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(REVISED THIRD EDITION)

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Commissioned by
The New Zealand Equine Research Foundation

STRANGLES
(REVISED THIRD EDITION)

by
Drs Andrea Britton and Tony Mogg
(Reviewed by Dr John O'Flaherty)

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PREFACE

The New Zealand Equine Research Foundation has been commissioning books on topics of importance to the NZ Horse Industry for many years. On three previous occasions, books on Strangles, the most common, severe, bacterial disease of horses in our country have been produced and distributed to horse owners and breeders.

When the last Strangles booklet was printed in 2004 recent research at the Animal Health Trust, Newmarket, UK, had identified that 10% of horses infected with strangles became chronic carriers and hence a source of infection for future outbreaks of this disease. These carriers can best be identified using gutteral pouch lavage via an endoscope and bacteriology or PCR (identification of Strangles bacterial DNA) on the samples. Their more recent research has shown that up to 25% of infected horses can become carriers.

At the 10% level it was hoped that horse owners may have the means of identifying and treating these carriers. In the interim the uptake and application of this technology has been low and with a higher percentage of infected horses likely to become carriers the hope of eradication is now much reduced.

Strangles is not a notifiable disease in New Zealand but our Ministry of Agriculture and Forestry (MAF) has to report to the OIE (Office International des Epizooties - International Organisation for Animal Health) on its occurrence here. Unfortunately amongst some horse owners there is still a stigma about admitting their horses have strangles, which hinders both quick diagnosis and effective control

of the spread of the disease. We would encourage all horse people to adopt a voluntary code to be followed in the event of an outbreak.

This book sets out to explain how to recognize a horse with strangles, how to understand why the disease occurs and how to effectively treat, control and possibly eradicate it.

This book has been written by two veterinarians, Dr Andrea Britton now at Ultimate Efficacy Consulting Pty Ltd, Melbourne and Dr Tony Mogg of The University of Sydney. The NZ Equine Research Foundation is very appreciative of their willingness to produce this book and for their expertise in presenting the facts relating to Strangles in such an uncomplicated and readily understandable fashion. We are also indebted to our current Chairperson Dr John O'Flaherty for undertaking this review and Publications Subcommittee members, Dr Margaret Evans, Barbara Harvey and Bruce Graham for their enthusiastic assistance and informed criticisms during the reproduction of this book.

We could not have produced this book and distributed it throughout the NZ Horse Industry without the generous financial support of Pfizer NZ Ltd and The Trust Charitable Foundation. The NZ Equine Research Foundation is greatly encouraged by the generosity of these organisations and gratefully acknowledges their support of this publication. We are especially indebted to Pfizer NZ Ltd for their sincere interest in the welfare of our NZ horses and to the Trust Charitable Foundation for supporting the wide education value of this publication.

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NZ Equine Research Foundation

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Artificial Breeding of Horses

Ruptured strangles abcesses can be multifocal and involve large areas about the affected lymph nodes

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INTRODUCTION

Equine strangles is the most important bacterial disease of members of the horse family (horses, donkeys, mules, and zebras). It occurs worldwide, at any time of the year, is highly contagious, and has been recognized for over 7 centuries. It has been difficult over the years to explain the ability of the disease to resist attempts at control and eradication. In recent years, because of a number of careful scientific observations on horses with the disease and research on the organism which causes it, our understanding of the disease has increased prodigiously. It is this relatively new information that has dramatically changed many previous ideas on its prevention and control.

The purpose of this book is to share this information with horsemen and women so that they can understand the disease and apply this new knowledge to minimize its distressing occurrence.

THE CAUSE AND SPREAD OF STRANGLES (EPIDEMIOLOGY)

Strangles is caused by a bacterium with the scientific name of *Streptococcus equi* subspecies equi. But it is usually referred to as *Strep. equi.* and written as *S.equi.*

Horses of all ages are susceptible to strangles but it occurs most commonly in young horses less than 2 years of age. Foals under 3 months are usually resistant due to the protection they get from drinking their dam's colostrum. Although outbreaks can occur at anytime, they are more common in the spring.

A horse infected by this organism does not show any clinical signs of illness for 3 to 14 days. The horse can, however, shed the bacteria from its nasal passages 4 to 7 days after infection. Therefore, some infected horses are actually shedding the bacteria into the environment before they show any signs of the disease.

Researchers from Newmarket in England have shown that some horses can carry the bacteria for up to 3 years or more after recovery from their illness. In these horses the bacteria exist within large air-filled pouches (guttural pouches) that lie adjacent to the throat (pharynx), to which they are connected.

