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Hendra virus in Queensland, Australia, during the winter of 2011: Veterinarians on the path to better management strategies

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ABSTRACT

Following the emergence of Hendra virus (HeV), private veterinarians have had to adopt additional infection control strategies to manage this zoonosis. Between 1994 and 2010, seven people became infected with HeV, four fatally. All infected people were at a higher risk of exposure from contact with horses as they were either veterinary personnel, assisting veterinarians, or working in the horse industry. The management of emerging zoonoses is best approached from a One Health perspective as it benefits biosecurity as well as a public health, including the health of those most at risk, in this case private veterinarians. In 2011 we conducted a cross-sectional study of private veterinarians registered in Queensland and providing veterinary services to horses. The aim of this study was to gauge if participants had adopted recommendations for improved infection control, including the use of personal protective equipment (PPE), and the development of HeV specific management strategies during the winter of 2011. A majority of participants worked in practices that had a formal HeV management plan, mostly based on the perusal of official guidelines and an HeV field kit. The use of PPE increased as the health status of an equine patient decreased, demonstrating that many participants evaluated the risk of exposure to HeV appropriately; while others remained at risk of HeV infection by not using the appropriate PPE even when attending a sick horse. This study took place after Biosecurity Queensland had sent a comprehensive package about HeV management to all private veterinarians working in Queensland. However, those who had previous HeV experience through the management of suspected cases or had attended a HeV specific professional education programme in the previous 12 months were more likely to use PPE than those who had not. This may indicate that for private veterinarians in Queensland personal experience and face-to-face professional education sessions may be more effective in the improvement of HeV management than passive education via information packages. The role of different education pathways in the sustainable adoption of veterinary infection control measures should be further investigated.

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1. Introduction

Three quarters of all emerging infectious diseases are zoonoses; diseases that are transmissible between vertebrate animals and humans (Taylor et al., 2001). The management of such diseases usually benefits from a One Health multidisciplinary approach as it requires the collaboration of veterinary and medical professionals to mitigate biosecurity and public health risks. Many zoonoses have been known for decades or even centuries (e.g., Q fever, brucellosis, leptospirosis, salmonellosis) while others have only been recently recognised (emerging zoonotic diseases). Some emerging zoonoses spill over into humans and progress no further. Others spill over and succeed in making the next transition into human-to-human dissemination, becoming a major threat to human health (e.g., Human Immunodeficiency Virus (HIV), Severe Acute Respiratory Syndrome (SARS), swine influenza H1N12009, Ebola virus). Although some of the emerging zoonoses that remain confined to the first generation of human victims have a low-incidence, they remain a public health threat because of the severity of their pathogenicity in humans (Belay and Monroe, 2014). Hendra virus (HeV) is a good example of such a zoonosis. It emerged in humans in Australia in 1993 after spilling over from flying foxes (*Pteropus* spp.) to horses to humans (Murray et al., 1995a,b; Halpin et al., 2000, 2011). Since its emergence it has remained a uniquely Australian zoonosis where 49 equine outbreaks have occurred on the eastern coast between Far North Queensland (QLD) and Northern New South Wales (Department of Agriculture, Fisheries and Forestry Queensland (DAFF QLD), 2014). During this time, 91 horses have been suspected of HeV infection, 71 of which were confirmed positive; while only seven people have been infected (Murray et al., 1995a,b; O'Sullivan et al., 1997; Hanna et al., 2006; Field et al., 2010; Playford et al., 2010; Mahalingam et al., 2012; DAFF QLD, 2014). Compared to pandemic Influenza and SARS, HeV could be considered a minor threat to public health. However, HeV has a 57.1% case fatality rate in humans and all four who died of HeV had professional or direct caring roles for the ill horses. Two were equine veterinarians, one was a person assisting a veterinarian during a horse necropsy, and one was a horse trainer. Another veterinarian, a veterinary nurse, and a stable hand also became infected with HeV but survived. Those who became infected with HeV, did so through close exposure to infectious blood and/or other bodily fluids such as respiratory secretions from an infected horse (Animal Health Australia (AHA), 2013; DAFF QLD, 2014). Currently there is no cure available for those who become infected with HeV. A human monoclonal antibody has been shown to neutralise HeV in primates and has been used as experimental prophylaxis in humans but it is not currently licenced or available commercially (Bossart et al., 2011).

Consequently public health, biosecurity and occupational health and safety government authorities primarily targeted their HeV preventative recommendations to equine veterinarians and their staff. In 2010, all private veterinarians registered with the Veterinary Surgeons Board of Queensland (VSBQ) received a comprehensive information package about HeV and its management (DAFF QLD, 2010). Up until 2011, the prevention of HeV was solely based on avoiding exposure, through contact with horses potentially infected with the virus, by implementing adequate infection control (IC) measures such as following hygiene and quarantine protocols and the use of personal protective equipment (PPE). In October 2012 a new HeV vaccine for horses was also released and promoted as a One Health measure that would protect both horses and the people coming into contact with horses, and in particular horse owners and veterinary personnel (Pallister et al., 2011a,b; AHA, 2013; Middleton et al., 2014). However, after more than a year in circulation the vaccine uptake seems to have been moderate despite the initial motivation of veterinarians to encourage horse owners to vaccinate their horses (Mendez et al., 2013a; Department of Primary Industries New South Wales (DPI NSW), 2013). Veterinary IC therefore remains a major component of the management of HeV in private practices providing equine veterinary services.

In the winter of 2011, as part of a cross-sectional study of private veterinarians registered in QLD we investigated: HeV management strategies implemented by eligible veterinarians including their use of PPE, with the aim of identifying the strategies implemented by private veterinarians who treated horses; and to determine if they modified their use of PPE depending on the health status of their equine patients.

2. Methods

2.1. Study design

This study was conducted as a cross-sectional study of private veterinarians providing equine services in QLD, Australia. Eligibility criteria for participation were as follow: (1) being a qualified veterinarian; (2) being registered in QLD; (3) working in private practice in QLD; and (4) to have provided veterinary services to at least one horse in the previous 12 months. All private veterinarians registered with the Veterinary Surgeons Board of Queensland (VSBQ) and working in private veterinary practices in QLD were invited to participate and self-select as providers of veterinary services to horses. Participation was voluntary and participants could withdraw from the study at any time. This study was conducted with the approval of the James Cook University Human Ethics Committee (Ethics Approval No. H3687)

2.2. Questionnaire design

The questionnaire used for this study was based on the results from a previous qualitative study which explored the HeV-risk related perceptions and barriers to IC and HeV management in equine veterinary practices in QLD between 2009 and 2010 (Mendez et al., 2012a,b, 2013b). The questionnaire also took into account the HeV management recommendations and Workplace Health and Safety (WHS) regulations in place at the time of the study design (DAFF QLD 2010; Workplace Health and Safety Queensland (WHS QLD); 2011a). The questionnaire was piloted with 6