What promotes the circulation of HPAI H5N1 in Indonesia: a descriptive analysis of a network of moving duck farmers, rice paddy owners, duck transporters and hatcheries

Henning, J.\textsuperscript{1}, Priyono, W.\textsuperscript{2}, Yulianto, D.\textsuperscript{2} and Meers, J.\textsuperscript{1}, \textsuperscript{1}University of Queensland, Australia, \textsuperscript{2}Disease Investigation Centre Wates, Indonesia; j.henning@uq.edu.au

Ducks can harbour HPAI H5N1 virus, thereby promoting its spread in the field. HPAI H5N1 endemicity in Indonesia is likely associated with the high density of ducks in that country. Consequently previous investigations focussed on identifying hazards related to the management of duck flocks by their owners, but various other occupations are also associated with duck production. For example, moving duck flock farmers are part of a network that also comprises rice paddy owners who provide paddies for scavenging, duck transporters who move ducks to and from scavenging locations and hatcheries which purchase eggs and sell ducklings to the farmers. Therefore, in 2009 we conducted cross-sectional surveys and interviewed total of 121 rice paddy owners, 30 transporters and 75 hatchery owners in Indonesia. We used descriptive statistics, descriptive social network analysis and descriptive spatial analysis to identify interrelationships of members of this network, movement patterns of duck flocks and bio-security factors possibly influencing the dissemination of HPAI virus. For example, the number and frequency of duck flocks allowed scavenging per paddy and the disposal practices of carcasses found by rice field owners were identified as important risk factors for HPAI spread. Furthermore, the cost-reducing practice of combining flocks from different farms or the mixture of duck flocks with other poultry types and poultry feed during transport as well as a lack of disinfection in both, transport vehicles and hatcheries, presented further high-risk management practices. The complexity of the duck production network was further highlighted in the identified spatial travel patterns of moving duck flocks. Based on our results, we highlight recommendations for HPAI control that go beyond the management of ducks on farms and also consider other members of the community involved in duck production.