterinarians from one clinic, which satisfied for all inclusion criteria were selected for this study. This resulted in data from eight farms (4158 sows). The farms started vaccination due to high mortality and high antimicrobial usage after weaning. Strains were isolated from piglets with typical *S. suis* signs. Only farms that isolated at least one *S. suis* serotype 9 strain were included. When different serotypes were isolated at a farm each serotype was included into the vaccine. This resulted in an average of 2.3 *S. suis* strains in the eight different vaccines, selected out of 3-11 serotyped strains per farm. Sows were vaccinated 6-7 weeks pre-partum and boosted 4 weeks later. In the next cycle sows received only 1 booster 2-3 weeks pre-partum. The autogenous vaccines were oil/water adjuvanted and were produced at Biovac, France.

We investigated the results of total mortality and oral antimicrobial treatment (amoxicillin and trimethoprim/sulfonamide) after weaning (4-10 weeks of age) during 6 months after the moment that piglets born from vaccinated sows reached the age of 10 weeks. These data were compared to data from twelve months earlier. For total mortality and antimicrobial use we performed ANOVA analyses with month (nested in period), farm and period (pre and post) as categorical variables (SYSTAT for WINDOWS, Version 13.00.05).

Farm (sows)	results of serotyping	serotypes in vaccine	TM pre-vacc	TM post-vacc	AMB pre-vacc	AMB post-vacc
1 (541)	6x st9	9	2.5	1.0	789	0
2 (536)	7x st9	9 + 4	4.9	2.3	159	0
	1x st4					
3 (752)	3x st9	9 + 9	3.7	2.9	55	166
4 (574)	1x st9	9 + 7 + 2	4.0	1.7	0	0
	3x st7					
	2x st2					
5 (261)	4x st9	9 + 2	4.7	1.4	227	0
	1x st2					
6 (684)	9x st9	9 + 9 + 7 + 2	4.5	2.6	106	0
	1x st7					
	1x st2					
7 (480)	3x st9	9	3.8	2.3	46	39
8 (330)	1x st9	9 + 1/2 + 1	4.0	3.1	240	126
	6x st1/2					
	1x st1					

Table 1
Results of serotyping: serotyping results of isolated *S. suis* strains prior to autogenous vaccine production

Serotypes in vaccine: the different strains incorporated in the autogenous vaccine

TM pre/post-vacc: mean total mortality per month before/after vaccination (%)

AMB pre/post-vacc: mean antimicrobial usage per month before/after vaccination (kg BW treated/sows present at farm)

Results

Mean total mortality after weaning was 4.1% pre- and 2.0% post-vaccination. This is a decrease of 50% (p<0.001). Oral antimicrobial use in piglets was calculated as kg bodyweight that could be treated/sow present at the farms/month. This resulted in 203 kg pre- and 41 kg post-vaccination which is a reduction of 80% (p=0.015).

