

Poultry trading networks in Bangladesh: identification of market's trading characteristics and implications for poultry virus spread and targeted control measures.

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**Purpose:** Avian influenza (AI) is endemic in Bangladesh and poultry is mainly sold at live bird markets (LBM), which have an important role in spreading viruses through human and poultry populations. With a growing human population, poultry consumption is expected to continue to increase, and, with it, the quantities of poultry traded at LBM across the country. The network structure connecting the LBMs is likely to be extremely heterogeneous, and being able to identify LBMs which are 'central' to the network will allow design of more effective surveillance and control strategies.

**Methods:** A cross-sectional survey of 161 LBM across Bangladesh, was carried out to describe the network of contacts between LBMs and poultry farming areas resulting from the trade of poultry. Over 600 poultry traders, from 18 of 64 districts, were interviewed.

**Results:** Supply was diverse in terms of type of supplier and geographical origin: the LBMs interviewed were supplied by 44 districts. Although 50% of them had a catchment area of 50km or less, 7% sold poultry produced more than 200km away. Almost 50% of the LBMs interviewed had 1 or 2 different suppliers: either 1 or 2 LBMs, or 1 or 2 poultry farming sub-districts, but 3% of the LBMs had at least 10 different suppliers. Sales to poultry traders operating in other LBMs were identified in only 16 of the LBMs in this study. These markets were generally the ones supplied by the greatest number of poultry, and by the greatest number of LBMs and farms. Additionally, these LBMs, also had the largest catchment areas. More than 90% of the LBMs and the poultry farming sub-districts are connected via this trading network, linking distant districts and, impacting the risk of spread of AI throughout the country.

**Conclusions:** Our study confirms the important role played by LBMs in connecting 2/3 of the districts, in all 7 divisions of Bangladesh. However, heterogeneous supplying characteristics of LBMs suggest that they are at different risks of disseminating virus throughout the poultry trade network.

**Relevance:** Inclusion of network parameters as risk factors for AI dissemination identified in this study could enhance implementation of targeted surveillance and control measures.