Equine influenza in Australia

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A large-scale outbreak of equine influenza (EI) virus in Australia in 2007 resulted in major disruption to horse activities and related industries across the nation and particularly in the two infected states (Queensland and New South Wales). In a major test of animal health response capacity, the outbreak was successfully contained and the EI virus eradicated as a result of a coordinated national response that relied heavily on the cooperation of government and industry stakeholders. Quarantine measures have been strengthened to minimise the risk of future incursions and ensure that Australia remains free of this important and highly contagious disease.

EI had never been recorded in Australia before August 2007 [1]. Recently imported horses housed at Eastern Creek Quarantine Station (ECQS), New South Wales, showed clinical signs of EI and tested positive to EI on 23 August 2007 [2]. EI was then confirmed in horses at Centennial Parklands Equestrian Centre in Sydney late in the evening of 24 August 2007 and Morgan Park Recreational Grounds at Warwick in Queensland on 26 August 2007 [2]. Movement restrictions were imposed on 25 August 2007 and exotic disease response plans were implemented.

Subsequent investigations suggest that the virus entered Australia in horses imported from Japan and housed at ECQS [2]. Inadvertent contamination of equipment or people with EI virus within ECQS was considered the most likely mechanism, explaining subsequent exposure of one or more horses in the general population [3]. The presence of small numbers of infectious horses at horse events in New South Wales and Queensland in the week prior to detection and imposition of movement controls resulted in exposure of a larger number of horses and dissemination of infection to numerous locations as these horses left events and were transported to home or other locations.

The period immediately prior to imposition of movement restrictions was notable for long distance spread of infection associated with movement of horses to and from events. From the time of movement restrictions and throughout the remainder of the response, further spread of EI infection was largely due to local spread over short distances, through direct contact between infected and susceptible horses and indirect contact of susceptible horses with virus carried via fomites. There is uncertainty over the role of aerosol in the spread of infection. Limited evidence appeared to suggest that under favourable conditions wind-borne spread of infection may have occurred over distances of hundreds of metres and perhaps up to two to four kilometres. However, reports were largely anecdotal and it was generally not possible to eliminate other plausible spread mechanisms particularly through fomites.[2]

The response to the EI outbreak was managed under Emergency Animal Disease Response Plans that were prepared by affected states and approved by the National Management Group (NMG) under advice from the national Consultative Committee on Emergency Animal Diseases (CCEAD). These were in accordance with AUSVETPLAN and arrangements prescribed in the Emergency Animal Disease Response Agreement (EADRA) [1]. The response objective was to contain the infection, with a view to eradication and key strategies included movement controls, biosecurity measures, including decontamination and disinfection, risk-based zoning and vaccination. Vaccination was used initially to assist in containing infection by generation of buffer zones of immune horses surrounding known infected areas and then expanded to include mitigation of the impacts of infection within infected areas and within targeted sectors or groups of horses in uninfected areas [2]. Zoning was introduced in September 2007 to allow local area risk to be defined and managed appropriately while also allowing controlled resumption of horse activities and movements within and between zones. Zones were colour-coded to facilitate communication to stakeholders and as infection was controlled, areas were progressively reclassified towards free status [1, 2]:

Purple zone – Special Restricted Area: Area with high horse density and active infection. No restriction on horse movements or events within the defined area but no horses permitted to leave the area. Limited to New South Wales and used to facilitate resumption of horse activities in areas where spread of infection was considered inevitable.

Red zone – Restricted Area: Areas containing active EI infection.

