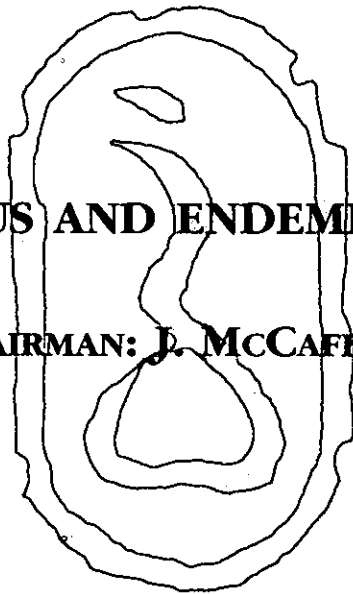




INFECTIOUS AND ENDEMIC DISEASE

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ENDEMIC AND EXOTIC EQUINE INFECTIOUS DISEASES AND THEIR EFFECT ON INTERNATIONAL RACING

K. L. Watkins

*The Hong Kong Jockey Club, Veterinary Department, Equine Hospital, Sha Tin Racecourse,
New Territories, Hong Kong*

ABSTRACT

Australia, Europe, Hong Kong, Japan, North America and the United Arab Emirates, all regularly hold international races. The horses travel to these races by air by the quickest, most direct route. The potential for spreading equine infectious diseases between countries is enormous, especially the airborne and insect-vector viral diseases.

Government animal health and quarantine authorities control the movement of horses into and out of their countries by methods which include health certification, periods of pre-export quarantine or isolation, post arrival quarantine or isolation, vaccinations and various testing procedures. Many of these control measures are sometimes criticised as being too conservative and restrictive by racing authorities, owners and trainers. There is currently a call for special health conditions to be applied to racing Thoroughbreds to facilitate their international travel for competition purposes.

Some countries, whose equine health status is not recognised internationally, are keen to send horses to compete overseas. Racing administrators, wishing to increase the international aspect of racing, do not always understand or appreciate fully the possible consequences of allowing such movement of horses. Apart from the possibility of introducing exotic diseases, importation of such horses could damage existing equine trade agreements with other countries.

The consequences of introducing an infectious equine disease to a country can vary considerably. They may not be great if a disease of low morbidity and mortality was imported and diagnosed, isolated and controlled or eradicated rapidly. However, importation of a high-morbidity, high-mortality disease, such as African horse sickness, could devastate a country's equine population. Even a low-mortality disease could have a major economic impact, as for example occurred with the introduction of equine influenza into Hong Kong in 1992. This outbreak resulted in the cancellation of

7 race meetings, with a potential total betting turnover of nearly US\$1 billion; almost 15% of which is returned to the community in the form of tax and donations.

This paper discusses how endemic and exotic equine infectious diseases affect the development of international racing. It cites Hong Kong as an example of how many of the problems encountered have been solved to allow horses from 12 countries (so far) in Asia, Australasia, Europe, the Middle East and North America to join together in competition.

INTRODUCTION

In recent years, more and more horses have been travelling overseas for racing, breeding and equestrian purposes. This movement of horses, which may be temporary or permanent, brings with it the very real risk of spreading disease. This subject has been addressed by many authors (Abraham *et al.* 1992; Dalglish 1992; Fujita 1994; Higgins 1994; Morgan 1994; Mumford 1994; Ozawa 1994; Powell 1994; Timoney 1994).

There are many infectious and contagious equine diseases of varying significance in terms of morbidity, mortality and worldwide distribution. They are bacterial, fungal, parasitic, protozoal or viral and may be spread by various routes, such as alimentary, contact, fomites, insect-vectors, respiratory, venereal and wounds (Table 1).

Safeguards are instituted in an attempt to prevent travelling horses from taking diseases to their host country. Such safeguards may include quarantine periods before and/or after travelling, vaccinations, testing procedures, clinical examinations and certification. Additionally, valuable competition horses are usually in good health and kept under very good management conditions, thus further reducing the risk of them carrying infectious diseases.

However, these safeguards and suppositions are not infallible and exotic diseases can be carried and spread internationally by asymptomatic carriers and

