Brief communication

Peer reviewed

Individual Pig Care program improves productive performance and animal health in nursery-growing pigs

Carlos Pineiro, DVM, MSc; Joaquin Morales, DVM, PhD; Andre Dereu, DVM; Niels Wuyts, DVM; Olivia Azlor, Engr; Elena Vizcaino, DVM; Paolo Doncecchi, DVM

Summary

Individual Pig Care (IPC; Zoetis, Paris, France) is a new management tool for swine farmers, based on daily keen observation of pigs, early detection of health problems, and prompt reaction to them. In this study, IPC improved production and promoted more effective management with more targeted use of medication.

Keywords: swine, Individual Pig Care, health, management, antibiotic judicious use

Received: October 29, 2013
Accepted: May 20, 2014

Resumen - El programa Individual Pig Care mejora el desempeño productivo y la salud animal en cerdos de destete-crecimiento

El programa Individual Pig Care (IPC; Zoetis, Paris, Francia) es una nueva herramienta de manejo para los productores porcinos, basada en la aguda observación de cerdos, detección temprana de problemas de salud, y la pronta respuesta a los mismos. En este estudio, el IPC mejoró la producción y promovió un manejo más efectivo con una utilización más enfocada de la medicación.

Résumé - Le programme Individual Pig Care améliore les performances de production et la santé des animaux chez les porcs en pouponnière-croissance

Le programme Individual Pig Care (IPC; Zoetis, Paris, France) est un nouvel outil de gestion pour les producteurs porcins, basé sur une observation quotidienne attentive des porcs, une détection précoce des problèmes de santé, et une réaction prompte à ces problèmes. Dans la présente étude, le programme IPC a permis d'améliorer la production et a favorisé une gestion plus efficace avec une utilisation ciblée de la médication.

Antimicrobial-resistant zoonotic bacteria may be transmitted from pigs to the human population, potentially resulting in human disease that may not respond efficiently to antimicrobial treatment.[1,2] In an attempt to reduce antimicrobial resistance in zoonotic pathogens, the current pig-production industry is aiming to promote a more judicious use of antibiotics either under national regulations (The Netherlands, France, and Germany are the latest countries involved in this initiative) or the demands of the final customer (retailers and supermarkets). However, animal health and welfare require a highly efficient and economically sustainable system for disease control, including a need for both vaccination and antibiotics.

To fulfill those objectives, a new management tool for swine farmers in Europe has been developed. It is called Individual Pig Care (IPC; Zoetis, Paris, France) and is based on daily individual observation of the pigs, early detection of husbandry and health problems, and prompt and accurate reaction to these problems, enabled by rapid and effective data collection and processing.

The IPC program is a commercial service delivered by coaches called husbandry educators. To determine if IPC positively affects swine productivity in nursery-growing pigs, a study was conducted at a commercial swine-production facility. Productive performance and health status outcomes for a group monitored by a dedicated on-site IPC educator (IPC group) were compared to outcomes for a group raised according to the standard care protocol in place prior to the trial (Control group).

Materials and methods

Animal care and experimental procedures used in this study followed the regulations and guidelines of the Spanish government for the protection of animals under scientific research (Real Decreto Español 223/88 BOE 67: 8509-8511).

Study facilities

The study was conducted on a commercial, 700-sow, farrow-to-finish farm in Segovia, Spain. The health status of the farm was medium-low; the herd was positive for porcine reproductive and respiratory syndrome (PRRS) and there was a high incidence of colibacillosis in the nursery phase.

A total of 24 pens (2.5 m × 2.8 m) distributed in four nursery rooms were used for the study. Environmental conditions during the trial (temperature and ventilation rate) were automatically controlled and assessed as appropriate for the age of the pigs. Each pen was equipped with one six-hole self-feeder and two nipple waterers, allowing ad libitum access to feed and water.

Study animals and housing

A total of 368 pigs, with equal numbers of females and entire males, were selected for the study at 23 days of age (weaning day) and were observed until they were 90 days of age. Pigs were randomly assigned (by random number generator) to the four nursery rooms, with four pens per room and

CP, JM, EV: PigCHAMP Pro Europa SL, Segovia, Spain.

AD, NW, OA, PD: Zoetis, Paris, France.

Corresponding author: Dr Carlos Pineiro, PigCHAMP Pro Europa S. L., Calle Santa Catalina 10, 40003 Segovia, Spain; Tel: +34 921412556; Fax: +34 921412378;
E-mail: carlos.pineiro@pigchamp-pro.com.

