

Horserace Betting Levy Board
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Equine Influenza Programme

Animal Health Trust

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The Threat of Equine Influenza



Equine influenza is constantly present in the UK and is a major cause of respiratory disease in horse populations around the world. It has been responsible for substantial economic losses in performance horses, with outbreaks such as the one in Australia in 2007 costing the racing industry billions of pounds. Major outbreaks affect racing directly, due to movement restrictions and cancellation of events, but can also have an impact on subsequent breeding seasons.

In unvaccinated horses the classic signs of equine influenza include a harsh dry cough, fever and labored breathing. The infection will usually spread very rapidly through a previously unexposed horse population with close to 100% infection rate.



The Threat of Equine Influenza



- Vaccination is mandatory for competition horses in the UK, but outbreaks can still occur if vaccination breaks down. This happened in the UK in 1989, as a result of changes in circulating equine flu viruses compared with the outdated vaccine strains in use at the time. There were also serious outbreaks in vaccinated Thoroughbreds in Newmarket in 2003 & Japan in 2007.
 - Horses that have only partial protection, either due to irregular vaccination or the use of outdated vaccines, will typically show signs of milder respiratory disease. But, they can spread the virus to other horses
-

Aim of the Equine Influenza Programme



- **Our mission is to support the UK racing industry by minimising the potentially devastating effects caused by outbreaks of equine influenza.**
- The purpose of this ongoing programme of work is to collect as much information as possible about equine influenza viruses circulating in the UK and further afield.
- The data are used to review vaccine strains on an annual basis and, if considered necessary, update the OIE recommendations.
- A variety of methods are used to encourage vets, owners and trainers to submit nasal swab samples from infected horses, which are required for the isolation and characterisation of virus strains.
- The **key reason** for keeping vaccine strain recommendations up to date is that this will **prevent future outbreaks** resulting from **antigenic drift**, such as those in the UK in 1989 and Japan in 2007.

Encouraging submission of samples



Sentinel Practice Scheme

- To encourage the submission of samples for virus isolation, UK's horse vets are invited to join a sentinel practice scheme.
- Participants are offered free diagnostic testing for equine influenza.
- Participants receive sampling packs, regular newsletters and support from our veterinarian.
- The network of sentinel practices provides a means of rapidly communicating information about outbreaks, members of the scheme then notify other practitioners of outbreaks in their local areas.



Veterinarians interested in joining the scheme can visit www.equiflunet.org.uk, email equiflunet@aht.org.uk or contact the equine influenza team at the Animal Health Trust

Raising awareness of equine influenza



Home Horse Owners Veterinary Surgeons



WELCOME TO EQUIFLUNET

Our aim is to improve awareness of equine influenza amongst veterinary surgeons and horse owners. Flu can have a huge impact on competitive events, but may also cause severe problems in pet horses if not recognized quickly. We are an **OIE reference laboratory** for equine flu and provide support to other laboratories around the World. We also help select suitable strains for use in vaccines. We are dependent on your flu samples, so please send them in. The Horseshace Betting Levy Board supports our work, so we can offer **free diagnostic testing** for suspected cases.

Influenza alert: 2 outbreaks in France, possible link to sales in Ireland

On 31st October Réseau d'Epidémiologie-Surveillance en Pathologie Equine (RESPE) reported two outbreaks of equine influenza in France. Both have been epidemiologically linked to ponies originating from sales in Ireland. So far all affected animals appear to have been unvaccinated and have showed clinical signs of coughing, pyrexia and nasal discharge. RESPE warned that many ponies may have been bought during the sale in Ireland and dispatched to other countries in Europe.

Please be especially vigilant at this time, as there is a risk that infected animals may have been shipped to the UK. Clinical signs may include a harsh dry cough, fever, associated inappetence and nasal discharge.

We strongly encourage submission of samples from any suspicious cases to our diagnostic laboratory for **free influenza testing**. For details about our surveillance scheme, and to sign up, please follow the links below.

EQUINE INFLUENZA OUTBREAKS:

There have been outbreaks in Brazil, Chile, Dubai, France, Germany, Uruguay, Argentina & the UK this year. To download further information about previous outbreaks in 2012, please click [here](#).

Keep up to date with the latest outbreaks:

Twitter - follow us [@Equiflunet](#) to find out about outbreaks in the UK and abroad. Please spread the word and let us know if you hear of any outbreaks close to you.

