

Equine vaccination guidelines for New Zealand

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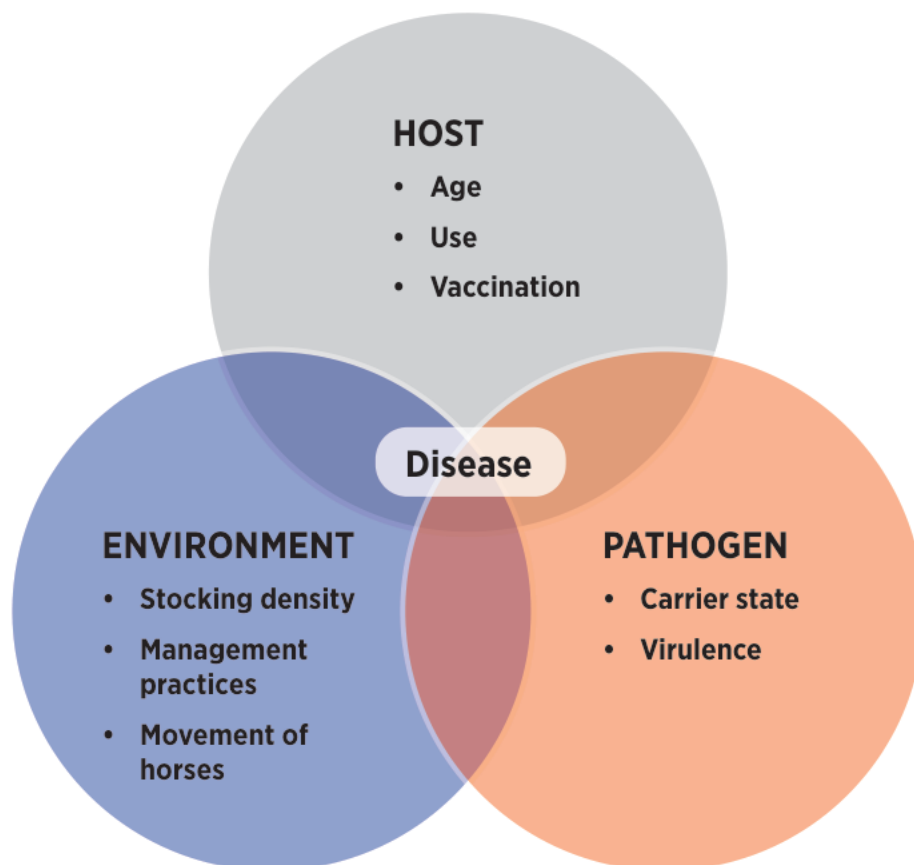
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Introduction

The following Guidelines were developed to assist veterinarians and horse owners to help control infectious diseases currently circulating in the NZ horse population. The information in these Guidelines is intended to be referenced by horse owners in collaboration with the advice of their attending veterinarian. The Guidelines should not replace the instructions of a veterinary practitioner.

Risk of infectious disease is higher in the following conditions:

- frequent contact with horses from outside the property
- the number of horses on the property (stocking rate)
- management practices
- the movement of horses to and from the property
- the presence of undiagnosed sub-clinical carriers or horses incubating disease



This diagram illustrates how all three factors are important and contribute to produce disease. It is important to consider all three when designing a disease control program, including vaccination. A standard vaccination program cannot be applied to all horses and the variability of the factors in the above triad need to be considered when deciding on a vaccination plan.

Risk factors

The horse's use and age are closely related to the risk of disease transmission. The *Equine Vaccination Guidelines for New Zealand Chart* on the following page provides a guide to the recommended vaccination program for a horse's age and usage.

One of the key principles in reducing the risk of disease transmission is to provide foals (less than 12 months of age) with a strong basis of immunity. Effective protection is often established early on by colostral antibodies, and some vaccination protocols assist this by vaccinating the pregnant mare. Vaccination of foals aims to provide active immunity once colostral protection wanes. Risk levels in the older individual will vary depending on the subsequent use of the horse but it is important to vaccinate at times that ensure maximum immunity at the time of likely challenge. Three broad use categories have been described below:

Competitive / Pleasure Horses

This individual is deemed to be of high risk because of interaction with multiple horses of unknown disease and vaccination status, along with the physiological stress of physical competition and travel. The more frequently the horse interacts with other horses while away from their property, the higher the risk of exposure to infectious agents.

