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A cross-sectional study on biosecurity practices and communication networks of poultry exhibition in Australia

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ABSTRACT

Poultry exhibitors are perceived to pose a biosecurity risk due to the high frequency of movements of birds and the close contact between birds at poultry shows. This cross-sectional study assessed the risks posed by poultry exhibitors in Australia using face-to-face interviews ($n = 46$) at eight poultry shows and a postal survey. Univariable and multivariable logistic regression analyses were used to investigate associations between age, sex, location, number of birds, number of shows attended per year and distance travelled to a show, with biosecurity and communication practices. A total of 357 (29.1%) exhibitors responded to the postal survey. Among all participants ($n = 403$), most had owned poultry for more than 15 years (71.9%), kept less than 200 birds (83.4%), mainly chicken (96.7%) and waterfowl (17.8%), and reported not having any commercial poultry operation within 5 km of their property (85.4%). Despite most exhibitors (90.8%) having at least some knowledge of biosecurity principles; some of their practices could pose a risk for disease introduction and spread. Most exhibitors kept their birds with outdoor access (87.0%) and 67.0% of exhibitors reported contact of wild birds with domestic birds being possible. Only 60% and 40.6% of exhibitors cleaned transport cages after each use and isolated birds for over two weeks, respectively, with men and exhibitors keeping more birds less likely ($P = 0.003$) to conduct this practice. Most exhibitors (75.0%) attended more than 5 shows per year, travelling long distances (up to 1000 km) to attend a show. Although most exhibitors would source and sell their birds from and to other exhibitors and at poultry shows, some reported sourcing (15.2%) and selling (25.3%) their birds at live bird markets. In addition, contact with veterinarians was low (23.1%), with younger exhibitors and women more likely to contact a veterinarian than older exhibitors ($P = 0.006$) and men ($P = 0.017$). Other poultry exhibitors were reported as the most useful source of information, followed by the poultry club, the veterinarian and Internet. Less than a quarter of exhibitors perceived the government agencies as a useful source of information. Newspapers, newsletters, emails and websites were the preferred methods of information delivery. However, information seeking behaviour was found to differ significantly ($P < 0.05$) among gender and different age groups. Differing biosecurity, health and communication practices among poultry exhibitors found in this study need to be considered for the development of successful biosecurity extension and communication programmes.

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1. Introduction

Poultry exhibition has previously been identified as posing a risk for disease spread, mainly due to the movement patterns of birds exhibited at poultry shows and the close contact of birds from different origins being commingled at these venues (Schelling et al., 1999; Dusan et al., 2010). Poultry exhibitors are small poultry keepers; however, their practices might differ from those of other small poultry keepers, who keep birds mainly for producing eggs and meat for their own consumption and are commonly known as backyard poultry keepers. The level of biosecurity practices among small poultry keepers is believed to be poor in comparison with that of commercial poultry operations (Hernández-Jover et al., 2009) and concerns are raised regarding the role of small poultry keepers in the introduction of diseases, such as avian influenza (AI), into the commercial poultry industry (Johnson et al., 2004; Dusan et al., 2010; Zheng et al., 2010). Potential risk factors for the introduction of AI viruses into commercial poultry operations in Australia have been previously investigated (Arzey, 2006; East et al., 2008; Hamilton et al., 2009). It is generally hypothesised that wild birds represent the principal natural reservoir of low pathogenic avian influenza (LPAI) viruses (Fouchier and Munster, 2009). Wild bird surveillance in Australia has identified bird exposure to a range of AI viruses and detected LPAI viruses H5 and H7 at very low prevalences (Haynes et al., 2009). These findings suggest that AI viruses are circulating amongst wild birds in Australia, which according to Hamilton et al. (2009), indicates that H5 and H7 AI viruses in wild birds pose a continuous low-level threat to the Australian poultry industry.

The role of backyard poultry in the introduction of AI into domestic poultry has been evaluated in other countries, with controversial results. Some suggest that backyard poultry pose a lower risk of AI introduction than commercial poultry operations (Stegeman et al., 2004; Tiensin et al., 2005; Bavinck et al., 2009); whilst, others identify a higher level of risk (Gilbert et al., 2006; Le Gall-Recule et al., 2008; Lee et al., 2008). A previous study in Australia among poultry keepers trading birds through live bird sales reported poor understanding of biosecurity and low level of on-farm biosecurity practices. In addition, some practices at live bird sales were also identified as posing a potential risk for disease spread, including the non-use of disinfectant for cleaning cages, inadequate dead bird disposal, the holding of different bird species and other animal species in close contact, and the lack of a proper traceability system (Hernández-Jover et al., 2009). A questionnaire-based survey among 54 backyard poultry farms in New Zealand, at two locations where AI virus was previously isolated from wild ducks, reported direct contact of wild birds with domestic birds and indirect contact via water sources (Zheng et al., 2010).

The national organisation for the poultry exhibition sector in Australia is the Exhibition Stud Poultry Australia (ESPA), which is the representative body of the state associations and poultry clubs. The aim of this organisation is to promote the importance of pure breeds of poultry at government and private sector levels (http://espa.backyardpoultry.com/index.php). Recently, the Department of Agriculture, Forestry and Fisheries (DAFF) in conjunction with ESPA, released a biosecurity manual for exhibition poultry, containing the same biosecurity principles as those recommended for commercial poultry operations (DAFF, 2011). Despite this collaborative work, limited information is still available on the numbers of exhibitors, their practices, needs and concerns. Determining the number of poultry exhibitors in Australia and communication with this sector is impeded by the lack of a national register, inconsistencies between the registration requirements of each state association and exhibitor mistrust of government authorities (Bowden T, personal communication). Some knowledge about the exhibition sector was provided by a recent study among poultry exhibitors in New South Wales (NSW) (Dusan et al., 2010), which assessed biosecurity practices of exhibitors at seven poultry shows and identified several factors that could pose a risk for disease introduction and spread. These included the mixing of birds at shows, the lack of adequate traceability records and the poor quarantine practices of exhibitors for birds post-show.

The current study builds upon research by Dusan et al. (2010) and extends investigation to the national level. The aims of the study were to investigate the biosecurity and health practices and communication networks of poultry exhibitors in Australia and identify potential factors that might influence these practices. An improved understanding of the practices, concerns and trusted sources of information of poultry exhibitors will inform decision-making regarding the most effective extension approach to enhance biosecurity among this sector.

2. Material and methods

Poultry exhibitors' biosecurity and health practices and communication networks were investigated in a cross-sectional study, involving a postal survey and face-to-face interviews, conducted from April to November 2011. The experimental procedures used for this study were approved by the Human Ethics Committee of The University of Sydney, Australia (Approval 13690).

2.1. Questionnaire design

A questionnaire was developed to gather information on characteristics related to biosecurity and communication networks of the poultry exhibitors. The questionnaire, written in English, consisted of 5 sections with 45 questions in total. These sections were: demographics, bird movements, biosecurity, flock and health management, and communication. The questionnaire comprised short closed, semi-closed and open questions in a simple, clear format to minimise confusion and maximise response accuracy (Dilman, 2000; Dohoo et al., 2009; Thrusfield, 2007). The questionnaire was piloted with three poultry exhibitor representatives of ESPA and input was obtained from the funding body. The questionnaire was subsequently modified to improve understanding and implemented through a postal survey and face-to-face interviews. Completion time for the questionnaire was estimated at 15 min. A copy of the