Until recently it was considered that the main means of spreading the disease was from nasal discharges or burst abscesses containing the organism via airborne dispatch to other susceptible horses.

However, veterinarians now believe that most horses are infected by nose-to-nose transmission or from contaminated feed, tack, transport vehicles, people, or drinking troughs.

Several studies over recent years have shown that *S. equi* can survive in the environment for various periods depending on the climate and local conditions. In hot climates, the bacteria last only a few hours when exposed to the sun, but in soil it can last for 2 to 3 weeks. In cold climates, on the other hand, they can survive for much longer. One study demonstrated that in these climates, in favourable situations, the organism can survive in the environment for at least 8 months. Another recent study has shown that contaminated water troughs are an important source of infection as *S. equi* can survive for 2 months or more in this environment.

Typically, an outbreak of strangles on a property follows the introduction of an infected horse, which is incubating, or showing early signs of the disease or has recently recovered but is shedding the organism. Outbreaks, however, do also occur on properties with no history of recent arrivals. The long-term survival of the bacteria in the environment and the capacity of some apparently healthy horses to intermittently discharge the bacteria from the guttural pouches provide an explanation as to why these outbreaks occur.

Some situations predispose to the occurrence of strangles outbreaks. These include moving and mixing of horses from different sources, overcrowding, pregnancy, poor health and

parasitism. Whether the disease causes isolated cases or outbreaks (epidemics) depends on the level of immunity of the horses in the exposed group. When strangles is introduced into a herd of susceptible horses between 30% and 100% may become affected. Death can occur in 1% to 5% of cases and this may be higher in severe epidemics due to serious complications such as pneumonia or "bastard strangles" (explained later).

Horses are most vulnerable on properties which frequently have other horses introduced. Recently introduced animals may not show signs of strangles but may be silently incubating or even recovering from a mild attack of the disease. After infection approximately 10 - 25 % of horses become long-term carriers of infection and intermittently shed the strangles bacteria and thus pose a serious risk to other horses with which they come in contact.

Rapid spread of the disease is more likely when the horse's immunity to strangles is low. It is also likely to occur when factors which increase the opportunity for the organism to spread such as overcrowding and poor hygiene exist or when factors which affect the health of the horses such as poor nutrition, parasitism, concurrent disease and stress are present.

WHAT HAPPENS TO THE STRANGLES BACTERIA ONCE IT HAS ENTERED THE BODY

The strangles bacteria, after entering the horse's body through the nose or mouth, become attached to the lining of the upper respiratory tract especially the pharynx. Here they are identified by the lymphatic system, one of the horse's defense mechanisms, and are carried via its ducts to the lymph glands surrounding the throat.

White blood cells, another part of the body's defense system against bacterial infection, are attracted in very large numbers to these infected glands. In many bacterial diseases the white cells ingest and destroy the infecting bacteria. However the strangles bacteria contain protecting substances on their capsule or skin known as "M" proteins which block their destruction by the white cells. These M proteins also assist the strangles bacteria to attach to the cells lining the respiratory tract.

The bacteria also produce toxins (endotoxins), which stimulate the body's inflammatory response to infection. It is thought that these toxins are a major factor in producing a high fever and a massive white cell accumulation in the lymph glands which consequently swell and form abscesses.

Because of the difficulty that the body has in destroying the strangles bacteria they sometimes escape from the lymph nodes surrounding the throat and lodge in other parts of the horse's body, leading in some instances, to so called *bastard strangles*.

HOW TO RECOGNISE STRANGLES (CLINICAL SIGNS)

As mentioned earlier, the clinical signs of strangles appear about 3 to 14 days after exposure to the infection. In the classical case, the horse becomes dull, loses its appetite, and develops a fever between 39.5° and 41° C which persists as the abscesses develop. Soon characteristic swellings appear beneath and behind the jaw (Fig 1). These swellings are due to enlargements of the local lymph glands. Early in the course of the disease the horse's eye and lining (mucous membrane) of the nostrils becomes reddened and a watery discharge appears. This discharge soon changes and becomes thickened and yellow in colour (contains pus and mucus). A soft cough develops and breathing becomes loud and laboured with the horse struggling for every breath - hence the term "strangles". The pressure on the horse's airway from the swelling around the throat not only restricts breathing but makes swallowing very difficult. As a result grass eaten by the horse becomes mixed with the discharges from the nose discolouring them green. To

Fig 1 - *Horse infected with strangles showing swelling beneath the jaw. The swelling is due to enlargement of the local lymph node.*

relieve the breathing problem the horse tends to extend its neck (Fig 2). The swellings below and behind the jaw become hot and painful due to the development of abscesses in the lymph glands. The skin surface over the abscesses may ooze fluid (serum). Hair is lost from over the points of swelling and eventually skin rupture may occur with the discharge of copious amounts of thick and creamy pus. This occurs 7 to 14 days after the onset of clinical signs.