TABLE 1: Equine infectious and contagious diseases

African horse sickness (AHS)	Equine viral encephalomyelitis (VEE/WEE/EEE)
Anthrax	Glanders
Borna disease	Japanese encephalitis (JE)
Contagious equine metritis (CEM)	Leptospirosis
Clostridial diseases	Lyme disease
Dourine	Prioplasmosis (Babesiosis)
Epizootic lymphangitis	Potomac horse fever
Equine encephalosis	Rabies
Equine herpesviruses (EHV)	Rhodococcus equi
Equine infectious anaemia (EIA)	Ringworm
Equine influenza (EI)	Salmonellosis
Equine morbillivirus (AERS)	Scabies
Equine protozoal myeloencephalitis	Strangles (<i>Streptococcus equi</i> , sub-species <i>equi</i>)
Equine rhinovirus	<i>Streptococcus equi</i> , sub-species <i>zooepidemicus</i>
Equine rotavirus	Surra
Equine viral arteritis (EVA)	Vesicular stomatitis

horses with sub-clinical infections, as well as by fomites and vectors. Equine influenza is an excellent example of such a problem and this viral respiratory infection has been introduced to many countries by travelling horses (Table 2). The November and December 1992 outbreak of this exotic disease in Hong Kong has been reported extensively (Watkins *et al.* 1993; Powell *et al.* 1994a,b; Powell *et al.* 1995).

During the summer of 1993, equine viral arteritis gained entry to the UK via a stallion imported from Poland amidst suggestions of irregularities in the testing and certification procedures.

Exotic equine diseases of unknown origin may occur, as was the case in July and August 1992 when a 'mystery disease' affected approximately 200 Thoroughbreds at racetracks in the New England states of north east America, severely disrupting racing and horse movements. Likewise, in Queensland, Australia, in August and September 1994, symptoms of respiratory disease occurred in horses and in-contact humans. The causative organism for this acute equine respiratory syndrome, which killed 2 people, and several

horses was found to be equine morbillivirus. Investigations have so far failed to identify the source of infection, although local fauna have been strongly implicated. Race meetings and horse movements in the State were severely affected for some time.

Endemic equine disease affects national race meetings with varying frequency and severity. For example, the November 1992 to May 1993 outbreak of equine influenza subtype A2 in Sweden (Forsberg and Silfversborg 1995) and also the outbreak of equine viral arteritis (EVA) at the Arlington Million Racecourse in Chicago, USA, in 1993 had serious consequences for its international race meeting (Jensen and Scollay 1995).

Naturally, a country hosting an international equine event, such as a horse race, wishes to protect its own equine population's health and is entitled to take steps to ensure that the importation of horses will not present a risk of importing disease. The reasons for this relate both to animal

TABLE 2: Documented outbreaks of equine influenza associated with international movement of horses

- 1965 A/equi-2 arrives in UK with mares going to stud from France
- 1977 A/equi-1 arrives in Singapore/Malaysia with racehorses from UK
- 1986 A/equi-2 arrives in South Africa with horses from USA
- 1987 A/equi-2 arrives in India with horses from France
- 1989 A/equi-2 arrives in Jamaica with mares and yearlings from USA
- 1992 A/equi-2 arrives in Hong Kong with racehorses from UK/Ireland
- 1993 A/equi-2 arrives in Dubai with racehorses from Europe

TABLE 3: Economics of horse racing in Hong Kong for the 1994/95 racing season

- 69 racemeetings
- 517 races
- 6,090 starters from an average population of 1,000 horses
- US\$9.2 billion turnover for the season
- US\$130 million average turnover every race meeting
- US\$17.5 million average turnover every race
- US\$1.5 million bet on average on every horse that raced
- US\$1.3 billion returned to the community in tax, duty and donations
- Total attendance of 3,270,100 with an average of 47,400 every racemeeting
- Total employees of 16,178 (4,717 full time and 11,461 part time)

welfare and economics. Economic considerations affect not only the local equine industry but also its trade with other countries. As an example, Table 3 illustrates the economics of horse racing in Hong Kong for the 1994/95 racing season.

HONG KONG'S EXPERIENCE

Hong Kong is a small territory of about 400 square miles but has a large population of over 6 million people. It has a closed land border only with southern mainland China from where the importation of horses is currently not permitted. The rest of the border is sea-bound. For many years Hong Kong has only accepted horses for permanent importation directly from Australia, France, Ireland, New Zealand, North America and the UK. Other countries such as Argentina and India have sent horses to Hong Kong via prescribed periods in the USA. Hong Kong has a total equine population of approximately 1,500, of which 1,000 Thoroughbreds are stabled at Sha Tin Racecourse in the New Territories and 500 retired racehorses and ponies are kept at 10 riding schools in the territory. The Royal Hong Kong Jockey Club's Veterinary Department is responsible for the health and welfare of the entire equine population.

Hong Kong's major horse disease, equine infectious anaemia, was eradicated in 1977 by a serological testing and slaughter programme (Coggins and Auchnie 1977). Restricting the importation of horses to those originating from countries of acceptable equine health standards has kept Hong Kong free from the major significant equine diseases. Thus it became possible to export horses to France, Ireland, UK and USA, as well as to Asian countries, from the early 1980s onwards. Surveillance for equine diseases in Hong Kong, by clinical examination and serological surveys of the major equine diseases, is an ongoing process and regular quarterly reports are submitted to the International Collating Centre for equine infectious diseases in Newmarket, UK.

