Antibiotic reduction on farms in the United Kingdom, as a result of the introduction of PCV2 vaccination in piglets.

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Introduction:
Porcine Circovirus Disease (PCVD) was first described in the UK in 1997. Since 1999 it has been a major cause of mortality in the pig industry and has been estimated to cost the British pig industry £30M per year (2004). The introduction of PCV2 vaccines has allowed greater control of PCVD, a significant reduction in mortality and an improvement in production parameters in herds throughout the UK. Porcine Dermatitis and Nephropathy Syndrome (PDNS) has been observed as an early indicator of PCVD on some farms and may also be a reflection of post-PMWS in the British national herd. This study looks at the improvement in mortality, performance and the reduction in antibiotics in pigs sourced from a 900 sow unit in East Anglia, England, (Farm A) following the introduction of Ingelvac CircoFLEX®. ‘Farm A’ is one of 28 breeding units belonging to a large commercial pig business (comprising 26,000 sows in total).
This study also analyses the reduction in overall medication costs for all the pigs reared in this company in 2007 compared to 2008, following the introduction of Ingelvac CircoFLEX®.

Materials and Methods:
The 900-sow unit (Farm A) was Mycoplasma hyopneumoniae positive and using a routine M hyo vaccination at weaning. A PRRS vaccination programme was initiated in spring 2007 (sow vaccination only) and the herd considered PRRS stable by autumn 2007. PDNS was the predominant cause of mortality in the grower pigs (responsible for almost 60% of total mortality) and this usually occurred in pigs over 70kg live weight. PCV2 also manifest as part of a respiratory disease complex, with limited response to antibiotics. Sporadic ileits/colicitis occurred throughout the growing phase and in-feed antibiotics were used as necessary.
Routine PCV2 vaccination was introduced to ‘Farm A’ in May 2008. Piglets were vaccinated at weaning time (aged approximately 4 weeks of age) with a single dose (1 ml) of Ingelvac CircoFLEX®, concurrently with the Mycoplasma vaccination.
Pigs were batch farrowed and weaned off-site every 3 weeks and then transported to one of five designated grow-out units (wean to slaughter units). These grow-out units were designed as all in/all out facilities. The pigs were reared in similar types of units with straw-based, solid floorc set and ad-lib dry feeders and each unit had a designated herd manager.
Pig performance was monitored (wean to slaughter) on all 5 grow-out farms, from November 2007 to February 2009. SPC data was collected from 11 batches of pigs before (11,075 pigs) and 7 batches of pigs after (5,851 pigs) the introduction of Ingelvac CircoFLEX®. Data collected included post weaning mortality, average daily weight gain (ADWG), feed conversion ratio (FCR) and veterinary costs. Veterinary costs comprised of routine and emergency veterinary visits and total antibiotic expenditure (in-feed, injectable and water-soluble antibiotics) per pig, but did not include vaccination costs. No other management or nutritional changes occurred on these grow-out units during that time period.
A Gross Margin (GM) per pig was calculated for pigs sourced from ‘Farm A’, based on the average improvements seen on the grow-out units, following vaccination with Ingelvac CircoFLEX®. Assumptions considered for economics were: a constant slaughter weight of 100kg, feed price of £170/ton, weaner price of £36 and a deadweight price of £1.23/kg.

In addition, one of the 5 grow-out units was already achieving top performance (wean to slaughter). Mortality and performance parameters were compared before (4 batches) and after (3 batches) PCV2 vaccination on this unit.

Finally, the total medication costs (including all antibiotics and vaccines) given to the piglets reared in this commercial system of 26,000 sows were compared for 2007 and 2008.

**Results:**

Table 1 shows the performance data for successive batches of pigs from ‘Farm A’ before and after the introduction of Ingelvac CircoFLEX®. The average mortality showed a statistically significant decline from 6.4% to 2.77% per batch (graph 1) and at the same time the variation in mortality per batch also reduced. The reduction in mortality was predominantly due to the disappearance of PDNS in the pigs and, to a lesser extent, the resolution of respiratory disease.

