

# Injection of PG600<sup>®</sup> at weaning of the first litter: Effects on sow lifetime performance

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## Summary

A retrospective analysis was performed over five parities of the reproductive performance of sows that did, or did not, receive PG600<sup>®</sup> at their primiparous weaning. It was determined that PG600<sup>®</sup> did not result in the breeding of potentially infertile sows nor was the sow response to PG600<sup>®</sup> predictive of long-term performance.

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The exogenous gonadotropins, pregnant mare serum gonadotropin (PMSG) and human chorionic gonadotrophin (hCG), act on the ovary to induce follicle growth and subsequent ovulation.<sup>1</sup> We have previously demonstrated that administering 400 IU PMSG with 200 IU hCG (PG600<sup>®</sup>, Intervet Canada, Ontario) at weaning to primiparous sows greatly facilitated the achievement of breeding targets.<sup>2</sup> However, in our previous study, the subsequent litter size was significantly reduced in PG600<sup>®</sup>-treated sows compared to control sows. This contrasts with other studies that have noted either no effect on litter size<sup>3–5</sup> or an increase in litter size.<sup>6</sup> Although we were not able to determine the reason for smaller subsequent litters in our previous study, we did suggest that the longer weaning-to-estrus intervals (WEI) of primiparous sows might allow a longer recovery period after the metabolic stress of lactation, with a concomitant recovery in fertility similar to the skip-a-heat phenomenon. In our previous study, we reasoned that PG600<sup>®</sup> treatment may have acted to override a delay in estrus onset and, therefore, may have allowed the breeding of some sows that were relatively less fertile.

Conceptually, it is reasonable to suggest that a sow population will have a normal distribution of potential fertilities (i.e., WEI and/or ability to conceive and/or subsequent litter size). We further suggest that sows with relatively high potential fertility will consistently respond more rapidly to PG600<sup>®</sup> treatment. In contrast, sows of relatively poorer potential fertility will probably show a less consistent response, possibly due to the failure of the ovary to respond to the gonadotrophic

signals, or to a lesser degree of follicular development at weaning. Inadequate follicular development will require a longer period to achieve a preovulatory follicular status. Therefore, sows with longer treatment-to-estrus intervals may be more likely to be from the less-fertile component of the population.

If more-fertile sows respond more rapidly to PG600<sup>®</sup> than do less-fertile sows, sow response to PG600<sup>®</sup> treatment could be used to predict longer-term potential sow fertility. However, we are aware of no information regarding the predictive value of PG600<sup>®</sup> treatment at the primiparous weaning for long-term sow productivity.

The objectives of the present study were to test the following hypotheses:

- Hypothesis 1: PG600<sup>®</sup> would allow the breeding of relatively infertile sows, resulting in an overall reduction in sow longevity and/or pig production compared to nontreated controls. A potential scenario may be that a relatively infertile sow would be mated after PG600<sup>®</sup> treatment, then would subsequently farrow a small litter and/or fail to be rebred at the next parity and so possibly be culled. This would reduce both mean population longevity and piglet production.
- Hypothesis 2: Within the treated population, sows responding to PG600<sup>®</sup> promptly would be inherently more fertile and fecund. These sows would be equivalent to control sows and have wean-to-estrus intervals of 3–5 days. Therefore, within the PG600<sup>®</sup>-treated population, these sows would be more likely to have a greater herd longevity, and thus piglet production. In this way, the predictive value of the speed of response to PG600<sup>®</sup> for sow fertility could be evaluated.

## Materials and methods

The present study employed the database from one of our previous study herds (Farm 2).<sup>2</sup> The sows on this farm were of Yorkshire and Landrace breeding, were bred by a combination of natural and artificial insemination, and lactated for 21 days.<sup>2</sup>

We conducted a retrospective analysis of relationships between

- receiving PG600<sup>®</sup> treatment (PG600<sup>®</sup>; n=450) or not (Control; n=424) at weaning of the first litter, and
- lifetime sow productivity, defined as either number of litters produced, or total number of pigs produced. These variables were chosen for analysis because we believed them to be the best indicators

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of breeding herd performance over time.

The retrospective evaluation period encompassed five potential parities.

## Statistical analysis

All analyses were performed using SAS<sup>®</sup>.<sup>7</sup> The first hypothesis was tested using GLM procedures to derive least-squares means and standard errors of the means for the total number of pigs born and number of litters produced with treatment (PG600<sup>®</sup> versus Control) as the main effects. For the second hypothesis, the REG procedure was used to perform a simple linear regression procedure to determine the dependency of the total number of pigs produced and total litter size on first wean-to-estrus interval of PG600<sup>®</sup>-treated sows.

## Results

### Hypothesis 1

ANOVA indicated no treatment effect on either total pigs born (36.6 versus 35.9 [SEM = 0.8];  $P=0.5$ ) or on litters produced (3.3 versus 3.2 [SEM = 0.07];  $P=0.9$ ) for control and PG600<sup>®</sup>-treated sows, respectively.

### Hypothesis 2

For PG600<sup>®</sup>-treated sows, regression analysis of total pigs produced and total litters produced on the first wean-to-estrus interval revealed a positive relationship ( $P < .02$ ) for pigs born and no relationship for litter production ( $P < .3$ ). However, weaning-to-estrus interval accounted for only 2% of the variation.

## Discussion

### Hypothesis 1

In practical terms, our results indicate that the previously observed PG600<sup>®</sup>-associated reduction in litter size did not reflect potential sow fertility and fecundity. Further, these results support the conclusion that no claims should be made for litter size when advising clients

about the use of PG600<sup>®</sup> in their management programs. Previous studies show that subsequent litter size may increase, decrease, or be unaffected following PG600<sup>®</sup> treatment.<sup>2-6</sup>

## Hypothesis 2

Our observations failed to indicate evidence that sow response to PG600<sup>®</sup> will have a useful predictive value for determining potential fertility.

## Implications

- Injection of PG600<sup>®</sup> at weaning of the first litter will not result in the breeding of infertile sows and so does not affect sow lifetime performance.
- The rapidity of the sow response to PG600<sup>®</sup> does not predict fertility potential.

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