The Royal Hong Kong Jockey Club holds international race meetings in December and April every year and currently 11 countries send horses to race and return home (Table 4). The Club has hosted 11 international meetings since their inception in 1988. This has not been easy to achieve. Equine health protocols had to be established and agreed by the government health authorities, racing and other equine industries of all participating countries. The Royal Hong Kong Jockey Club and the Club's Veterinary Department has an excellent working relationship with Hong Kong Government's Agriculture and Fisheries Department as well as with overseas animal health

TABLE 4: Countries that send horses to Hong Kong's international race

Australia	New Zealand
Canada	Singapore
France	United Arab Emirates (Dubai)
Ireland	UK
Japan	USA
Malaysia	

authorities. This has helped tremendously in addressing and overcoming the many problems encountered in establishing, running and developing international horse races in Hong Kong.

The Malayan Racing Association of Singapore and Malaysia were the first countries invited to send horses to Hong Kong to race and then return home in January 1988. Six horses were sent to this first international race and this number has now increased; up to 30 horses are imported temporarily into Hong Kong, from up to 11 countries, to compete in 3 races on the same day.

In 1989 a serological survey of 10% of the territory's equine population produced negative results for the major infectious diseases affecting horses. This satisfied the Australian and New Zealand quarantine authorities, as well as their local horse industries, about Hong Kong's equine health status. Horses from both countries were then allowed to come to Hong Kong in December 1989 to compete and return home again with appropriate quarantine, testing, vaccination and certification protocols.

In December 1990, France, Ireland and the UK joined the list of visiting countries and in December 1991 Canada and the USA were represented. In April 1993 a horse from Japan competed in Hong Kong's international races and in December 1994 horses were allowed into Hong Kong from the United Arab Emirates (Dubai) following the publication of their equine health status (Ellis *et al.* 1995)

In addition to Hong Kong hosting international races, some of its horses have been sent overseas to race. In August 1992, Hong Kong sent its first horse to compete in an overseas race when 'River Verdon' was temporarily exported to the USA to compete in Chicago's Arlington Million Race. This was followed in April 1994, when 'Winning Partners' competed in the Yasuda Kinen horse race in Japan and in November 1994 'River Verdon' visited Australia to race in the Melbourne Cup.

Another milestone was achieved in October 1995 when a horse was exported permanently to Australia for the first time, interestingly this horse was called 'Silk Road'.

Now more and more Hong Kong horses are being exported temporarily or permanently around

TABLE 5: Protocols covering permanent equine imports into Hong Kong

-
- 1. Before arrival**
 - Pre-export quarantine (PEQ) of 21 days, government supervised and regular clinical examination
 - Equine influenza tests (Directigen Flu-A) if endemic
 - Government veterinary health examination, tests and certification
 - 2. After arrival**
 - Post-arrival quarantine (PAQ) of 14 days, security controlled with daily veterinary inspections and twice daily temperature recording
 - Fly control and disinfection procedures
 - Naso-pharyngeal swabs for bacteriology (*Streptococcus equi*, sub-species *equi* 'strangles') and rapid equine influenza tests (Directigen Flu-A) of any horses with pyrexia or exhibiting signs of respiratory disease and all horses prior to release from PAQ
 - Vaccination programmes commence - equine influenza, tetanus, Japanese B encephalitis
 - Prolonging PAQ of whole batch if indicated
-

TABLE 6: Protocols covering temporary equine imports into Hong Kong

-
- 1. Before arrival**
 - Vaccination for equine influenza - primary course or booster within 6 months but not within 14 days of the race
 - Government veterinary health examination, tests and certification
 - 2. After arrival**
 - Security controlled post arrival quarantine / isolation for entire stay in Hong Kong
 - Fly control and disinfection procedures
 - Naso-pharyngeal swabs for bacteriology and rapid equine influenza tests (Directigen Flu-A) of any horses with pyrexia or exhibiting signs of respiratory disease
 - Horses train separately from those of a different quarantine status
 - No sharing of communal facilities such as the swimming pool and aquatred
 - Horses from all visiting countries and Hong Kong only meet during the race
 - Government veterinary health examination and certification for export
-

the world.

To facilitate the importation and return of horses after racing in Hong Kong, bi-laterally agreed equine health protocols have been produced. Hong Kong has separate importation protocols for horses permanently and temporarily imported (Tables 5 and 6).

These 2 different equine importation protocols are of very important practical value. In the case of permanent imports the horses will eventually be entering the resident equine population. However, temporary equine imports will be isolated from Hong Kong's resident horses and from those countries not of equivalent equine health status except at the time of the race. They will then be exported from Hong Kong.

