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Efficacy of Ingelvac CircoFLEX® vaccination against PCV2/PCVD: A meta-analysis of 10 studies

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Introduction and Objectives
Numerous individual studies confirming the efficacy of Ingelvac CircoFLEX® (Boehringer Ingelheim Vetmedica, Inc., St Joseph, MO) in vaccinated versus non-vaccinated pigs have been described. The aim of this meta-analysis was to assess the overall impact of vaccination on average daily gain across 10 separate studies.

Materials and Methods
The individual pig was the experimental unit in each of the 10 studies and average daily gain was the treatment effect of interest. Conventional pigs were vaccinated around the time of weaning at approximately 3 weeks of age. Measurement periods ranged from 119-158 days on test. The magnitude of the treatment effect, standard deviation, and number of pigs that were placed on test and finished for each treatment group was entered into Comprehensive Meta-analysis software (Version 2, Biostat Inc., Englewood, NJ) for analysis. Even though each study followed the same basic protocol and all studies were conducted with many important conditions in common (e.g., study populations having a history of clinical PCVAD, similar starting animal age/weight and gender mix, barn type, management conditions), the more conservative random-effects model with 99% confidence intervals was used for the meta-analysis.

Results
Table 1. Treatment effect of vaccination with Ingelvac CircoFLEX® on ADG in 10 individual studies.

<table>
<thead>
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<th>Study Number</th>
<th>Average daily gain (ADG)</th>
<th>Difference</th>
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<tr>
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<td>CircoFLEX</td>
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<tr>
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<td>1.74a</td>
<td>1.85b</td>
</tr>
<tr>
<td>2</td>
<td>1.70a</td>
<td>1.79b</td>
</tr>
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<td>1.57b</td>
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<td>6</td>
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<td>1.34b</td>
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<tr>
<td>10</td>
<td>1.59a</td>
<td>1.65b</td>
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</table>

ab: P<0.05

The individual study difference in ADG between treatments (vaccinated vs non-vaccinated animals) is presented in Table 1. The meta-analysis forest plot (Figure 1) shows that in 9 of 10 studies the lower 99% confidence limit equals or exceeds a standardized mean difference of zero increase in ADG, i.e., favoring Ingelvac CircoFLEX® vaccination. The diamond at the bottom of Figure 1 signifies the 10 study summary ADG effect. The standardized difference in means summary value of +0.33 (99%CI of +0.29 to +0.38) translates to a weighted difference in ADG of +0.07 (99%CI of +0.06 to +0.08) favoring vaccination.

Figure 1. Forest plot of individual studies ADG (lbs) effects and overall summary effect.

Conclusions
This 10-study meta-analysis of the impact of Ingelvac CircoFLEX® vaccination on ADG illustrates a consistent and statistically significant advantage favoring vaccines. Aggregating data from many adequately similar (i.e., effectively homogenic) studies across multiple production systems and geographic areas brings greater confidence to the vaccination decision process.

References