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Horse owners' biosecurity practices following the first equine influenza outbreak in Australia

K. Schemann[a,*], M.R. Taylor[b], J.-A.L.M.L. Toribio[a], N.K. Dhand[a]

[a] Faculty of Veterinary Science, The University of Sydney, 425 Werombi Road, Camden 2570, NSW, Australia
[b] School of Medicine, University of Western Sydney, Locked Bag 1797, Penrith South DC 1797, NSW, Australia

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ABSTRACT

A cross-sectional study was conducted involving 759 Australian horse owners to determine their biosecurity practices and perceptions one year after the 2007 equine influenza outbreak and to investigate the factors influencing these perceptions and practices. A web link to an online questionnaire was sent to 1224 horse owners as a follow-up to a previous study to obtain information about biosecurity perceptions and practices, impacts of the 2007 EI outbreak, demographic information and information about horse industry involvement. Ordinal logistic regression analyses were conducted to determine factors associated with poor biosecurity practices. Biosecurity compliance (low, medium, high), as determined by horse owners' responses to a 16-item question on the frequency of various biosecurity measures, was used as the outcome variable in ordinal logistic regression analyses. Variables with a univariable p-value ≤ 0.2 were eligible for inclusion in multivariable models built using a manual stepwise approach. Variables with a p-value <0.05 in multivariable models were retained in the final model. Two potential confounders – age and gender of participants – were included in the final model irrespective of their p-values.

Thirty percent of the respondents had low biosecurity compliance and were performing biosecurity practices 'not very often' or 'never'. Younger people, people with two or more children, those who were not involved with horses commercially and those who had no long-term business impacts resulting from the 2007 EI outbreak were more likely to have lower biosecurity compliance. People who were not fearful of a future outbreak of equine influenza in Australia and those who thought their current hygiene and access control practices were not very effective in protecting their horses also had poor biosecurity practices.

In this observational study we identified factors associated with a group of horse owners with low levels of biosecurity compliance. As this cross-sectional study only assesses associations, the identified factors should be further investigated in order to be considered in the design of extension activities to increase horse owners' biosecurity compliance.

1. Introduction

In late August 2007, Australia experienced its first ever outbreak of equine influenza (EI), a highly contagious respiratory disease affecting all members of the equidae family. The outbreak followed the importation of infected horses from Japan and subsequent escape of the virus from the Eastern Creek quarantine facility in Sydney, New South Wales (NSW) (Callinan, 2008). The virus spread through major parts of the state of NSW and into south eastern Queensland during the course of the outbreak. The outbreak lasted for four months from the initial confirmation of the virus in the general population on 24th August 2007 until the last case was detected

* Corresponding author. Tel.: +61 2 90367736; fax: +61 2 93511693.
E-mail address: kathrin.schemann@sydney.edu.au (K. Schemann).

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in Queensland on 25th December 2007. In order to control, contain and eradicate the disease, the government implemented outbreak control measures, including movement restrictions, vaccination, quarantining of properties and the issuing of biosecurity guidelines (NSW DPI, 2007; DEEDI, 2011a). Biosecurity guidelines included personal hygiene as well as equipment hygiene and access control measures.

The 2007 EI outbreak raised horse owners' awareness of the importance of biosecurity measures to prevent disease outbreaks (DAFF, 2011). In a study conducted during the period of the EI outbreak, the majority of the respondents reported practising at least some access control and personal hygiene measures (Taylor et al., 2008; Taylor and Agho, 2009). Most of the respondents in that study believed that these measures were effective in reducing the spread of EI. Another survey conducted with 1870 Australian horse owners in 2008 revealed that 48% of respondents were in favour of, but 32% against, the ongoing implementation of biosecurity and quarantine measures in day-to-day horse activities (AHIC, 2008). We conducted this study to investigate the biosecurity perceptions and practices of horse owners one year after the 2007 EI outbreak and to characterise owners with low biosecurity compliance.

