

CHOOSE EQUILIS PREQUENZA WITH CONFIDENCE

- The only Equine Influenza vaccine with efficacy confirmed by challenge with a Florida Clade 1 strain at onset of immunity and Florida Clade 2 strains at onset of immunity and during the immunity gap
- Whole Equine Influenza Virus vaccine presents all of the antigenic components of the virus – both external and internal – to the immune system
- Matrix-C™ adjuvant mimics the natural response infection and leaves no depot⁴
- Pre-filled syringes and vials with peel off labels for flexibility and convenience
- Backed by the knowledge and partnership of MSD Animal Health

INTRODUCING THE EQUILIS® PREQUENZA EQUINE VACCINES



References

1. Paillot, R., Garrett, D., Lopez-Alvarez, M.R. et al. (2016) The Immunity Gap challenge: protection against a recent Florida Clade 2 Equine Influenza strain. Equine Vet J. 48(Suppl. 50):7-8.
2. MSD Animal Health Report (2011) 10R/0179
3. Pouwels, H. Hoeijmakers, M, Horspool, L. et al. (2013) Equilis Prequenza Te protects horses against virulent A/Equine-2/Richmond/1/2007challenge. In Proceedings 13th WEVA Congress, 3-5 October 2013, Budapest, Hungary.
4. MSD Animal Health Report (2001) 01R/0535
5. Paillot, R. & Prowse, L. (2012) ISCOM-matrix based Equine Influenza Vaccine stimulates cell-mediated immunity in the horse. Vet Immunol Immunopathol. 145:516-521.

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EQUILIS
PREQUENZA



EQUILIS
PREQUENZA





PROTECT WITH CONFIDENCE

Equine Influenza is a constant threat to the health and welfare of the horses that you care for and the equine population at large. Whilst Equine Influenza outbreaks are relatively rare, this highly infectious virus has the potential to spread rapidly through unprotected populations, with serious implications especially for the very young or very old.

Vaccination is a core element in protecting any individual or group of horses. You need to be confident that the vaccine you use will protect against circulating strains, bringing peace of mind to you and your clients.

The majority of outbreaks occur in unvaccinated horses or horses with an incomplete or unknown vaccination history; this highlights the need to focus efforts on increasing vaccination rates to achieve herd protection.

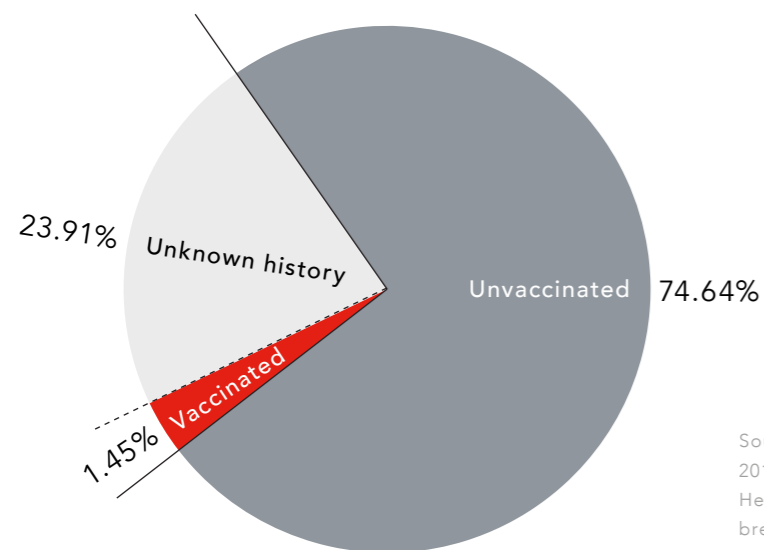
MSD Animal Health has a track record of advancing vaccine technology to prevent infectious diseases in a wide variety of species. The Equilis Prequenza range of vaccines has been developed and rigorously challenged to ensure that it provides protection against circulating strains of Equine Influenza¹, giving you the confidence that you are doing the very best for the horses under your care.

In addition to efficacy, it is important that vaccines should be well tolerated by horses, so that everyday activities can continue and owners can feel confident about future vaccinations.