The ADWG per pig per batch increased from 669g/day to 729g/day (graph 2) and the feed conversion ratio (FCR) reduced from 2.53 to 2.44kg/kg. With all parameters the variation between batches of pigs before and after vaccination decreased. The total cost of veterinary fees per pig (vet visits + all antibiotics) was reduced from £1.62 to £1.26 per pig, a reduction of over 22% per pig.

**Table 1: Summary of the mortality, performance data and antibiotics + veterinary costs of pigs from ‘Farm A’ before and after the introduction of Ingelvac CircoFLEX®**

<table>
<thead>
<tr>
<th></th>
<th>No. pigs</th>
<th>Mortality %</th>
<th>ADWG (g/day)</th>
<th>FCR (kg/kg)</th>
<th>Total antibiotics + vet visit fees per pig (£/pig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Vx</td>
<td>11,075</td>
<td>6.39</td>
<td>669</td>
<td>2.53</td>
<td>1.62</td>
</tr>
<tr>
<td>After Vx</td>
<td>5,851</td>
<td>2.77</td>
<td>729</td>
<td>2.44</td>
<td>1.26</td>
</tr>
<tr>
<td>Difference</td>
<td></td>
<td>-57%</td>
<td>+60</td>
<td>-0.09</td>
<td>-22%</td>
</tr>
</tbody>
</table>

Results in the grow-out unit that was already achieving top-performance showed a reduction in mortality of 25% (3.05% to 2.29%), an increase in ADWG from 725g/ay to 761g/day and a reduction in FCR from 2.43 to 2.37kg/kg following vaccination.

Based on the reduced mortality and improved performance of PCV2-vaccinated pigs leaving Farm A, the GM that could be achieved following vaccination with Ingelvac CircoFLEX® is £6.77.

In the whole system (in total 560,000 pigs slaughtered, from 28 breeding units) antibiotic costs in 2008 were reduced by 27% compared to 2007. Including the additional investment in vaccines the total expenditure on all medicines (antibiotics + vaccines) given to rearing pigs from 2007 to 2008 reduced by 4.2%.
Graph 1: Post weaning mortality (%) for each batch of pigs from 'Farm A' before and after vaccination with Ingelvac CircoFLEX®

Graph 2: ADWG (g/day) per pig for each batch of pigs from Farm A before and after vaccination with Ingelvac CircoFLEX®
Discussion
The introduction of PCV2 piglet vaccination to a 900-sow breeding unit resulted in a dramatic reduction of mortality, improved ADG and FCR, as well as a reduction of antibiotic usage in the pigs sourced from that farm. This improvement could be observed on all grow-out units, despite the level of PCVD, so that even the farm with mild PCVD and top performance also benefited from PCV2 vaccination. PDNS-related mortality, which was accountable for up to 60% of total post-weaning mortality, disappeared not only from pigs sourced from Farm A, but also across the farms where PCV2 piglet vaccination had been initiated.

Though a new piglet vaccine was introduced, the overall medication cost (including antibiotics and vaccines) for all pigs reared in the company was reduced by 4.2% in 2008 compared to 2007, reflecting a massive reduction of antibiotic use. Across the whole company PCV2 vaccination commenced in Dec 2007 and by the end of 2008 less than half of the pig population were receiving routine Ingelvac CircoFLEX®, so it could be expected that the full economic benefit of vaccination would not be fully observed until all the population had been vaccinated.

Besides the overall reduction in expenditure on medicines and the reduction in the total amount of antibiotics required to successfully rear the pigs in these types of systems, the response to antibiotics (especially those used to treat respiratory disease) has been much more predictable and satisfactory, following the introduction of Ingelvac CircoFLEX®.

Conclusion
This demonstrates that the introduction of a PCV2 vaccination programme can not only reduce mortality and improve performance but can also lead to a significant reduction in overall medication costs.

Reference:
1) Kennedy et al. (1998). Vet Record, 142, 495-496.