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Detection of influenza virus in aerosols from swine farms

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Introduction

Influenza A virus transmission in swine occurs mainly by direct nose-to-nose contact and aerosol. It has been documented that pigs can shed influenza virus in their nasal secretions for approximately 7 days after infection.[1] Transmission between farms is thought to occur through movement of infected pigs.[2] However, there are reports in which outbreaks of respiratory disease in pig farms have occurred suddenly and are not associated to the introduction of animals. In addition, farm density has been associated to increase in the risk of influenza infections[3] which suggest that airborne transmission of influenza between farms may be possible. Information on transmission of influenza A in pigs is scarce, therefore, the objective of this study is to detect airborne influenza A virus from acutely infected pig populations in the field.

Materials and methods

Two acutely infected pig populations raised under commercial conditions were identified through constant communication with local veterinarians. Upon diagnostic confirmation of influenza infection by RRT-PCR in pigs affected with respiratory signs, a total of fifteen 30-minute air samples were collected inside and outside the barn using a cyclonic collector. Additionally, 15 oral fluid samples were collected from pigs inside the barn. If a population tested positive in the first visit, a second visit was scheduled seven days after the first visit and testing repeated. Air and oral fluid samples were tested for influenza RNA by RRT-PCR.[4] Further diagnostics included virus isolation, titration, strain subtyping and sequencing.

Results

In farm 1 (nursery), an influenza A H1N2 virus was detected in pigs with acute respiratory signs suggestive of influenza infection. Based on its clinical history, the herd was going through a clinical episode of respiratory disease. All air samples (inside and outside) tested positive for influenza A. Virus was isolated from 8 (7 inside and 1 outside) air samples. Virus was also isolated from 11 of 15 oral fluid samples. During the second farm visit, out of 15 air samples collected inside the barn, 6 were classified as suspect. Out of 15 air samples collected outside, 2 tested positive and 1 was classified as suspect. All 15 oral fluid samples tested positive. No virus was isolated from these samples.

On farm 2, a wean-to-finish barn, with influenza clinical signs in the later stage of the disease, four (2 inside and 2 outside) air samples were classified as suspect. All 15 oral fluids tested positive for influenza A. No virus was isolated from these samples.

Discussion

Our results confirm that acutely infected pig populations do generate airborne influenza A virus viable particles capable of being exhausted from pig barns and likely disseminated to other farms in the vicinity. Additionally, acutely infected populations can generate viable particles for at least a week after infection. Detection of influenza A virus in the field will depend on the course of disease, as it was previously demonstrated.[5] More studies are needed to further understand regional airborne transmission of influenza A virus.

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