Not all infected horses show the classical signs of strangles mentioned above. Some only develop mild signs of respiratory disease. They may have a slight nasal discharge, cough and slight fever and not develop swollen glands.

The majority of horses which become infected recover fully without detriment although the complications that occur in a small number of cases can cause serious long-term effects or even death.

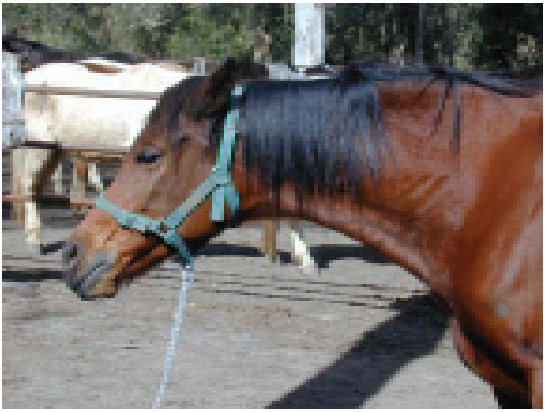

Fig 2 - *Horse infected with Strangles extending its neck to make breathing easier*

COMPLICATIONS OF STRANGLES

While the commonest course of the disease is the external rupture of abscesses followed by an uneventful recovery, in a small number of cases complications do occur and can cause death. Lymph nodes in almost any part of the body may develop abscesses, which may eventually rupture and discharge pus into the surrounding tissue or organs. This is referred to as "bastard strangles". Though uncommon, this form of the disease is difficult or impossible to treat successfully and has a high mortality rate.

Some of the more common forms of "bastard strangles" are as follows:

- Septic arthritis (joint infection), and necrosis of skin over the joint.
- Recurrent seizures associated with brain and spinal cord infection and the formation of abscesses.
- Vegetative endocarditis (abscesses on the heart valves). These can discharge septic emboli (plugs of pus and bacteria), which travel via the bloodstream to localize in the brain, ophthalmic tract (eyes), liver and kidney.
- Rupturing of lymph gland abscesses into the respiratory tract allowing pus to enter into the trachea and lungs resulting in pneumonia.

- Abscessation of the lymph nodes in the neck causing pressure or damage to the recurrent laryngeal nerve, causing laryngeal hemiplegia (roaring).
- The accumulation of pus in the guttural pouches.
- Colic due to abscesses in the mesenteric lymph nodes.

Another, less common but very serious and potentially fatal sequel to strangles is the development of *Purpura haemorrhagica*. This is a condition in which blood cells and plasma leak out of the bloodstream into the tissues. It is believed to be an excessive allergic-type reaction to streptococcus or viral antigens. Its signs are variable and include well-demarcated soft swellings (oedema) of the trunk, head and extremities. Small haemorrhages are also seen on the membranes of the mouth and eye. The swellings are hot and painful and affected horses are depressed and reluctant to move. The limbs swell and colic may occur due to involvement of the visceral organs.

IMMUNITY TO STRANGLES

Historically, it was thought that once a horse had recovered from an attack of strangles it had a lifelong protection to the disease. However it is now known that previously infected horses acquire a level of immunity for up to four years and that one in four horses remains susceptible and may become reinfected within six to twelve months. Protection against infection is from both locally produced or surface antibodies on nasal membranes and circulating antibodies in the blood. Foals that suckle from mares which are immune to strangles (previously infected or vaccinated) are usually resistant to the strangles infection for the first 3 months of life.

The local or nasal immune response seems to occur sooner than the systemic or blood protection. Immunity produced by vaccination is preferred to that resulting from recovery from natural infection because of the complications which may follow the latter. The first or initial dose of strangles vaccine sensitizes the horse's immune system and a second or booster dose, produces a high level of protection against the disease. A horse cannot acquire strangles from vaccination. If a horse develops strangles following vaccination it must have been incubating the disease at the time the vaccine was administered.