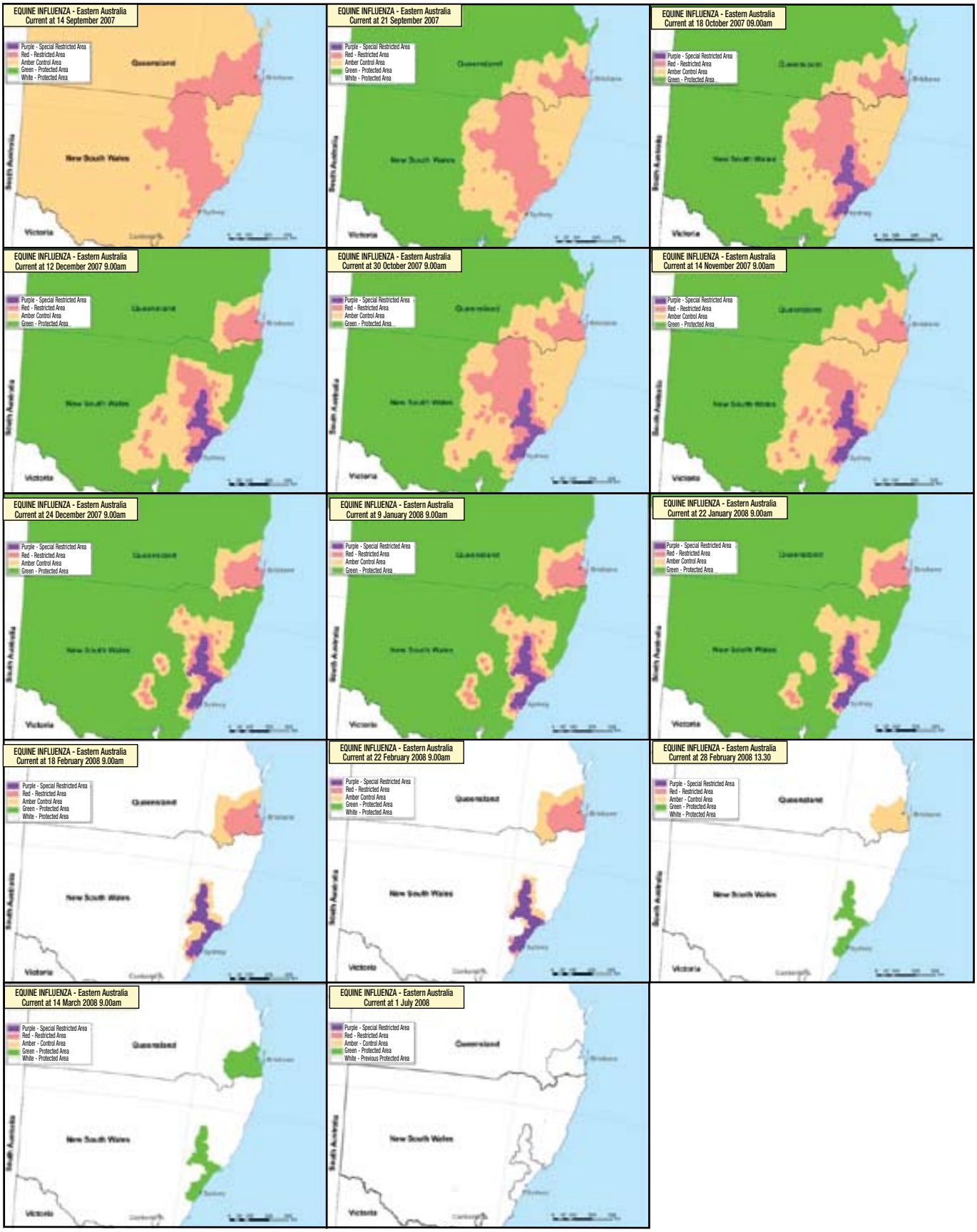
Amber zone – Control Area: Areas adjacent to infected areas and assessed as having low risk of EI.

Green zone – Protected Area: Areas within infected states that were free of EI.

White zone – Protected Area: Areas free of EI. Initially limited to uninfected states.

