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SDEC Partners Research Update

Project Update: Association between influenza A virus infection and pig subpopulations in endemically infected breeding herds

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Background

- Influenza A virus (IAV) is a main cause of respiratory disease in pigs and causes significant economic losses in the swine industry.
- Piglets at weaning can be a source of IAV to other swine populations, and new gilts can carry IAV
- There is a high turn over of piglets and gilts in swine breeding herds. However, it is unknown whether the risk of IAV infection is different among pig subpopulations in swine breeding herds.

Objective

To define patterns of IAV infection in pig subpopulations in breeding herds in order to understand the relative importance of these subpopulations as sources of IAV infection in breeding herds

Methods

- 5 swine breeding herds with confirmed history of IAV infection were conveniently selected.
- Each farm was visited every month for 12 months. At each visit, three pig subpopulations were sampled: a) replacement females, resident on-farm for less than 4 weeks (new gilts), b) replacement females, resident on-farm for more than 4 weeks (gilts), and c) neonatal pigs less than 21 days of age (piglets).
- From each subpopulation 30 individual nasal swabs were collected and tested for IAV by real time reverse transcriptase PCR (RRT-PCR)
- The relative odds of IAV was compared between subpopulations and adjusted by the effect of farm, year quarter, and sampling event.

Results

After adjusting by annual quarter and sampling visit, the odds of IAV infection were higher in groups of new gilts (OR=7.9 95% CI: 1.4,43.9) and piglets (OR=4.4 95% CI: 1.1,17.1) compared to groups of gilts (Table 1). Inclusion of farm to the model was not statistically significant (p>0.05) therefore this variable was excluded from the final model

Table 1. Results from the multivariate analysis (Mixed effects model). While subpopulation and annual quarter were included as fix effects, sampling visit was included as random effect.

Variable	Group	OR (95% CI)
Subpopulation	Gilts	-
	New gilts	7.9 (1.4, 43.9)*
	Piglets	4.4 (1.1, 17.1)*
Annual quarter	2nd. Apr, May, Jun	-
	3rd. Jul, Aug, Sep	3.5 (0.2, 54.9)
	4th. Oct, Nov, Dec	16.1 (1.1, 234.7)*
	1st. Jan, Feb, March	43.9 (2.8, 686.8)**

*p<0.05, **p<0.01, ***p<0.001

Conclusions

- In this study, piglets and new gilts had higher odds of IAV infection compared to gilts.
- In these herds there was a seasonal trend of IAV infection. There was a higher odds of finding IAV in pigs sampled between October and March.
- Piglets can harbor different IAVs over time and be a source of IAVs to other swine populations after weaning.
- Ideally, new gilts should be isolated prior to introduction into a breeding herd, and should not be introduced into the breeding herd until they have cleared any IAV infection.

For more information:

http://journals.plos.org/plosone/article?id=10.1371%2Fjournal.pone.0129213