This article is available online at http://www.aasv.org/shap.html.

Pineiro C, Morales J, Dereu A, et al. Individual Pig Care program improves productive performance and animal health in nursery-growing pigs. *J Swine Health Prod.* 2014;22(6):296–299.

23 pigs per pen. Two pens housed males and two pens housed females. Two additional pens per room, initially empty, were used as hospital pens.

Experimental design

The main effect assessed was management of the pigs in the standard (Control) and IPC models. Animals and pens were equally distributed in both treatment groups. Each hospital pen accommodated pigs from only one IPC pen in order to maintain pen integrity. The control group was managed according to the traditional methodology used on this farm, which provided one observation of the pigs per day. Sick pigs were marked with a spray and treated according to the standard operating practices on the farm. Briefly, clinical signs were treated according to the preexisting treatment protocols at the site. When clinical signs affected several pigs in a pen, treatment was applied in feed or via drinking water to the entire pen. In addition, severely ill pigs were treated, removed from the pen, and left in the corridor, with feed and water available, until they died naturally or their health status improved and they were returned to their pens.

In the IPC group, the IPC guidelines were followed for health and husbandry management of pigs.[3] A different caregiver, previously trained in the IPC guidelines by an IPC veterinarian educator, also monitored the IPC-trained farmer during the study. Management consisted of one daily visit to the pigs by the caregiver, treating sick pigs according to clinical signs and the preexisting treatment protocols at the site, but individual pig treatment was emphasized in this group. The same intramuscular (IM) antibiotics were used in both groups.

All data was recorded using paper forms and a digital pen paired with the SIM card of a commercial smartphone. These devices sent data to a database prepared to automatically process data, delivering a Web-based dashboard or control panel to check and monitor data and information generated immediately after collection. Sick pigs were scored and clinical signs were quantified according to severity (A, mild signs of disease; B, medium; C, serious; and D, very serious or near death) and type of disease (digestive, respiratory, lameness, neurological, bite wounds, or other). Pigs with disease described as category B or C were placed in hospital pens, with males and females accommodated in separate pens in each room. Pigs that did not recover within 3 to 4 days remained in the hospital pen for the duration of the study. Dying pigs (category D) were immediately euthanized.

Measurements and observations

Pigs were individually weighed and feed intake was measured by pen at day 0 (23 days of age); at day 40, the end of the nursery period (63 days of age); and at day 67, the end of the growing period (90 days of age). Parameters calculated were average daily gain (ADG), average daily feed intake (ADFI), and feed conversion ratio (FCR) in each phase. Body weight (BW) homogeneity within pen was also calculated, using the equation "100 minus the coefficient of variation" in each pen. Deaths and incidence of diseases were recorded daily in forms traditionally used in the site (Control) or in digitalized paper forms and using a digital pen (IPC).

Statistical analyses

Data were analyzed as a randomized complete-bock design using SAS 9.2 (SAS, Cary, North Carolina). Productive performance data were analyzed by ANOVA (PROC GLM), and mortality and incidences of diseases were analyzed as binary variables using the chi-square test. The pen of 23 pigs was the experimental unit. The model included treatment and gender as fixed effects and room as a random effect. Least-squares means were calculated for each treatment, and the effect of treatment was considered significant when $P < .05$ and as a trend when $P < .10$.

Results

Growth performance is presented in Table 1. Both in the nursery and in the growing periods, ADG and ADFI were higher and FCR was lower in IPC pigs than the control group ($P < .05$). Body weight homogeneity tended to be higher in IPC than in the control group at days 40 and 67. Final BW was higher in IPC group than in the control group.

Mortality did not differ between treatments in the nursery period (Table 1). Three pigs died in total, one in the control group and two in the IPC group. Both deaths in the IPC group were D pigs which were humanely euthanized. In the growing phase, pigs were clinically affected by PRRS at approximately 80 days of age, when typical signs were observed (lack of appetite, lethargy, respiratory signs, and blue discoloration of the skin on the ears). Mortality increased above the average in this phase in this farm (which was approximately 1%) and tended to be higher in the control group than in the IPC group (Table 1). One of the seven pigs that died in the control group was placed in the corridor with neurological signs and died approximately 24 hours later.