Incident cases peaked in late September and early October in New South Wales and Queensland respectively, followed by a progressive decline until the last cases, which occurred in December 2007 [2]. The success of response efforts in containing the spread of infection was aided by the transition into summer with warmer climatic conditions considered to be less favourable to virus survival [2]. In addition, topography and areas of low horse density provided natural barriers to spread of infection in both affected states [4]. In infected areas with relatively high

Figure 1: Progression of EI zones in Australia through the course of the 2007 EI outbreak [1].



horse densities, the highly contagious nature of the disease meant that most horses were infected rapidly and then infection became self-limiting as there were no further susceptible horses to facilitate ongoing spread. Response efforts shifted over time from control to clearing previously infected areas and testing for proof of freedom from infection. Australia declared provisional freedom from EI on 14 March 2008 and subsequently declared official freedom from EI on 25 December 2008, in accordance with protocols outlined by the World Organisation for Animal Health (OIE).[1]

It is estimated that the 2007 outbreak involved approximately 10,000 infected premises and a total of 76,000 infected horses[2].

The successful control, containment and eradication of EI in Australia was the result of a coordinated national response, involving cooperation between government and industry stakeholders at all levels[1]. The presence of an effective national animal health system, pre-existing strategies and agreements to guide rapid implementation of an exotic disease response and cooperation and participation of industry stakeholders in the development and implementation of response strategies were major contributing factors to the success of the response. Changes have been made as a result of internal and independent inquiries into aspects of the outbreak, with a particular focus on strengthening quarantine procedures to minimise the risk of further incursions of this and other exotic animal diseases into Australia[1,5].

References

1. Australian Chief Veterinary Officer (2008) *Recovery of EI country free status. Australian Report to the World Organisation for Animal Health (OIE)*. Available at http://www.outbreak.gov.au/pests_diseases/pests_diseases_animals/equine_influenza/index.htm#situation. Accessed 12 June 2009.
2. EI Epidemiology Support Group (2008) *Equine Influenza 2007: The Australian Experience. Report to the Consultative Committee on Emergency Animal Disease*.
3. Callinan, I. (2008) *Equine influenza: The August 2007 outbreak in Australia. Report of the Equine Influenza Inquiry*. Available at http://www.equineinfluenzainquiry.gov.au. Accessed 12 June 2009.
4. East, I.J. (2009) The Role of Land Use Patterns in Limiting the Spread of Equine Influenza in Queensland During the 2007 Epidemic. *Transbound. Emerg. Dis.* DOI: 10.1111/j.1865-1682.2009.01080.x
5. *Equine influenza inquiry: the government's response*. Available at http://www.daff.gov.au/aqis/about/eiimplementation. Accessed 12 June 2009.

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A new arbovirus in northern Australia

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Routine arbovirus surveillance has unearthed a number of novel viruses circulating in domestic and wild animals in northern Australia. One of these is a new virus named *Middle Point orbivirus* (MPOV). While its disease potential remains unknown, evidence suggests that this virus emerged quite recently in Australia and it has now become the single most commonly isolated animal virus in the Northern Territory. The discovery of MPOV highlights the importance of obtaining prototype data on novel Australian viruses.

Beatrice Hill research farm, Middle Point (Figure 1), is located approximately 50km East of Darwin and has long been recognised as a hot spot for arthropod-borne viruses (arboviruses)[1]. For over 30 years, the National Arbovirus Monitoring Program (NAMP) has maintained herds of sentinel cattle at this site for virus isolation and serological studies[2]. From the mid-1990s onwards, an increasing number of viruses were isolated that could not be identified by traditional methods (such as using panels of antibodies raised against all known Australian arboviruses) and by 2005 the unidentified virus collection had exceeded 1000 specimens [Richard Weir, personal communication].

Using a genetic sequencing approach, the collection has yielded a number of viruses new to science, including the virus now known as MPOV[3]. Our initial examination of MPOV by electron microscopy had shown that this virus had morphology consistent with members of the genus *Orbivirus,* of which 10 species were already known to exist in Australia. At the genetic level, however, MPOV was distantly related to all known Australian viruses, but