

Network analysis of swine value chain: towards efficient zoonotic disease surveillance programs in Vietnam

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The occurrence of the H1N1 2009 pandemic demonstrated the importance of swine influenza (SI) surveillance, but a systematic surveillance is still lacking especially in less developed countries.

Purpose: The objective was to develop feasible and efficient surveillance protocols suitable to the swine production organization in Vietnam.

Methods: Based on a comprehensive study of the pig value chain in Northern Vietnam using participative methods and network analysis, different surveillance protocols for SI detection were implemented over a one-year period, with serological and virological testing of pigs.

Results: A total of 78 viruses were isolated at a large slaughterhouse where pigs originated mainly from commercial farms. No viruses were isolated from the other protocols focusing on the familial sector. Based on haemagglutinin and neuraminidase sequencing, the subtypes detected included 16 H1N1, 27 H3N2, and 35 H1N2 viruses related to H1N1pdm09, a H3N2 Korean triple reassortant virus, and H3N2 and H1N2 human-like SI viruses isolated in Southern Vietnam in 2010. Further sequencing of internal genes will be performed to identify reassortants. From ELISA results, seroprevalence was high in the slaughterhouses and low in young pigs at the market. Pigs in six out of 17 sentinel familial farms seroconverted during the study but no virus isolation was possible due to the lack of timely reporting of influenza-like illness by farmers. Pending HI test results will show if the viruses isolated in the commercial sector were circulating as well in the familial farms. Based on these observations and on the results of a pilot study carried out concurrently, the potential for the use of syndromic surveillance for virus isolation in the familial sector will be analyzed and discussed.

Conclusions: In Vietnam, no SI virus isolation has ever been successful in the familial sector despite high SI circulation. Surveillance at the large slaughterhouse has been maintained due to successful virus isolation and is a first step toward SI monitoring in Vietnam.

Relevance: The use of innovative methods such as participatory epidemiology and syndromic surveillance may be the key to enhance and sustain surveillance.