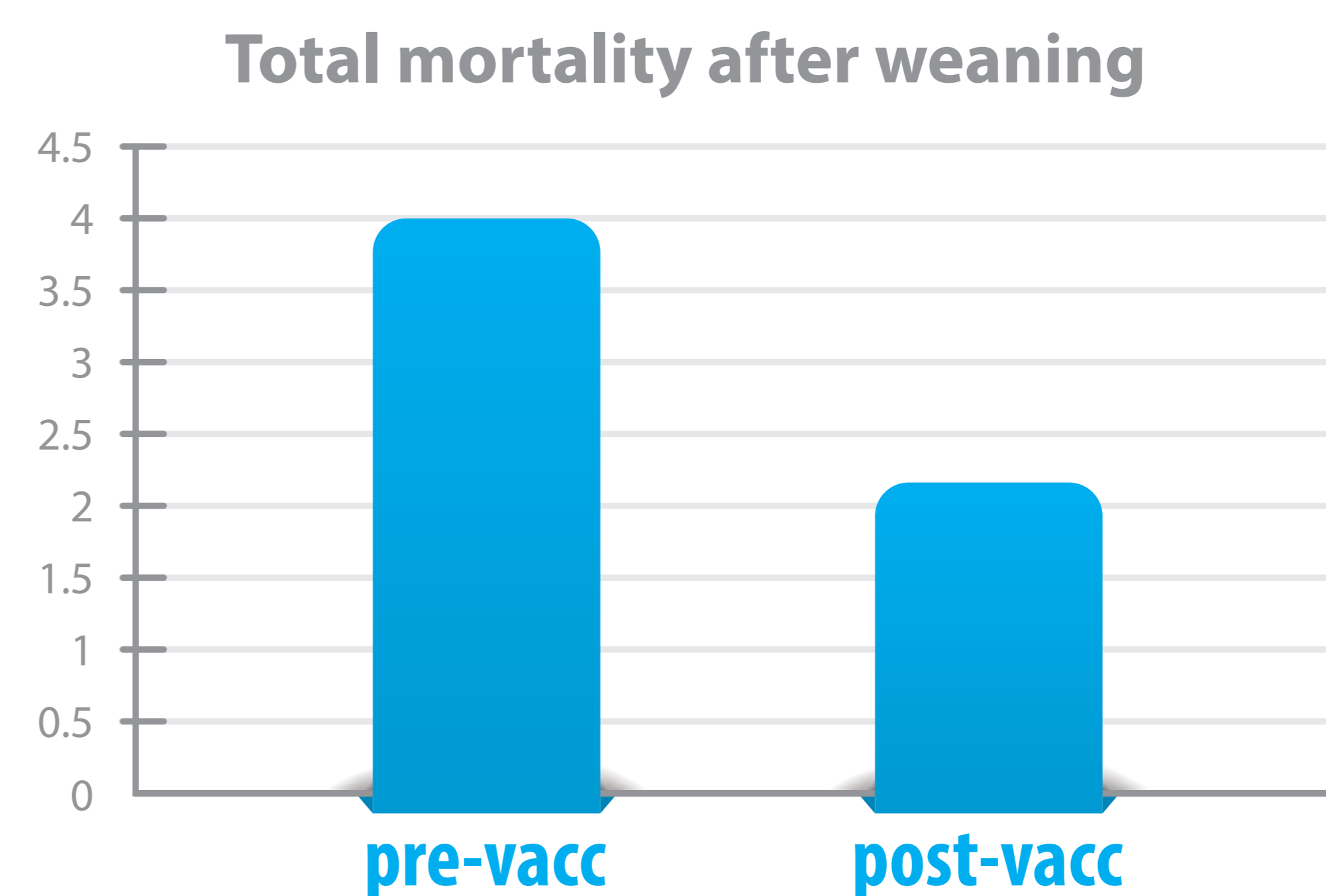


Figure 1
Mean total mortality per month of eight farms before and after vaccination (%)