Breeding Horses

This individual is deemed to be of moderate to high risk depending on the stability of the herd and the environment, and the rate of change of both factors. Management factors such as the scale of the operation, high stocking density and high proportion of introduced horses during the breeding season, will increase the risk of exposure to infectious agents. The vaccination of this individual also helps to protect an immunologically naïve foal.

Low Interaction Horses

Individual horses or horses in a small closed herd are at low risk of being exposed to infectious agents. While the risk of exposure is low, the consequences are high in fully susceptible animals. If this band of horses is unvaccinated and an infectious agent is introduced, severe manifestations of disease are possible.



Outbreak Management

While vaccination is important in minimising the risk of infection, vaccination alone, in the absence of good management practices is not sufficient to prevent the spread of disease in all circumstances.

The general principles involved in outbreak management are designed to control the outbreak as fast as possible and prevent spread to neighbouring properties or subsequent outbreaks on the original property. The principles are broad-ranging and applicable to the majority of infectious diseases in New Zealand. They have been proposed as “Voluntary Codes” and these have been supported by the New Zealand Equine Health Association and its comprehensive membership. The general principles are as follows:

- Minimise exposure
- Isolate affected individuals
- Identify the causative agent of an outbreak
- Minimise the spread within the herd
- Notify neighbouring properties
- Minimise the spread to other properties
- Increase immunity
- Reduce the likelihood of infectious agent reservoirs

Minimise exposure

During the outbreak, horse owners are advised to implement practices which separate infected and exposed animals from non-exposed animals, minimising the spread of infection. Affected animals should ideally be grazed/housed separately for the duration of the disease and convalescence.

Exposed groups can be further divided to minimise the spread of disease. Personnel and equipment used to manage these horses should be different, if possible, or cleaned and disinfected in between use. If personnel and equipment are to be used for all of the groups then it should be used first with non-exposed horses, then in exposed healthy horses, and lastly in clinically infected horses. No new horses should be introduced onto the property until the outbreak is over and individuals from exposed groups should not be moved into non-exposed populations.

After the outbreak, introductions of new horses into a stable population should be kept to a minimum. Any additions to the group should undergo a period of quarantine and isolation equal to twice the length of incubation for the disease.

Isolate affected individuals

Affected individuals excrete large amounts of infectious agent. The isolation of these individuals during periods of active disease and subsequent convalescence reduces direct and indirect exposure to healthy horses.

During the outbreak, it is recommended that horse owners use barrier clothing (overalls, gloves and boots) when handling affected animals, and foot baths for leaving infected areas to minimise the spread of infection.

After the outbreak, affected animals may require ongoing isolation depending on the disease. Convalescent animals may require further testing to assess the risk to other members of the herd.



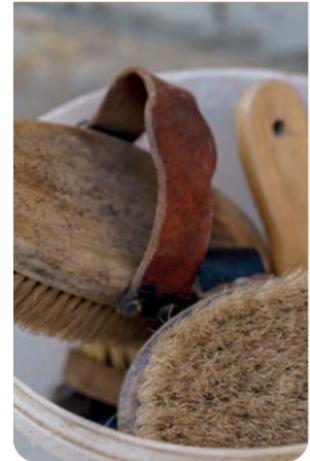
Identify the causative agent of an outbreak

It is important to attempt to identify the causative agent to provide specific risk-based recommendations for treatment and control of the outbreak. Depending on the disease suspected, particular samples and tests can be performed. Veterinarians should consult their diagnostic laboratory for information on appropriate sample collection and handling.

Minimise the spread within the herd

Facility design can be used to reduce the spread of infectious agents. Paddocks and yards should be separated by distance or physical barriers to prevent the spread of infectious agents. In the situation where this is not possible various solutions can be used, including temporary fencing to create space between groups of horses. Biological barriers, including other species or mature, low risk individuals, can also be used to minimise the spread of infection.

Management practices such as good hygiene, appropriate disinfection, rotation of facilities between high risk and low risk animals or spelling of areas after use can reduce environmental contamination. It may be worthwhile to consider confining pets that may otherwise roam the property.



Notify neighbouring properties

It is important that your neighbours are informed as soon as possible that horses on your property have an infectious disease. This allows them as much time as possible to look at their own management practices, isolate recent arrivals, shift animals from the boundary, seek advice and vaccinate if applicable. Neighbours should treat such notifications in confidence and be supportive of their neighbour's efforts to manage their problem.