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Vaccination status of horses in Equine Influenza outbreaks



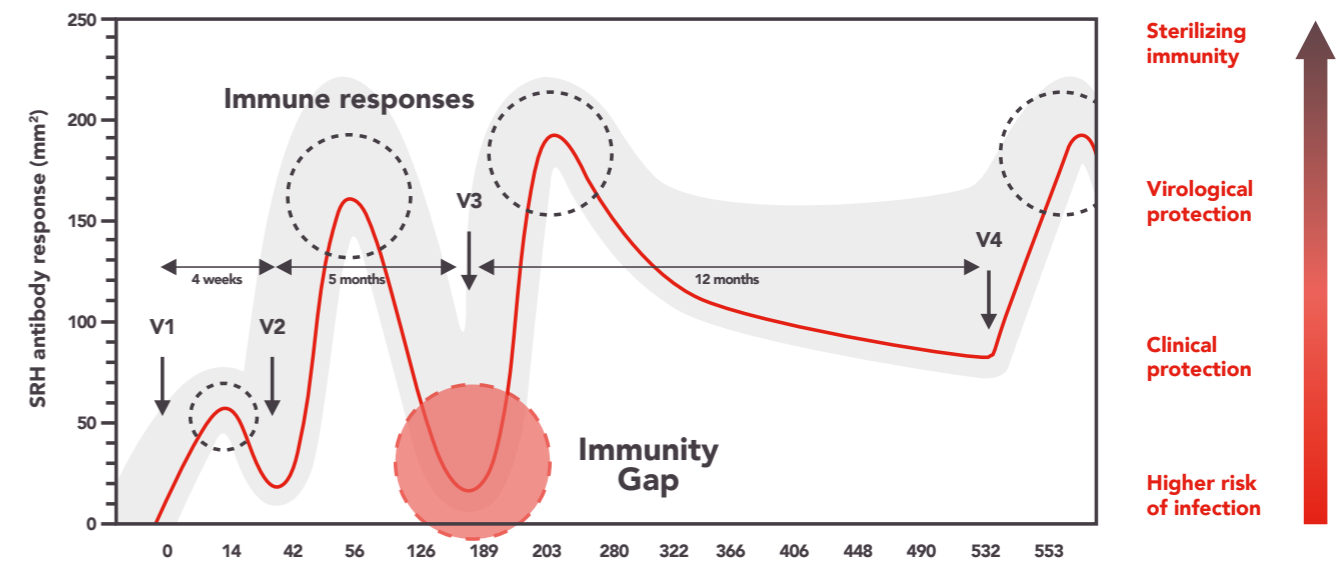
Source: R. Paillot, personal communication, data (January 2014-July 2017, 64 UK outbreaks) from the International Collating Centre, Animal Health Trust, UK. <http://www.aht.org.uk/cms-display/international-breeders-meeting.html>

BRIDGING THE IMMUNITY GAP

It is known that horses may experience an 'immunity gap' between the second (V2) and the third (V3) vaccinations. This is characterized by

low antibody titres and increased susceptibility to Equine Influenza. The 'immunity gap' poses a challenge to all Equine Influenza vaccines.

Schematic representation of Single Radial Haemolysis (SRH) antibody response to Equine Influenza vaccination in horses (adapted from¹)



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IMMUNITY GAP CHALLENGE

Florida Clade 2 challenge – Northamptonshire/1/13¹

A 2016 study led by Dr R Paillot, Head of Immunology at the Animal Health Trust, was commissioned by MSD Animal Health to evaluate the efficacy of Equilis Prequenza Te during this crucial period when antibodies are likely to be at their lowest and susceptibility to Equine Influenza infection may be increased.