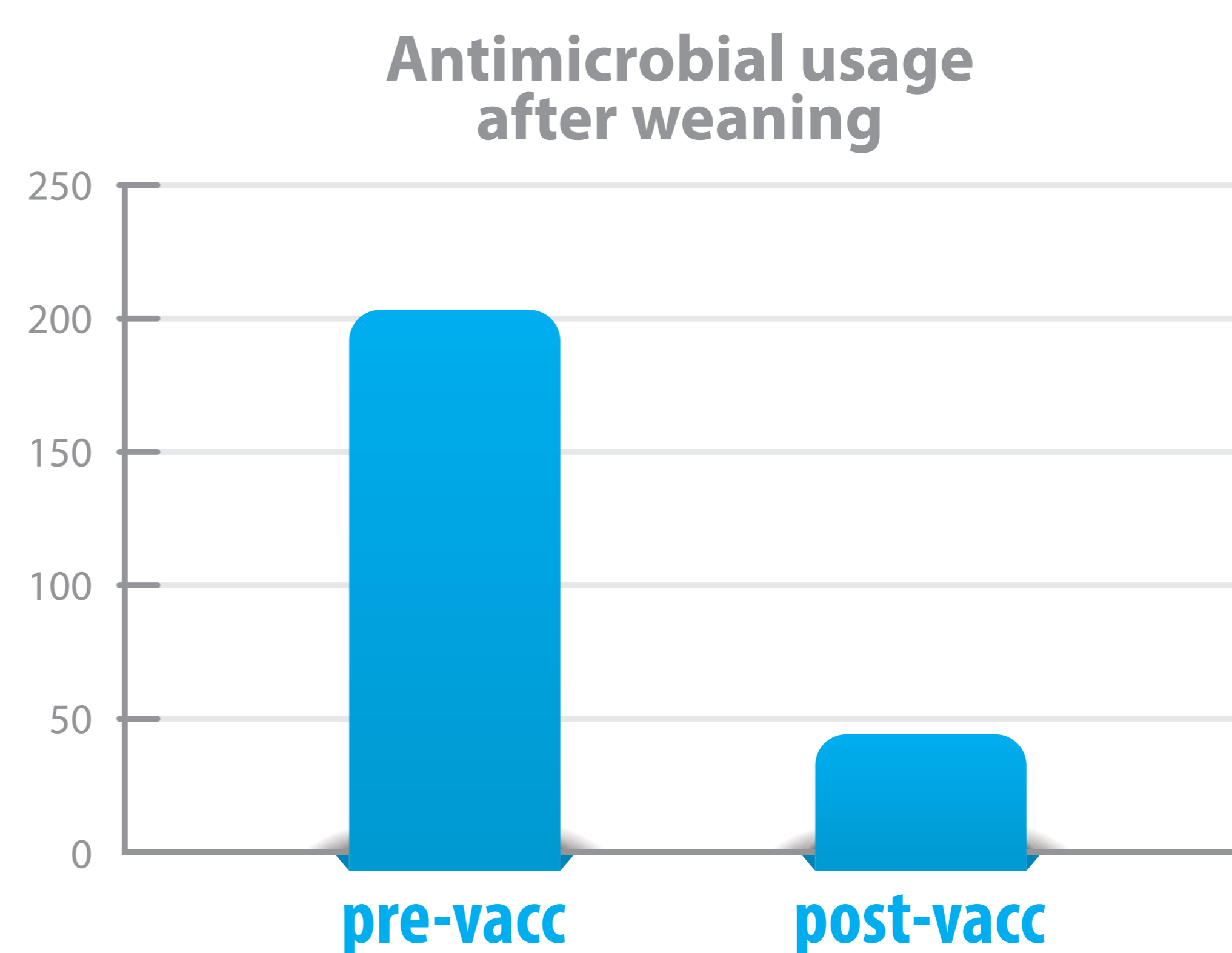


Figure 2
Mean antimicrobial usage per month of eight farms before and after vaccination (kg BW treated/sow presents at farm)

Discussion and conclusion

In this study it was shown that autogenous *S. suis* sow vaccines play an important role in reduction of total mortality and antimicrobial use in piglets after weaning.

Randomised controlled clinical trials are important to establish the efficacy of a vaccine in a small population receiving close follow-up. However they have often limited predictive value for the use in larger populations which are exposed to variations that were not studied² (especially in multifactorial diseases as *S. suis* infections). To our knowledge this is the first field study that evaluates the efficacy of multiple autogenous *S. suis* vaccines for which a standardized protocol was used. We evaluated total mortality and oral antimicrobial usage after weaning for each farm. It would be more accurate to evaluate *S. suis* mortality instead of total mortality, however these data were not available for all farms. Furthermore the correctness of a farmer's diagnose is questionable because it is often difficult to distinguish between *S. suis* infections and other diseases. For the evaluation of antimicrobial usage we did not include parenteral administration but oral administration only. For *S. suis* infections, oral administered antibiotics are most important in the total exposure to antimicrobials. Furthermore, for the investigated farms it was possible to distinguish between the investigated drugs used for weaned piglets and for other animal categories present at the farm. This distinction was not possible for parenteral administered antimicrobials. Amoxicillin and trimethoprim/sulfonamide combinations were the only used oral antimicrobials for *S. suis* infections at the investigated farms.

References • 1 Segura, 2015 • 2 Ho et al., 2008