Minimise spread to other properties

No horse should leave an infected property until the outbreak is over. If horses have recently left before a diagnosis was made it is important to immediately notify the owners of the property they were sent to. Discourage visitors to the property.

Increasing immunity

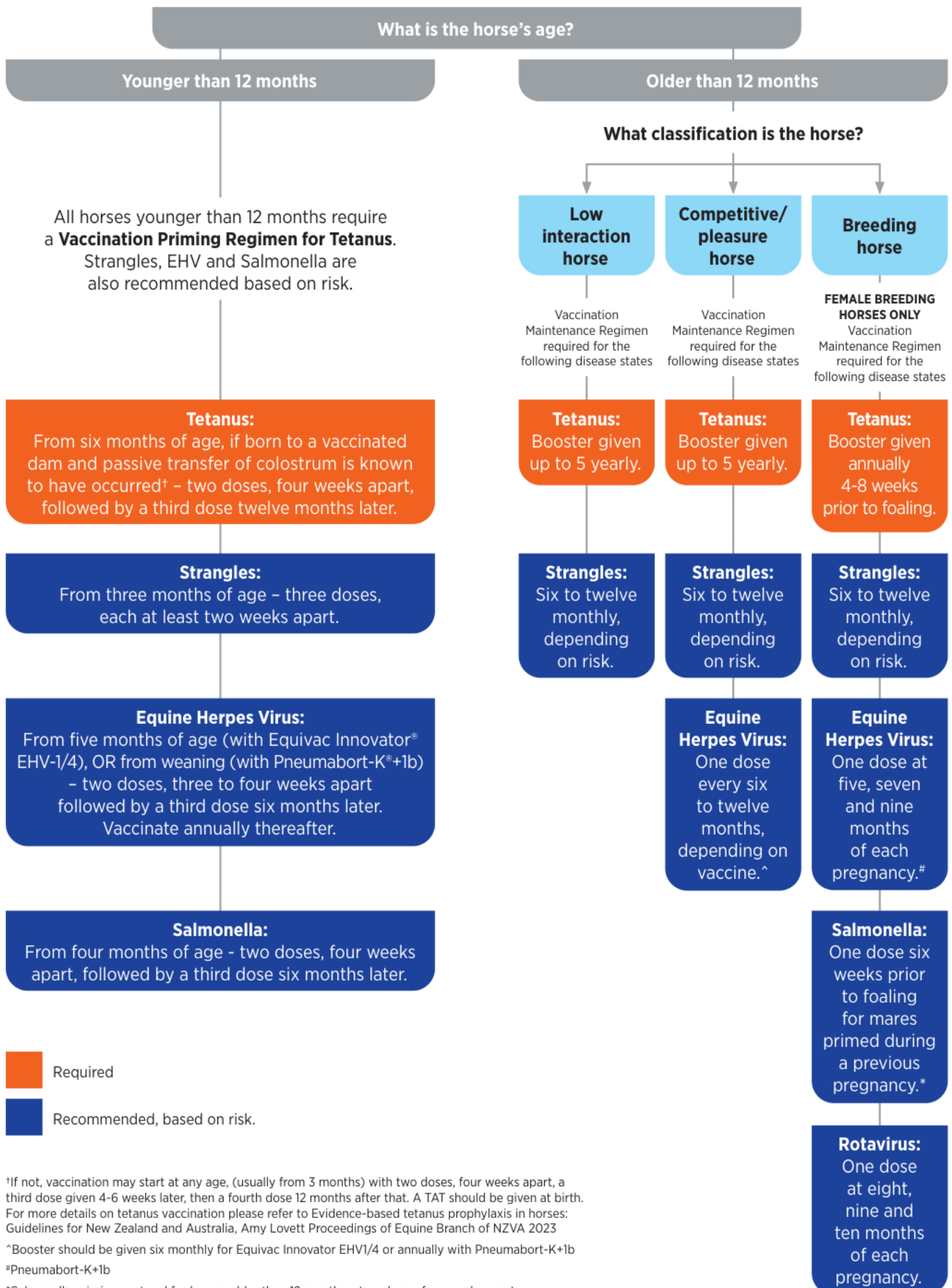
During the outbreak, horses in the healthy non-exposed group should be vaccinated to increase immunity and reduce the population of susceptible animals. Depending on the disease, healthy horses in the exposed group may also be vaccinated to increase immunity. The vaccination of affected horses is not recommended.