STUDY METHODOLOGY

- A group of 7 Welsh Mountain ponies was vaccinated twice with Equilis Prequenza Te, 4 weeks apart
- A control group of 5 ponies was left unvaccinated
- Both groups were challenged with a recent virulent Florida sublineage Clade 2 Equine Influenza Virus strain, Northamptonshire/1/13, around 5.2 months (158 days) after V2
- Clinical signs and virus shedding were then monitored

RESULTS

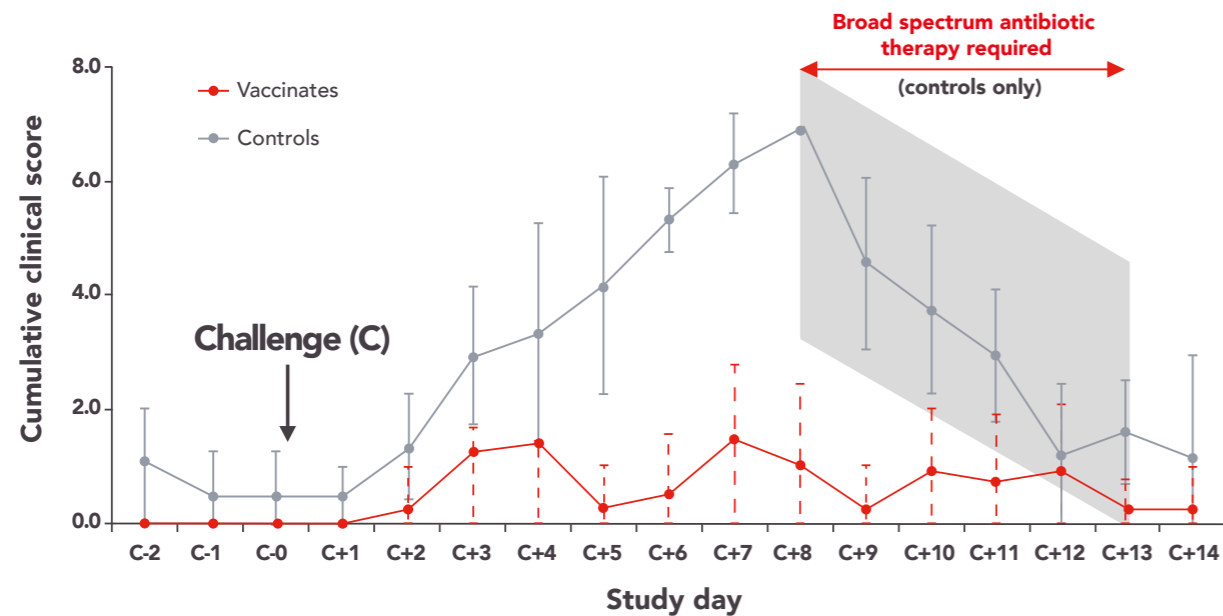
All of the ponies in the control group showed typical signs of Equine Influenza:

- Pyrexia
- Pronounced and prolonged coughing
- Evidence of secondary bacterial infection necessitating antibiotic treatment in 4 out of 5 control ponies for 7 days