Tell-Tail - register for this text alert scheme provided by the Animal Health Trust and Merit Animal Health by clicking [here](#). Alternatively text your Name, Practice name and postcode to 07797 801 863.



[Horse Owners](#)



[Veterinary Surgeons](#)

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RELATED LINKS

- Horse Owners
- Veterinary Surgeons

LATEST UPDATES

November 2012: RESPE report #equine #flu outbreak in Mayenne, France. Unvacc Connamara pony imported from Ireland, 8 other horses affected.

Nov 2012: #equine #flu confirmed in Roxburghshire, Scotland. Irish Sports Horse, recently imported from Ireland. Typical clinical signs.

October 2012: #equine #influenza outbreaks in France reported by RESPE. possible link to recent sale in Ireland. Please look out for signs.

Lab analysis shows the Essex outbreak of #equine #influenza was caused by a H3N8 Florida Clade 2 virus, similar to previous UK isolates.

Oct 2012 #Equine #influenza confirmed in Durham (UK). 2 horses affected. Please send in samples for free testing if you're concerned.

DOWNLOAD OUR NEWSLETTER

Keep up to date with our latest newsletter

[Download](#)

WORKING WITH



www.equiflunet.org.uk

Our website supports the sentinel practice scheme, with dedicated pages for both veterinarians and horse owners. The site includes information about equine flu, how to diagnose it, how to manage outbreaks and the importance of surveillance.

Rapid alert schemes:

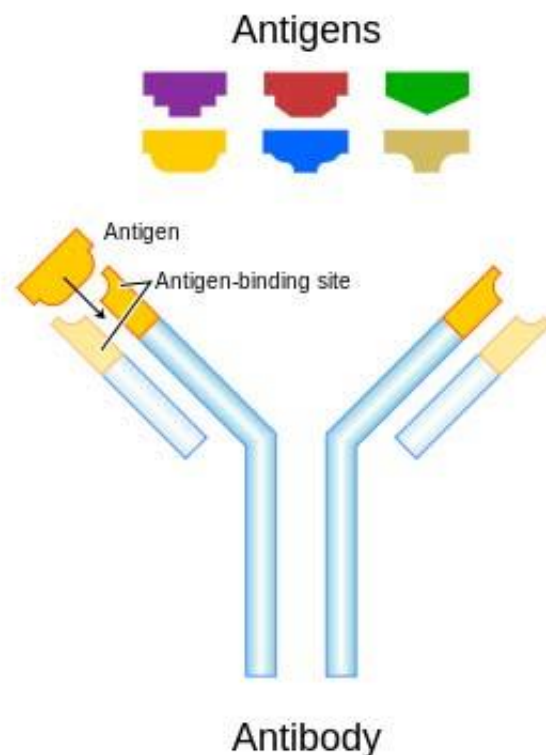
Twitter@equiflunet – available to everyone, for the rapid notification of equine influenza outbreaks in the UK and abroad.

UK horse vets - we use several routes to keep UK horse vets up-to-date. Vets receive updates on disease surveillance through British Equine Veterinary Association and can subscribe to obtain information from several social media routes.

How does a vaccine work?



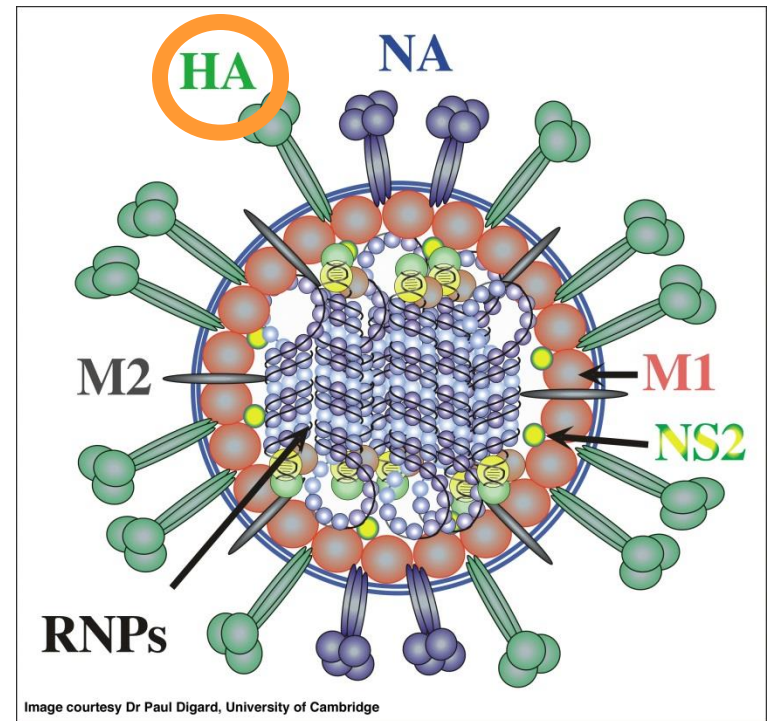
- Vaccines contain material from the virus they are designed to protect against, this can be:
 - A whole virus particle that is dead and therefore safe.
 - A whole virus particle which is still alive but it has been manipulated so that it can no longer cause disease.
 - A component or sub-part of the virus that is capable of stimulating the immune system.
- The equine immune system recognises the virus or its sub-part within vaccines and makes **antibodies**.
- Antibodies are large Y-shaped proteins produced by white blood cells that identify and neutralize foreign objects such as bacteria and viruses.
- The antibody recognises a protein on the virus surface which identifies that it is a foreign invader, called an **antigen**.
- Antibodies made when a vaccine is given are retained so that the next time the horse is invaded by the real virus, its immune system is primed with antibodies, ready to fight off infection.