After the outbreak, ongoing vaccination programmes may provide sufficient herd immunity to prevent further disease outbreaks, in conjunction with appropriate management practices. Vaccination protocols can be reviewed after a risk assessment has been carried out.

Reduce the likelihood of infectious agent reservoirs

Depending on the disease, some infectious agents can survive in the environment and inside asymptomatic animals for long periods of time. Identifying contaminated areas and carrier animals can reduce the likelihood of outbreaks recurring.

Equine Vaccination Guidelines for New Zealand



Required

Recommended, based on risk.

[†]If not, vaccination may start at any age, (usually from 3 months) with two doses, four weeks apart, a third dose given 4-6 weeks later, then a fourth dose 12 months after that. A TAT should be given at birth. For more details on tetanus vaccination please refer to Evidence-based tetanus prophylaxis in horses: Guidelines for New Zealand and Australia, Amy Lovett Proceedings of Equine Branch of NZVA 2023

[^]Booster should be given six monthly for Equivac Innovator EHV1/4 or annually with Pneumabort-K+1b

[#]Pneumabort-K+1b

^{*}Salmonella priming protocol for horses older than 12 months – two doses, four weeks apart.



Disease: Tetanus

Tetanus is an often fatal disease caused by the potent neurotoxin elaborated by the anaerobic, gram positive, spore-forming bacterium *Clostridium tetani*. The organism is found in the intestinal tract and faeces, and is abundant in the soil. The spores of the organism can survive in the environment for many years. All horses are therefore at risk of this disease, even if they are relatively inactive.

Clostridium tetani gains access to the horse through infected wounds. The organism proliferates if there is low local tissue oxygen tension. The neurotoxin (tetanospasmin) reaches the central nervous system by passing up peripheral nerves and via the bloodstream, and binds irreversibly with inhibitory neuron proteins, thus treatment is difficult once clinical signs are evident.

Clinical Signs

Diagnosis of the disease is based on clinical signs, predominated by diffuse, hypertonic [tetanic] muscle contractions resulting in a classical “saw-horse” stance. Protrusion of the third eyelids, tetanic contraction of the muscles of mastication (“lockjaw”) and hypersensitivity to noise, and touch are also typically present. Death is due to asphyxia following paralysis of respiratory muscles.



Vaccination

Equivac® T

The vaccine is a formalin-inactivated, adjuvanted toxoid that induces strong immunity. It is a well-tolerated and very effective vaccine, and protective immunity is usually attained within 14 days of the second dose of the vaccine. Initial vaccination requires two doses given intramuscularly four weeks apart. A third dose should be given 12 months later, then ongoing boosters should be given up to five yearly after that.

For guidance on vaccination in different situations including pregnancy, foals etc please refer to Evidence-based tetanus prophylaxis in horses: updated guidelines for New Zealand and Australia, Amy Lovett, Proceedings of Equine Branch of NZVA, 2023



Equivac® 2 in 1 (Combined Strangles and Tetanus vaccine)

This vaccine has the features of Equivac® S and Equivac T. Potential side effects are the same so refer to Equivac S below. It is administered intramuscularly and the interval between the three initial doses should not be less than two weeks.



Because tetanus is regarded as one of the most painful diseases known and the vaccine is very effective in protecting horses, **ALL HORSES SHOULD BE VACCINATED AGAINST TETANUS.**

There is often confusion between tetanus vaccine and tetanus antitoxin so for completeness an outline of the use and usefulness of antitoxin will be included even though it is not a vaccine.

Equivac® TAT

Tetanus antitoxin is administered by the subcutaneous route to horses that are at risk of tetanus. It is prepared by immunising horses against the *Cl. tetani* toxin and harvesting their serum which is then refined to be free of other serum proteins and concentrated. Tetanus antitoxin neutralises tetanus toxin and therefore provides short-term passive immunity.

The antitoxin is administered subcutaneously on the opposite side of the neck to where the intramuscular toxoid is administered. Administration of the antitoxin carries with it the rare risk of Theiler's Disease, an acute fatal hepatitis. This disease has been recorded four to ten weeks after the administration of an equine origin biologic, such as tetanus antitoxin, and some evidence indicates it is due to a Flavivirus. The risk of this disease should be assessed against the requirement for immediate tetanus prophylaxis.