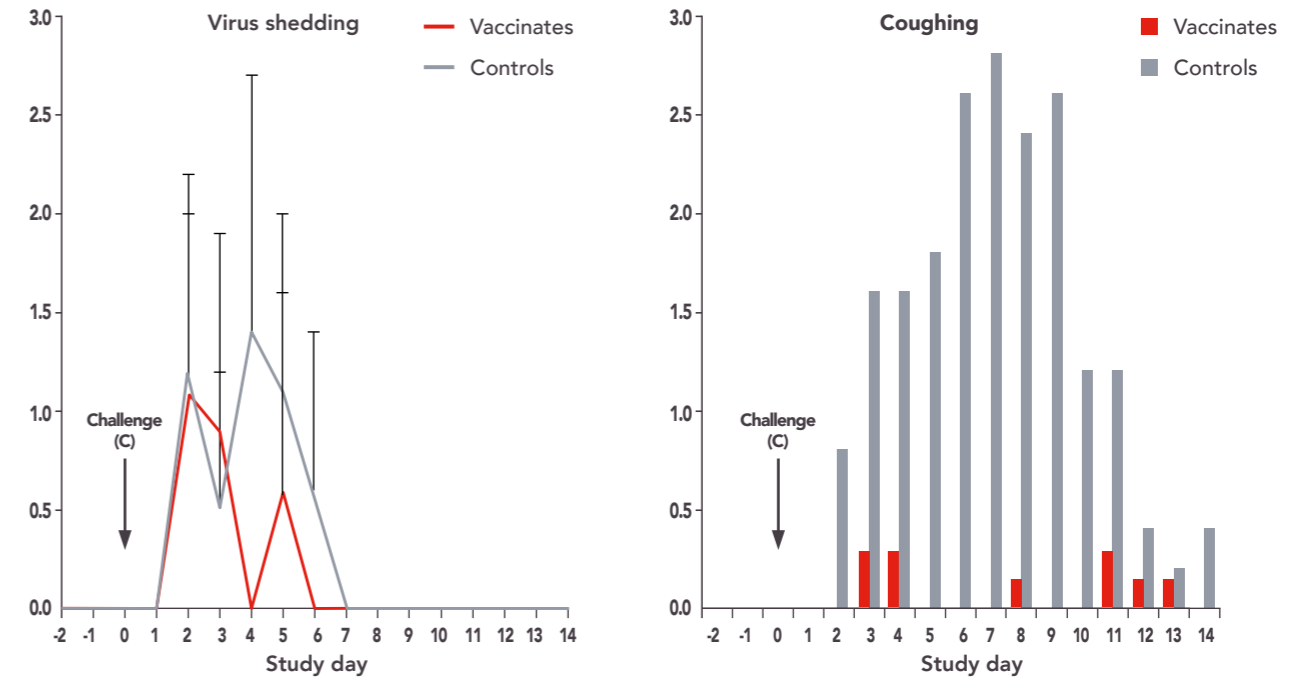
Vaccination reduced the risk of Equine Influenza transmission:

- Significantly reduced frequency ($p=0.023$) and duration ($p=0.033$) of pyrexia
- Significantly reduced severity ($p=0.006$) and duration ($p=0.00009$) of clinical signs (e.g. cough, nasal discharge)
- None of the ponies in the vaccinated group developed secondary bacterial infection that required antibiotic treatment
- Significantly reduced duration ($p=0.006$) and cumulative ($p=0.0028$) virus shedding (qRT-PCR)

Clinical signs significantly lower in vaccinates than in controls



Vaccination reduces virus shedding and clinical signs of Equine Influenza



Infectious Equine Influenza Virus was isolated in embryonated hens' eggs from all of the ponies from the control group. Two of the vaccinated ponies did not shed infectious Equine Influenza Virus. Vaccination significantly reduced the duration ($p=0.04$) of infectious influenza virus shedding.

CONCLUSION

This study confirms the efficacy of Equilis Prequenza Te at one of the most vulnerable time points, against a recent Florida sublineage Clade 2 strain representative of the Equine Influenza Virus circulating currently in Europe.

OTHER RECENT STUDIES

This immunity gap challenge study is the latest in an extensive and ongoing research program on Equilis Prequenza Te.

Florida Clade 1 challenge – Ohio/03²

A group of 7 ponies was vaccinated twice 4 weeks apart and challenged, along with 5 unvaccinated ponies, with Ohio/03, 3 weeks after V2.

Vaccination:

- Significantly reduced clinical signs ($p=0.027$)
- Significantly reduced virus shedding ($p<0.0003$)

Florida Clade 2 challenge – Richmond/1/07³

A group of 7 ponies was vaccinated twice 4 weeks apart and challenged, along with 5 unvaccinated ponies with Richmond/1/07, 3 weeks after V2.

Vaccination:

- Significantly reduced clinical signs ($p=0.012$)
- Significantly reduced virus shedding ($p=0.0007$)

