

Session 12

Theatre 1

Spatiotemporal epidemiology of H5N1 disease and infection in people and poultry: a continuing enigma

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Despite the large investment which has gone into investigating avian influenza H5N1, a number of aspects of the relationship between infection and disease remain enigmatic. Comparison of experience in Vietnam and China demonstrates the epidemiological conundrum posed by findings since the detection of H5N1 in Vietnam in 2003 and its progenitor viruses in China in 1996. The disease has shown marked seasonality, with epidemics occurring principally between December and March. This is the cool season when influenza viruses typically spread more readily, but is also the time of peak rice harvesting and major national festivals, resulting in increased poultry movements and production. In Vietnam smaller epidemics have also occurred in mid-year. Poultry and human cases have shown strong spatial and temporal association in Vietnam, but not in China. In Vietnam, infection has been tightly clustered in the two major river deltas, with differences in spatio-temporal patterns between the deltas which provide insights into spread mechanisms. Studies in the Mekong River delta have shown that at the smaller scale there is marked heterogeneity in frequency of disease outbreaks between spatial units, which cannot be fully explained by prevalence of H5N1 virus distribution. Studies have also shown that infection can be detected during periods when there is no evidence of disease. In China, it has similarly been found that infection with H5N1 is widespread, but there are few outbreaks of poultry disease reported, and when human cases occur they have typically not been associated with poultry disease outbreaks in the immediate vicinity. Both countries use mass vaccination but vaccination has not prevented persistence of infection in vaccinated populations. In this paper potential explanations for these apparently inconsistent epidemiological features will be discussed, and unanswered questions will be identified.