Tetanus antitoxin is also used in the treatment of clinical cases of tetanus, administered intravenously and possibly into the subarachnoid space around the central nervous system. Early administration in the course of the disease is important due to the irreversible binding of tetanus toxin. If a risk event occurs, TAT should be given if a horse has not completed its primary course or the vaccination history is unknown. In a horse that has had its primary course (three vaccinations) and it has been more than 12 months since its last tetanus toxoid, a tetanus toxoid should be given. A TAT should not be necessary.



Disease: Strangles

Streptococcus equi subspecies *equi* is a bacterium which causes the highly contagious disease Strangles. Strangles commonly affects immunologically naive young horses (weanlings and yearlings), but horses of any age can be affected. While most horses recover, some individuals will die from the disease. Following natural infection a horse may become a carrier of the disease due to guttural pouch infection and as a result, intermittent/sub-clinical shedding may occur.

The organism is transmitted through direct contact with infected or “carrier” horses or indirectly through contact with water troughs, equipment or personnel that have come into contact with infected horses. The greatest risk of infection comes from nasal discharge or pus draining from lymph nodes of infected horses.

Clinical Signs

Clinical signs may include fever (39-40°C); nasal discharge of pus and mucus; dysphagia (difficulty in swallowing) or anorexia; stridor (respiratory noise); enlarged or abscessed lymph nodes and in extreme cases asphyxia. Pneumonia, guttural pouch empyema (infection) and bastard strangles can be complications and, especially in foals, these have a poor prognosis.

The diagnostic sample of choice is an aseptically collected aspirate from an abscessed lymph node that has not drained, or an infected guttural pouch, however this might not be possible in all cases.

Following natural or vaccination exposure to streptococcal antigens, certain individuals may unpredictably develop purpura haemorrhagica; an acute, non-contagious syndrome caused by immune-mediated, generalised vasculitis. Clinical signs develop within two to four weeks following exposure and may include hives with pitting oedema, or abnormal fluid retention of the limbs, ventral abdomen and head. Immediate medical attention should be sought for horses suspected of having purpura haemorrhagica.

Following recovery from strangles, most horses (currently thought to be approximately 75%) develop a durable immunity that can persist for a number of years. Previous exposure does not provide life-long protection and these horses might show milder clinical signs in subsequent outbreaks.

Horses that have recovered from infection can also develop a carrier state. These individuals carry the organism in the guttural pouch for long periods and can only be detected by bacteriological sampling of the area.

Managing an Outbreak

Foals born of mares that have had strangles or have been vaccinated can be immune for the first two to three months due to colostral antibodies. It is recommended that mares and foals be separated into smaller groups in the first two to three months after birth; removing them from the herd with an active infection is also strongly advised.

Steps in managing an outbreak:

- The daily measurement of rectal temperature and immediate isolation of individuals with pyrexia
- Isolation of new arrivals
- Daily disinfection of water troughs
- Use of separate (labelled) feed and water buckets for stalled animals
- Pasture rotation and resting for one month prior to reintroduction of stock
- Segregation and culture of recently recovered animals until shedding/carrier status is known
- Identification and treatment of carriers with guttural pouch lavage and topical antibiotic application
- Vaccination likely reduces number and severity of cases in an outbreak but does not fully protect from infection and clinical signs.

Vaccination

Vaccination is an important management tool in protecting against Strangles. Vaccination in the face of an outbreak should be carefully considered, as there is significantly increased risk of adverse reactions in exposed horses, including purpura haemorrhagica. Outbreak mitigation and the prevention of spread of *S. equi* infection are centred on management of horses, personnel, and facilities.

As already stated protective immunity following infection is less than 100% and vaccination also does not provide complete protection. However, appropriate pre-exposure vaccination provides complete protection in some individuals and appears to reduce the incidence and severity of clinical signs in other affected horses.

Vaccination Groups

- For adult horses that are unvaccinated or have unknown vaccination history, it is recommended that the horse undergo the priming regimen
- All at risk foals should be vaccinated against Strangles
- All at risk Competitive/Pleasure and Breeding horses should be vaccinated against Strangles

Equivac® S

Equivac S is a killed vaccine made up of a cell free extract of *Streptococcus equi*.

When horses and foals are vaccinated with Equivac S for the first time, a course of three doses should be given with an interval of not less than two weeks between each dose. The vaccine is given intramuscularly and the most convenient site for injection is the centre of the side of the neck. The immunity following vaccination has been shown to wane towards the end of the year of vaccination and all horses should receive annual booster doses. Increased protection is obtained by vaccinating more frequently and six monthly revaccination should be considered in circumstances where the risk of infection is known to be high.