Demonstration of cell-mediated immunity⁴

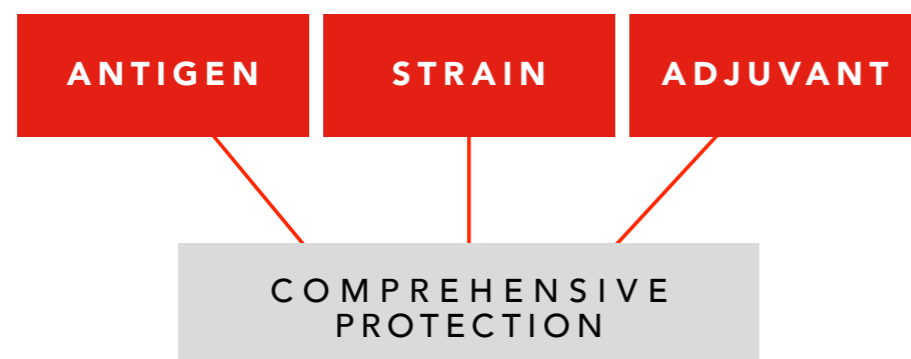
Stimulation of cell-mediated immunity (CMI) is important in the control of intracellular pathogens and is believed to play a role in Equine Influenza Virus clearance and host recovery after infection.

- This study demonstrated that, in addition to antibody responses, Equilis Prequenza stimulates cell-mediated immune responses in the horse.

WHAT MAKES EQUILIS PREQUENZA DIFFERENT?

A broad-based approach addresses the key areas that enhance the immunogenicity of Equine Influenza vaccines.

This can only be achieved through a combination of antigen, including strain, and adjuvant.



ANTIGEN

Equine Influenza Virus is composed of a lipid envelope containing haemagglutinin (HA) and neuraminidase (NA) glycoproteins. HA is involved in binding of the virus to the host cell and allows virus entry into cells. NA controls the release of virus from infected cells. The lipid envelope surrounds the more conserved virus matrix that includes nucleoprotein (NP) and RNA.

- Due to continued antigenic drift there may be a mismatch between the HA of vaccine and field strains
- Other components of the Equine Influenza Virus that could stimulate an immune response are also important
- Equilis Prequenza contains the whole Equine Influenza Virus, meaning that all of the virus components – both internal and external – are presented to the immune system

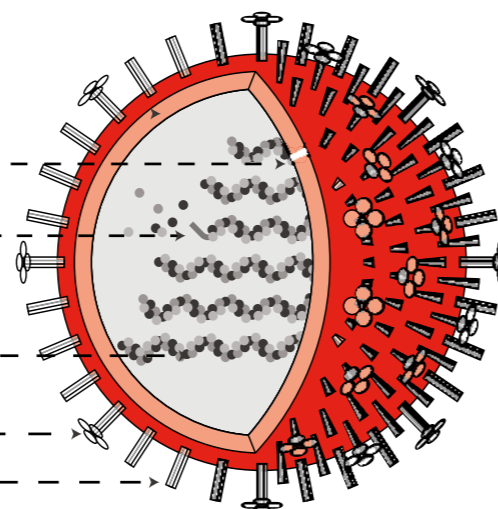
M2-PROTEIN

RNA

NUCLEOPROTEIN AND POLYMERASES

NEURAMINIDASE

HAEMAGGLUTININ



STRAIN

Equilis Prequenza contains the whole virus of 2 strains of Equine Influenza Virus;

- Eurasian strain Newmarket/2/93
- Florida Clade 1 strain, South Africa/4/03, as recommended by the OIE

Equilis Prequenza is the only Equine Influenza vaccine with efficacy confirmed by challenge with a Florida Clade 1 strain at onset of immunity and Florida Clade 2 strains at onset of immunity and during the immunity gap.

ADJUVANT

Unlike typical human Seasonal Influenza vaccines, Equine Influenza vaccines benefit from the addition of an adjuvant to help stimulate the horse's response to the Equine Influenza Virus.

Traditionally, vaccines have contained chemical adjuvants, such as aluminium salts, which form a depot at the injection site that slowly releases antigen. Matrix-C (also known as ISCOM-matrix) is different.

- Matrix-C acts as a delivery system for the vaccine
- Matrix-C and antigens are freely associated allowing an optimum ratio of antigen to complex
- Matrix-C uptake is rapid and leaves no depot, with no residues at the injection site after 24 hours⁴
- Following injection, Matrix-C rapidly stimulates antigen presenting cells to take up antigen and transport it to the key sites for immunity
- Matrix-C acts as an immune stimulant. It stimulates both antibody production and cell-mediated immunity, mimicking natural infection, to provide broad protection⁵



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