In the nursery period, morbidity did not differ between treatments: high immediately after weaning (43.4% and 52.7% of Control and IPC pigs, respectively, presented some type of clinical sign) and then decreasing progressively up to the first week after weaning when incidence was < 10% in each group. In the 7-day period after weaning, all clinical signs observed were digestive disorders. In the IPC group, sick pigs (52.7%) were individually treated by IM injection of antimicrobials. In this group, 78 sick pigs were scored as A pigs (42.4%), 17 as B pigs (9.2%), and two as C pigs (1.1%). All B pigs were moved to the hospital pen within the first week after weaning, and were treated and returned to their pen in 2 to 3 days, after showing signs of recovery. Both C pigs were moved to the hospital pen and remained there until they died during the growing period. In the Control group, mass antibiotic treatment was the treatment of choice when 20% to 30% of pigs per pen showed clinical signs of a digestive disorder. Within the first 7 days after weaning, all pens in the Control group received colistin sulphate via drinking water (100,000 IU colistin per kg BW daily for 3 consecutive days) and zinc oxide in the feed (2500 g per tonne for 14 days). In addition, more seriously affected pigs (43.4%) received individual IM antibiotic treatment.

In the growing phase, no mass treatments were used and the percentage of pigs individually treated with antibiotic did not differ between treatments (4.5%).

Discussion

The present study demonstrated that use of the husbandry- and health-management program proposed in this study (the IPC program) improved productive performance (both ADG and FCR).

In the UK, the Responsible Use of Medicines in Agriculture (RUMA) Alliance of farming, animal-health industry, food-retailing, and associated groups have as their goal promotion of a coordinated and integrated approach to best practice in the use of medicines. The Pig Working Group of the RUMA Alliance has published guidelines

Table 1: Mean (standard deviation) of growth performance in pigs managed under the Individual Pig Care (IPC) program or a standard care system (Control)*

	Control (n = 8 pens)	IPC (n = 8 pens)	*P*†
Nursery period (23 to 63 days of age)‡			
Initial BW (kg)	6.78 (1.122)	6.73 (0.867)	.91
ADG (kg/day)	0.326 (0.030)	0.368 (0.031)	.01
ADFI (kg/day)	0.467 (0.041)	0.511 (0.042)	.048
FCR (kg/kg)	1.434 (0.032)	1.392 (0.033)	.047
BW at 63 days (kg)	19.42 (1.333)	20.85 (2.303)	.07
Homogeneity at 63 days (%)	82.9 (4.142)	87.1 (3.142)	.06
Mortality (%)	0.54	1.09	.56
Growing period (64 to 90 days of age)			
ADG (kg/day)	0.391 (0.017)	0.439 (0.044)	.03
ADFI (kg/day)	0.637 (0.036)	0.696 (0.042)	.04
FCR (kg/kg)	1.634 (0.058)	1.590 (0.047)	.04
BW at 90 days (kg)	29.97 (1.304)	32.71 (2.448)	.04
Homogeneity at 90 days (%)	82.6 (3.879)	85.9 (3.003)	.07
Mortality (%)	3.83	1.10	.09
Total nursery-growing period (23 to 90 days of age)			
ADG (kg/day)	0.348 (0.011)	0.399 (0.031)	.004
ADFI (kg/day)	0.532 (0.032)	0.595 (0.048)	.049
FCR (kg/kg)	1.529 (0.029)	1.486 (0.032)	.049
Mortality (%)	4.35	2.17	.24

* A total of 368 pigs weaned at 23 days of age were used for the experiment, randomly allotted to 16 pens (23 pigs per pen), resulting in eight pens and 184 pigs per treatment group.

† One-way ANOVA for productive performance comparisons (ADG, ADFI, FCR, BW and BW homogeneity) and chi-square test for mortality comparisons.

‡ In the IPC group, 19 pigs were moved to the hospital pens within the first week after weaning: 17 returned to their pens in 2 to 3 days; two pigs remained in the hospital pen and died during the growing period. Average daily feed intake was controlled in the hospital pen and included in final calculations.