Occasionally local swellings develop at the injection site and these resolve over a few days. These are more likely if the vaccine is given subcutaneously. On rare occasions systemic signs such as purpura haemorrhagica may be observed.



Equivac® 2 in 1 (Combined Strangles and Tetanus vaccine)

This vaccine has the features of Equivac S and Equivac T. Potential side effects are the same so refer above. It is administered intramuscularly and the interval between the three initial doses should not be less than two weeks.



Disease: Equine Herpes Virus

Equine herpesvirus 1 (EHV-1) is a double stranded DNA virus, which is endemic in horse populations worldwide. EHV-1 is a respiratory pathogen that rapidly establishes a systemic infection and spreads throughout the body via a cell associated viraemia that can cause widespread vasculitis. EHV-1 causes a mild respiratory disease, but the most serious disease manifestations are EHV-1 abortion and neurological disease (equine herpesvirus myeloencephalopathy (EHM)).

EHV-1 is closely related to EHV-4 which is also primarily a respiratory pathogen. EHV-4 respiratory disease is most commonly reported in young horses, often associated with weaning. Both EHV-1 and EHV-4 can establish lifelong latent infections in recovered horses. Previously exposed horses may reactivate these latent infections, which may subsequently become a source of infection for new outbreaks.

Clinical Signs

Both EHV-1 and EHV-4 circulate on breeding farms in a silent cycle of infection, where foals are infected early in life. This early infection is often associated with respiratory disease, especially in weaned foals. Clinical signs include mild serous nasal discharge, which becomes mucopurulent with secondary bacterial involvement. Infection will occasionally result in enlargement of the lymph nodes that drain the upper respiratory tract and occasional episodes of coughing.

EHV-1 neurological disease (EHM) occurs following infection of the endothelial cells of the blood vessels of the central nervous system (CNS) and clusters of cases [outbreaks] do occur. This vasculitis results in leaky vessels in and reduced blood supply to the CNS and the clinical signs are directly related to the site(s) of vasculitis. Clinical manifestations range from mild signs such as dribbling urine and ataxia, through to tetraparesis (weakness of the limbs) and recumbency. Isolates of EHV-1 with such neuropathogenic potential continually result in outbreaks of EHM in many other countries, particularly the USA, and now have been identified in both New Zealand and Australian outbreaks. It is important that any neurological disease in horses in NZ is fully investigated.

EHV-1 Abortion

EHV-1 abortion is the most serious manifestation of EHV-1 infection. Abortions typically occur in late gestation, but have been reported as early as five months gestation. Cell associated viraemia is central to the pathogenesis of EHV-1 abortion. EHV-1 abortion occurs following infection of the endothelial cells of the blood vessels of the placenta. Vasculitis results in reduced blood supply to the placenta and subsequently rapid abortion occurs with very few warning signs. This disease process is very rapid and abortion occurs quickly after foetal death so that the aborted foetus is fresh with minimal autolysis or decomposition. In late gestation some affected foetuses may even be born alive, look healthy for a day or two and then die. Most EHV-1 abortions occur as single sporadic cases, although if large numbers of pregnant mares are exposed to the index (first) case, large abortion storms can occur.

Managing an Outbreak

All equine abortions should be considered as EHV-1 abortions until proven otherwise. Immediate management of the site and affected animal is critical to minimising potential exposure of other, in-contact horses. Outbreak management strategies include:

- Securing the area and ensuring appropriate biosecurity measures for in contact personnel
- Removing the affected mare (housed separately or with non-susceptible horses such as non-pregnant mares)
- Careful collection and containment of foetus and membranes for laboratory testing
- Management of in contact pregnant mares to minimise stress and spread from further abortions

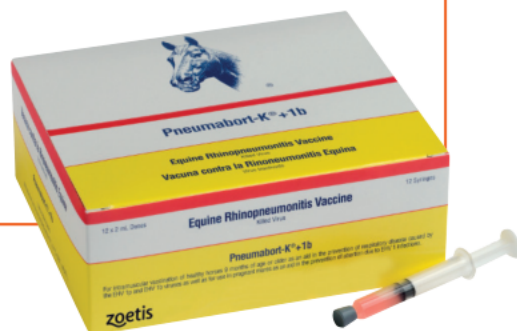
For further information refer to HBLB/BEVA guidelines <http://codes.hblb.org.uk/index.php/page/32>

Vaccination

Pneumabort-K® +1b

This vaccine has killed virus and is given by deep intramuscular injection during the 5th, 7th and 9th months of each pregnancy. To achieve deep injection it has been recommended that the muscles of the hindquarter be used. Annual revaccination is required. It has been shown in challenge trials to reduce the severity of respiratory disease and reduce the likelihood of EHV-1 abortion. This vaccine is widely used in the breeding industry as an aid to control losses associated with EHV-1 abortion.