What's in the equine flu vaccine?



- Antibody against **haemagglutinin** protein (HA) protects the horse from flu infection.
- This protein is located on the virus surface.
- With equine flu vaccine, antibodies recognise HA.
- HA is therefore an important component of equine flu vaccines.





Antigenic drift

- Flu viruses are smart.
- To avoid host immune responses, influenza viruses constantly change by mutation.
- This ability to mutate and change the proteins on the virus surface is called antigenic drift.
- In particular, the virus can change the HA proteins on their surface and therefore reduce the effectiveness of vaccines.
- As a result, vaccines must also change in order to keep up with the changes in the virus.
- Hence, the equine influenza programme is essential because we continuously look for virus mutations when disease occurs as this can be the first clue that vaccines are losing their effectiveness.

Who is responsible for which strains are used in vaccines?



- The HBLB's equine influenza programme contributes funds to the International Collating Centre for equine flu.
- ICC submits information about changes in the virus to the OIE.
- OIE is an international organisation that is responsible for collection, analysis and dissemination of veterinary information.
- This includes making recommendations on which strains should be included in equine influenza vaccines.
- Ultimately, it is the responsibility of the vaccine manufacturers to decide when and if they will update their vaccines.

<http://www.oie.int/>



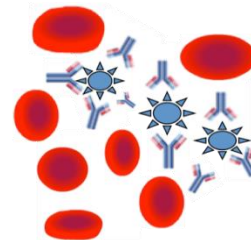
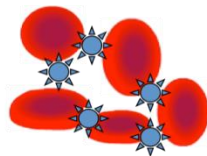
Antigenic Characterisation: our technique - the HI assay



Background

- Antigenic characterisation identifies how much viruses have changed and whether this is likely to affect how well vaccines will work.
- Changes on the surface of the HA molecule can reduce the ability of antibodies to recognise and block infection by the virus.
- We used a **Haemagglutination-inhibition (HI) assay** to determine whether circulating equine influenza viruses had changed and become different from vaccine strains.
- The assay works by measuring how well antiserum can block the clumping (agglutination) of red blood cells by equine influenza virus.