DIAGNOSIS AND DIFFERENTIATION FROM OTHER EQUINE RESPIRATORY DISEASES

In the advanced stage strangles is unlikely to be confused with other respiratory conditions of horses. The presence of fever and the purulent nasal discharge (Fig 3), abscess formation, and burst lymph glands under the throat are sufficient to make a tentative diagnosis.

However, in the early stages of the disease when the horse is depressed, has a clear or serous nasal discharge, cough and a fever, strangles must be differentiated from the common equine "colds" which in NZ are caused mainly by the equine herpes or rhino viruses. Viral infections are particularly common in young animals and those exposed to other horses as in training stables, at shows and during transport. Unless complicated by secondary bacterial infection, viral respiratory disease does not usually result in a copious purulent nasal discharge, and if the lymph glands become swollen they do not develop abscesses.

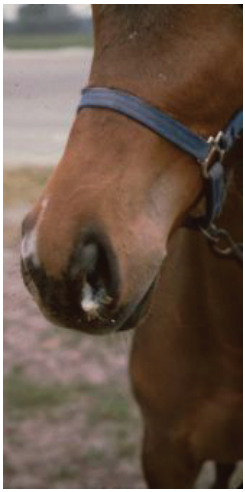

Fig 3 - *Pus from the nose may be an early sign of strangles and needs to be differentiated from other causes.*

The history of exposure to other horses with strangles, and a blood analysis showing signs of an acute bacterial infection are supportive of a diagnosis of strangles.

A diagnosis of strangles can be confirmed by bacterial culture of *Streptococcus equi* from either nasal discharge or from lymph node abscesses. Multiple samples may be required to confirm the diagnosis and, by definition, a horse with a positive culture result has strangles. Samples for examination are best taken from ruptured abscesses, as these are less likely to be contaminated with other bacteria. During an outbreak it is important to obtain a diagnosis of strangles, but failure to identify *Streptococcus equi* does not preclude strangles in the face of other obvious clinical signs. During an outbreak it is also important to obtain a diagnosis of strangles so that control and preventative measures are not unnecessarily imposed. It is possible to take a pus sample from a strangles infected horse and not be able to grow the organism by culture. This means that if you take one or two samples from horses with discharging abscesses and *Streptococcus equi* is not identified, you can still not be sure that the animals do not have strangles. If the clinical signs are typical of strangles then it is most likely that your animals do have strangles and the samples taken were just unsuccessful at growing the bacteria. DNA tests for the detection of strangles have also been developed. These are more sensitive than bacterial culture in detecting positive cases and the test can be done within 4-6 hours. In general, if there is suspicion of strangles, the disease should be treated as such until proven otherwise. Prompt implementation of appropriate treatment and preventative measures are indicated to limit the disease's spread and its effects on the animals.

IDENTIFICATION OF CARRIERS OF THE STRANGLES ORGANISM

In the management of horses after an outbreak of strangles it is important to be able to identify the long-term carriers of the disease. There are two main ways of doing this. The first, or traditional way, is by taking swabs from the nasal cavity or pharynx and culturing them for the organism. This method has been used for many years. Recent research, however, has shown that a single swab taken from carrier horses is less than 50% accurate in identifying infection. Even taking three or more swabs at weekly intervals from carrier horses has an error rate of 15%. This means that if 10 carrier horses were swabbed each week for 3 or 4 weeks, between one and two carrier horses would not be detected and could pose an infectious risk to other animals in the future. Thus this method cannot be relied upon to accurately identify carriers of the infection.

The second and most accurate method of identifying horses carrying the strangles organism is by endoscopy. With this technique a flexible tube is directed via the nostril into each guttural pouch, which is then rinsed with 50mls of saline solution. The fluid is then withdrawn and a sample plated up for bacterial culture. A sample of the fluid can also be tested for the strangles bacteria's DNA using a PCR (Polymerase Chain Reaction) test. If this sampling by endoscopy is undertaken on two or more consecutive occasions with negative results it can be assumed the horse is not a strangles carrier.

THE TREATMENT OF STRANGLES

To minimize the spread of strangles, horses showing signs of the disease should be separated from other horses.

The treatment of individuals then depends on the stage of the disease.