To use the vaccine as an aid in the prevention of respiratory disease, young horses after weaning should receive two doses 3-4 weeks apart, with a booster 6 months later and then an annual booster.



Equivac Innovator® EHV-1/4

This is an EHV-1/EHV-4 inactivated whole virus vaccine. It has been shown to reduce the severity of respiratory disease and reduced likelihood of EHV-1 abortion. Horses from 5 months of age can receive the vaccine by intramuscular injection with a booster dose 3-4 weeks later. Another booster should be given every 6 months thereafter.



NOTE: No claims can be made regarding vaccination providing protection against EHM although some evidence has indicated reduced frequency of EHM in experimentally challenged, vaccinated horses compared with unvaccinated control horses.

Disease: Rotavirus

Rotavirus, a non-enveloped RNA virus, is a major infectious cause of diarrhoea in foals, seen predominantly in horses aged one week to five months. While rotavirus diarrhoea morbidity can be high, mortality is low with nursing and veterinary intervention. Faecal shedding of virus can occur in recovered foals, however adults do not shed.

Clinical Signs

Equine rotavirus is transferred via the faecal-oral route and damages the small intestinal villi, resulting in maldigestion, malabsorption and diarrhoea. Most cases will resolve without treatment. Foals with the virus present signs quickly and will stop nursing, become quiet and show diarrhoea within 12-24 hours of infection.

The severity of a rotavirus infection depends on a horse's immunity, inoculation dose and age, as it is generally more severe in younger foals. Horses are diagnosed with faecal antigen tests that are sensitive, rapid and specific. Treatment for the disease is generally supportive with fluid therapy to rehydrate foals, especially during hot environmental conditions.

Managing an Outbreak

Outbreaks of rotavirus are related to poor hygiene and high stocking density. Mare owners need to be aware that strict biosecurity and disinfection during the foaling season lessens the morbidity associated with most types of infectious foal diarrhoea as with other contagious diseases. It is also advised that foals with diarrhoea be isolated from the herd to help in reducing the exposure of other young horses.

Rotavirus is very stable and can survive for up to nine months in the environment. Farms with endemic rotavirus and high stocking rates should consider the use of the vaccine.

Vaccination of mares results in a significant increase in their foal's rotavirus antibody titres. Field trials of rotavirus vaccination in pregnant mares have shown a decrease in incidence and severity of foal diarrhoea on farms that historically had annual rotaviral diarrhoea cases. Other studies have shown increased rotavirus antibodies in vaccinated mares' colostrum.

Vaccination

Duvaxyn® R

This vaccine contains inactivated rotavirus Group A and is indicated for administration to pregnant mares to enhance concentrations of colostral immunoglobulins against equine rotavirus (Group A).

Mares need to be vaccinated intramuscularly during each pregnancy in the 8th, 9th and 10th months.



Disease: Salmonella

Salmonellosis is a common cause of acute enterocolitis in the horse. Onset of the disease is often associated with stressful conditions such as advanced pregnancy, bad weather, transportation, recent surgery or treatment for other conditions. The most common manifestation is acute, profuse diarrhoea, especially in young horses. On some properties foals are regularly affected at an early age and vaccination of the pregnant mare is done to try to provide the foal with protection via colostrum.

Vaccination

Equivac® EST

The vaccine in New Zealand is an inactivated *Salmonella typhimurium* vaccine. It is administered by deep intramuscular injection.

For primary immunisation, foals of 4-12 months of age should be given three doses of vaccine while adult horses (more than 12 months old) should be given two doses of vaccine. The interval between doses should not be less than 4 weeks with a third dose for foals being 6 months after the second dose. This primary immunisation course should be followed by an annual booster injection to maintain high levels of immunity.

Foals which have been born to appropriately vaccinated mares will normally receive protective antibodies through the colostrum, which can be expected to provide adequate protection through to approximately 4 months of age. Primary immunisation of such foals may then be commenced.



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