Virus agglutinates
red blood cells



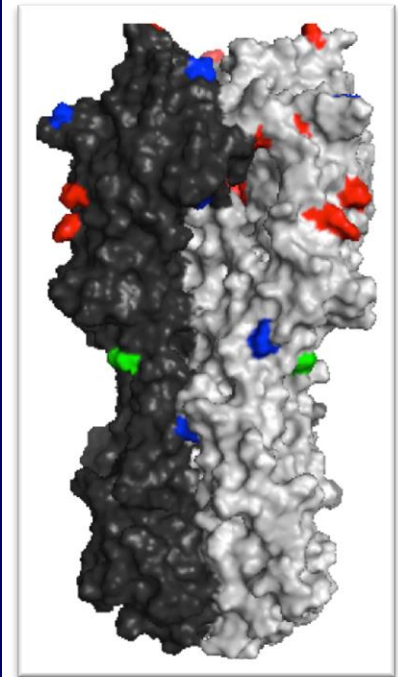
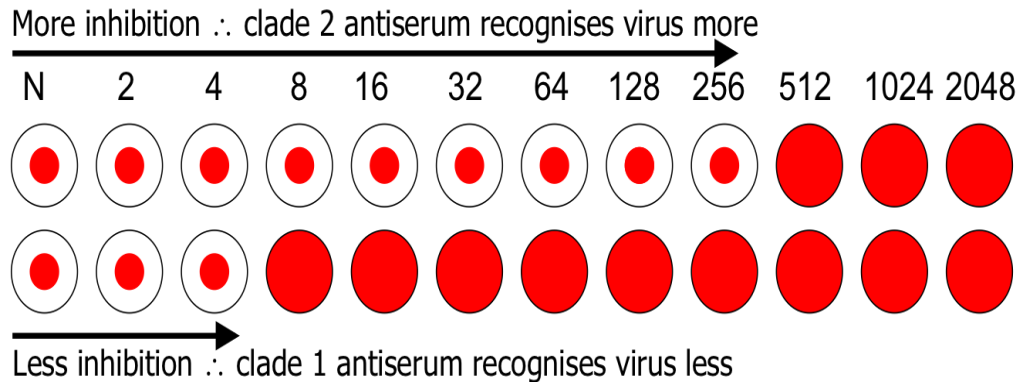
Antibodies bind to the
virus blocking it from
agglutinating red blood
cells

Antigenic Characterisation: our results



Results

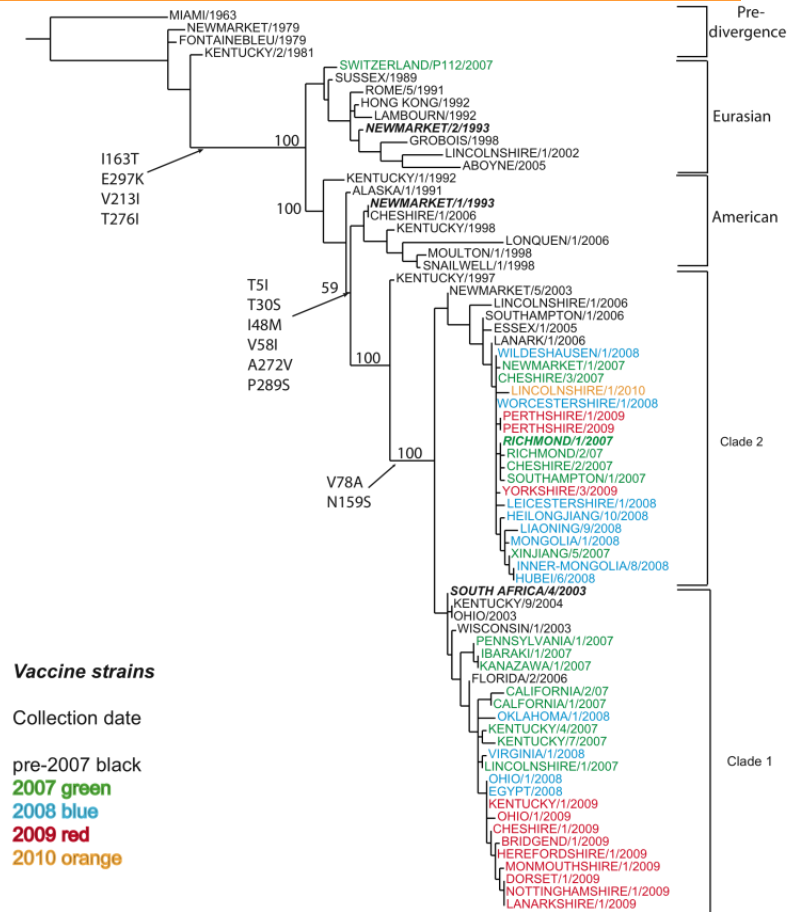
- Antibodies raised against viruses recommended for vaccines in 2004 did not react very well with the viruses that we found in horses in the UK between 2008-2011.
- This was of great concern to the OIE committee responsible for selecting vaccine strains.