Despite the importance of equestrian pursuits in Australia (Gordon, 2001), the presence of infectious endemic diseases such as strangles or equine herpesvirus, and the occurrence of emerging infectious diseases such as EI and Hendra (DAFF, 2011), to date research on biosecurity practices of Australian horse owners has been limited to the aforementioned studies. In contrast to Australia, efforts have been undertaken in the United States to describe biosecurity practices on equine operations and to monitor trends and compare changes between studies conducted in 1998 and 2005 as part of the National Animal Health Monitoring System (NAHMS) (USDA, 2006). The NAHMS studies examined biosecurity relating to potential contamination of feed and water, insect and animal disease vector control and isolation when animals arrive or return to the premise (USDA, 2006). Interestingly, the 2005 study found an increase in premises isolating equids returning to the operation after direct contact with outside equids compared to 1998, if the animal is diseased or believed to have been exposed to disease (USDA, 2006). Similarly, a New Zealand study examined biosecurity practices on thoroughbred stud farms and found general awareness of the need for biosecurity, but little on-farm implementation in the absence of disease (Rogers and Cogger, 2010). Another study conducted with 64 equine boarding facilities in Colorado scored biosecurity measures related to the general facility, written health protocols, movement and housing of equids, infection control and isolation practices, and visitor and employee biosecurity practices. Most facilities in this study received the highest scores for movement and housing measures (Kirby et al., 2010). A better understanding of horse owners' biosecurity perceptions will greatly assist communication initiatives related to infectious disease control. Knowledge of factors influencing biosecurity compliance will facilitate the design of infection control programmes for future exotic disease incursions and for endemic diseases.

2. Methods

2.1. Questionnaire design and sampling

An online questionnaire (available upon request) was designed to obtain information regarding the demographics of participants, the nature of their current involvement with horses, their attitudes towards biosecurity measures, the frequency of biosecurity practices, the impact of the 2007 EI outbreak on them and their attitudes towards a potential future outbreak. The questionnaire took approximately 20–25 min to complete and contained a total of 38 closed questions expressed in plain language to minimize confusion and to maximize the accuracy of the responses (Thrusfield, 2007; Dohoo et al., 2009). In addition, space was provided for making descriptive comments. The questionnaire also contained questions relating to general health of the respondent, drought status of the area of residence, impacts of the global financial crisis and perceptions of Hendra virus; however these data are not presented in this paper. The questionnaire was reviewed by subject experts including representatives of the NSW Department of Primary Industries (DPI), the Australian Horse Industry Council (AHIC) and the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) and modified after piloting with three horse owners from different equestrian disciplines. The University of Western Sydney ethics committee gave ethics approval for this study (Protocol No. H6612).

This study was designed as a follow-up study with participants of a 2007 online study investigating psychological distress among horse owners due to EI (Taylor et al., 2008) and biosecurity perceptions and practices (Taylor and Agho, 2009). It was not possible to identify the target population of Australian horse owners accurately and the original 2007 study therefore relied on an email alerting service through AHIC using the national Horse Emergency Contact Database (HECD); an internet-based database comprising contact details for both individuals and horse industry organisations (Oliver, 2007). The AHIC represents all major Australian horse sporting and breeding associations, including racing and equestrian sports, as well as recreational riders (AHIC, 2011a). Surveys conducted using the AHIC HECD database demonstrated a broad coverage of all major Australian horse sectors among their participants (AHIC, 2007, 2008). This database has also previously been used as a network to contact and inform horse owners during emergencies such as bushfires, the EI incursion and other disease outbreaks (Taylor et al., 2008).

In the original 2007 online study, 1224 participants expressed their interest in participating in future research by supplying their email addresses. The initial invitation to participate in the current study was sent out to these 1224 participants on 2nd December 2008. The survey remained open until 7th January 2009. Reminder emails were sent on 9thDecember 2008, 22nd December 2008 and 3rd January 2009.