Holding international races is very much a team effort involving a considerable amount of co-ordination. Experience is a great aid to streamlining the operation and minimising problems.

Advance planning and strict adherence to standard operating procedures with effective communication can help keep problems to a minimum. However, some problems are inevitable and a rapid effective response is always required. Often the problem itself is fairly minor but, unless immediately solved, a horse's or a country's chance of competing may be jeopardised or even lost. For example, due to laboratory problems or plane re-scheduling, a blood test result may not be available until a few hours after the aeroplane transporting the horse or horses is due to leave for

Hong Kong. The exporting country's veterinary authorities require Hong Kong government clearance to allow the horse to travel. This usually happens out of normal working hours and access to the home, pager or mobile telephone numbers of relevant personnel will often enable verbal clearance to be given for horses to travel with follow-up paperwork stipulating the conditions of approval. These would include blood test results being faxed as soon as they were available with the horse held in strict quarantine until the results were received. This practical flexibility would be based on sound risk assessment.

The reputation of, and confidence in, the integrity of a country and an organisation to implement and adhere to the quarantine protocols required by visiting countries is essential for that country's international horse racing to be successful and progress. The Royal Hong Kong Jockey Club enjoys this confidence with all countries sending horses to Hong Kong to race. I believe that Hong Kong re-inforced this fact when the Club took the decision at an early stage to cancel its international races in December 1992. Equine influenza virus had just struck the resident population of horses and Hong Kong did not want to expose visiting horses to any risk whatsoever of contracting the disease and taking it home with them.

Effective communication with epidemiologists, quarantine officials and industry personnel from the countries that send horses to Hong Kong's

international races resulted in the races being re-programmed just 4 months later. This was achieved by full and open collaboration and communication and by clinical and serological proof that Hong Kong had eradicated the influenza virus completely from its total equine population of around 1,500 horses and ponies.

While an outbreak of an equine disease is certainly not welcomed, especially when, as in Hong Kong's outbreak of influenza, it results in the suspension of 7 race meetings with a potential loss of US\$1 billion turnover, it can bring certain benefits.

One such major benefit that resulted from the equine influenza outbreak in 1992 was that it exposed the weaknesses in what was previously considered to be safe and adequate equine importation and quarantine procedures, facilities and management in Hong Kong. The outbreak created the opportunity and necessity to review and improve all areas of horse importation. New quarantine stable blocks were built, some at a distance of 1 km from the resident equine population, new management and veterinary monitoring procedures were implemented, the existing influenza vaccination programme was reviewed and improved and a novel rapid testing procedure for equine influenza, the Directigen Flu-A enzyme immunoassay (Chambers *et al.* 1994; Shortridge *et al.* 1994) was introduced during pre-export (for influenza endemic countries) and post arrival quarantine. This same test is also used on all pyrexial horses and those exhibiting respiratory disease symptoms whether in quarantine or in the general equine population.

Twenty-one days pre-export quarantine (PEQ) was imposed on European horses after they were found responsible for bringing the influenza virus into Hong Kong in 1992. Thirty days PEQ was already required for North American horses. Australia and New Zealand had not exported any significant equine disease into Hong Kong and thus PEQ was deemed unnecessary. However, the contained outbreak of the zoonosis equine morbillivirus causing acute equine respiratory syndrome in Queensland in 1994 resulted in a temporary ban on the importation of Australian horses into Hong Kong. This ban was gradually reduced to horses originating in Queensland and currently only applies to horses that have been on infected premises or in contact with horses that have been on such premises.

The importation of an initially asymptomatic horse infected with strangles (*Streptococcus equi*, sub-species *equi*) that arrived in a batch of 7 Thoroughbreds and one pony from Australia and New Zealand on 10th March 1996 has now resulted

in 21 days PEQ placed on all Australian and New Zealand horses permanently imported into Hong Kong

CONCLUSION

In conclusion, endemic and exotic equine infectious diseases have a major impact on the establishment, maintenance and development of international racing. The equine disease status of both the host and visiting countries is the limiting factor deciding whether international racing takes place. Hong Kong, along with other countries, has developed separate protocols for both permanently and temporarily imported horses to facilitate international movement of horses for competitive purposes. The temporary importation protocols are based on sound risk assessment and, most importantly, reliance on the integrity of government and racing authorities, as well as horse transport companies and all personnel operating the protocols. Participation in international horse races or other export trade by countries of a lesser or undocumented equine health status should be encouraged and facilitated wherever possible. However, the onus should rest fairly and squarely on such countries to prove, beyond reasonable doubt, that their horses pose no disease risk to any other horses that meet in international competition.

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