Genetic typing: mapping the evolution of new virus strains



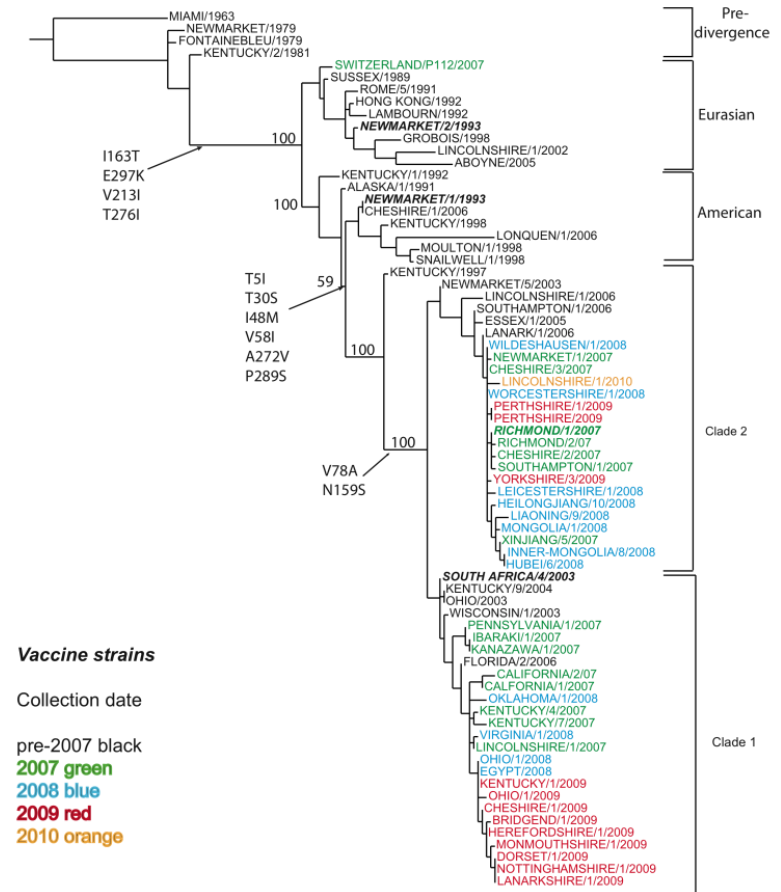
- The structure of proteins are determined by the genetic make-up of the virus.
- Flu's most variable gene is the one that codes for the surface **HA** protein.
- We have determined the genetic sequence of the HA gene for all viruses isolated at the AHT or collaborating laboratories from 2008-2011.
- HA sequences were compared with those of previous strains and also against vaccine strains.
- Phylogenetic analyses were carried out to work out which family, (aka '**clade**'), each virus belonged to.
- This is effectively a "family tree" for the virus: An example is shown in the figure opposite, with the different clades marked on the right.



Genetic typing: our results



- Phylogenetic trees showed that viruses belonging to **Florida Clade 2** were isolated in the UK during 2008, 2009, 2010 and 2011.
- Viruses belonging to **Florida Clade 1** were first isolated in the UK in 2007 (shown in **green**), were the dominant type in 2009 (**red**) but were not found again between 2010 and 2011 (**orange**).
- Only Florida Clade 1 viruses were found in the USA during the same period.
- The differences between the two clades of viruses became more obvious during 2008-2011.



OiE Vaccine Strain Selection



- During the course of this project, viruses belonging to Florida Clade 1 and Florida Clade 2 changed sufficiently that the OiE Expert Surveillance Panel recommended that both Clade 1 and Clade 2 viruses should be included in commercial vaccines for international use.

2010 Recommendations:

To include a representative strain from each of the two lineages of EIV, Florida Clade 1 and Florida Clade 2

What can horse owners do?



- By the end of the 2008-2011 Equine Influenza Programme, there were no vaccines available in the UK containing the latest recommendations and only one containing the 2004 update (Clade 1 e.g. Ohio/03).
- There is no legal requirement to update commercial vaccines.
- To encourage vaccine manufacturers to update their products, you should report every case of equine flu in a vaccinated horse to the manufacturer of that vaccine.
- It will also help if you buy the vaccines containing the most recent strains.
- ***You can help make it worthwhile for the vaccine manufacturers to stay up to date.***

Find out more about respiratory disease in racehorses



- Elton D, Bryant N, Facing the treatment of Equine influenza.
<http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3306.2010.00357.x/full>
- Smith K, Lower airway disease: now and in the future.
<http://onlinelibrary.wiley.com/doi/10.1111/j.2042-3306.2011.00375.x/full>

Find out more about equine influenza vaccinations



- Coming soon:
- Read the virologists', the sports regulator, the medicines authority's and the pharmaceutical industry's views on equine influenza vaccines in the November 2013 issue of Equine Veterinary Journal:
- www.wileyonlinelibrary/journal/evj