BW = body weight; ADG = average daily gain; ADFI = average daily feed intake; FCR = feed conversion ratio.

for responsible use of antimicrobials in pig production.[4] In this document, the importance of early recognition and treatment of disease is considered essential to protect animal welfare and also is a cornerstone of responsible medicine use, which is completely in line with IPC principles. The IPC program trains the caregiver to identify sick pigs at an early stage of disease (categorized as "A"). As a result, the IPC pigs in this study received individual treatment early in the disease process, which may have allowed them to recover quickly with minimal treatment. While they did not receive mass medication, their productive performance was better than that of the control pigs, and, in the growing phase, mortality tended to be lower than that of the control pigs, which had all received mass medication. Injectable antibiotics provide the most effective treatment in outbreak infections, mainly because they do not depend on water or feed consumption, which are usually reduced in sick pigs.[5] As a result, pigs treated individually have the best chance of recovery, with the least amount of antibiotic needed and with the medication given at the correct dosage. Availability of hospital pens may also contribute to a faster recovery in more seriously ill pigs (ie, categorized as B and C). Pigs in hospital pens are able to recuperate without competing with healthy pen mates for food, water, and comfortable lying areas. However, the effects on health status and productive performance obtained in the present study when the IPC guidelines were followed may be greater because of the relatively poor health status of the commercial herd.

It is increasingly necessary to adopt new approaches to food safety and pork quality. One way to describe the quality of pork production might be to collect information about medications used, proportion of pigs needing treatment, and management of herd health. In two studies, antimicrobials used in the different phases of swine production were registered and associated with production, sales, and trade information.[6,7] However, this kind of data gives little information about how, where, when, and why antimicrobials are used.[8] The current study proposes a new protocol, the IPC program, to generate these records properly,

accurately, and quickly. Health and growth performance might improve considerably with more comprehensive control of disease. In addition, records obtained with this program provide evidence of the timing and amount of medications used and the results of treatment.

Implications

- Under the conditions of this study, on farms with low health status, IPC training enables the caregiver to identify and treat sick pigs at an early stage of disease, which may contribute to better growth and productivity during the nursery and growing periods.
- Emphasizing individual treatment of sick animals through the IPC program, rather than mass medication, may result in less overall antibiotic usage and improved productivity.

Conflict of interest

Drs Andre Dereu, Niels Wuyts, and Paolo Doncecchi, and Olivia Azlor are employees of Zoetis, and IPC is a protocol management program service offered by Zoetis. Drs Carlos Pineiro, Joaquin Morales, and Elena Vizcaino were employed by the research organization PigCHAMP.

References

1. Khanna T, Friendship R, Dewey C, Weese JS. Methicillin resistant *Staphylococcus aureus* colonization in pigs and pig farmers. *Vet Microbiol*. 2008;128:298–303.

2. de Jong A, Bywater R, Butty P, Deroover E, Godinho K, Klein U, Marion H, Simjee S, Smets K, Thomas V, Valle M, Wheadon A. A pan-European survey of antimicrobial susceptibility towards human-use antimicrobial drugs among zoonotic and commensal enteric bacteria isolated from healthy food-producing animals. *J Antimicrob Chemother*. 2009;63:733–744.

3. Galina Pantoja L, Kuhn M, Hoover T, Amodie D, Weigel D, Dice C, Moeller T, Farrand E. Impact of a husbandry education program on nursery pig mortality, productivity, and treatment cost. *J Swine Health Prod*. 2013;21:188–194.

4. RUMA Alliance. Responsible Use of Medicines in Agriculture Alliance Guidelines. 2005. Available at: `http://www.ruma.org.uk/guidelines/antimicrobials/long/pig%20antimicrobials%20long.pdf`. Accessed 14 August 2014.

*5. Gemus ME. Treatment and control of swine respiratory disease. *Proc North Carolina Healthy Hogs Seminar*. Greenville, North Carolina. 1996. Available at: `http://www.ncsu.edu/project/swine_extension/healthyhogs/book1996/book96_14.htm`. Accessed 14 August 2014.

6. Espinasse J. Responsible use of antimicrobials in veterinary medicine: perspectives in France. *Vet Microbiol*. 1993;35:289–301.

7. Blocks GHM, Vernooy JCM, Verheijden JHM. Integrated quality control project: relationships between pathological findings detected at the slaughterhouse and information gathered in a veterinary health scheme at pig farms. *Vet Q*. 1994;16:123–127.

8. Dunlop RH, McEwen SA, Meek AH, Black WD, Clarke RC, Friendship RM. Individual and group antimicrobial usage rates on 34 farrow-to-finish swine farms in Ontario, Canada. *Prev Vet Med*. 1998;34:247–264.

* Non-refereed reference.