- If the temperatures of horses in an outbreak are taken twice daily, new cases can be isolated before they become infectious and transmit the disease to others. Shedding of the bacteria does not usually begin for a day or two after the onset of the fever.
- Horses showing fever, depression and an early serous nasal discharge should be treated with appropriate antibiotics, which may arrest the development of more serious clinical signs. There is however, a risk of relapse once treatment stops, particularly if the horse remains exposed to infected animals so isolation and other hygiene procedures are essential.
- Where the disease is more advanced and there is a purulent nasal discharge with enlargement or even rupture of the lymph nodes, localized and possibly surgical treatment may be required. This will involve hot fomentation (poulticing) and possibly lancing of swollen nodes. Care must be taken to ensure that abscesses are ripe for lancing and must be opened at the most dependent (lowest) site to ensure good drainage. The continued use of antibiotics on these cases should be decided by expert veterinary

opinion as antibiotic usage may delay abscess maturation. On the other hand some horses may require antibiotic treatment because of complications. Occasional animals with serious respiratory problems may even need a tracheotomy operation to allow them to breath adequately.

- In-contact horses not showing signs should have twice daily temperature checks and the lymph nodes around the jaw should be palpated. Antimicrobial treatment of these horses may also be considered to prevent seeding of the pharyngeal lymph nodes with bacteria. An alternative procedure is to monitor temperatures and administer antibiotics within 24 hours of a temperature spike. This will usually prevent further infection. The disadvantage of both these approaches is that the horse may not develop any immunity and remains susceptible to strangles.
- Horses with complications mentioned previously will need special treatment which will require veterinary advice.
- A percentage of horses recovering from infection can be expected to become chronic carriers and may intermittently shed the organism for up to several years. These animals can be detected by taking samples for bacterial culture or PCR testing from the guttural pouches. Animals that do have the strangles bacteria in their guttural pouches can be successfully treated though treatment may involve repeated infusions into the guttural pouches for months. It now appears that identification and treatment of chronic carriers may be the critical step in actually eliminating the strangles organism from a property after an outbreak.

As well as the above procedures, prevention of transmission by handlers is very important. Ideally different people should work with the infected horses from those handling non-infected animals. Clothes, shoes, hands, feeding equipment and general tack may all be potential sources of infection and separate gear should be used for each group.

Infected horses should be rested for at least a month after all clinical signs have resolved. Stables of infected horses should be cleaned of bedding and the stalls disinfected. Tack, grooming gear and feed and watering utensils should also be disinfected with povidone iodine or phenolic-based products. These two chemicals are highly effective in destroying the strangles bacteria and are emphatically recommended as disinfectants against this disease. Stables and paddocks should be left empty for four weeks and water troughs drained and cleaned. It is not possible to be completely sure that all infected sources are cleared but by following these procedures the risk of reinfection should be markedly reduced.

Vaccination of unaffected horses is recommended. In-contact horses can be vaccinated if they do not develop clinical signs over a two-week period. Strangles vaccine must not be given to sick horses or those likely to be incubating the disease as this may precipitate a reaction leading to the development of *purpura haemorrhagica*. Clinically affected cases should be vaccinated 3-6 months after all clinical signs have resolved.

THE PREVENTION OF STRANGLES AND ITS CONTROL

The prevention of strangles involves careful animal management, good records, strict hygiene and an efficient vaccination programme.

All new horses entering a property should be kept separate (quarantined) from other animals for at least two weeks. Keep an accurate record of all arrivals at and departures from the property.

Different classes of horses should be kept separate, eg breeding stock should be managed separately from show or racing stock. Over-crowding should be avoided.

Vaccination against strangles is recommended wherever numbers of horses come into contact with others, such as in studs, training stables and during travel. Vaccination may not prevent disease in all cases but it will reduce its severity. Vaccines are available and have been shown to be effective provided horses are vaccinated well before exposure to infection. The vaccines are for veterinary use only.

There are currently two types of strangles vaccine available in New Zealand.

One vaccine, Equivac™, is an inactivated bacterin (Dead vaccine) and it is required to be injected intra muscularly initially three times at two weekly intervals followed by an annual booster dose. There is also Equivac™ 2 in 1 (combined tetanus and strangles vaccine in one injection) which has the same vaccination program.

The other, Pinnacle™ I.N., is a live attenuated vaccine and it is administered as an intra nasal spray two times at 2-3 weeks interval followed by an annual booster.

More frequent booster dosage (six monthly) may be desirable for both vaccines when there is a high risk of infection. Both vaccines are safe for use in pregnant mares which should be given a booster dose four weeks before foaling to ensure maximum protection of the new born foal via her colostrum. Subsequently, foals should enter a vaccination programme at about three months of age.

Vaccination is an important preventative strategy that can reduce risk of the disease occurring, and reduce disease severity if it does occur. It is expected that new advances will be made in the area of vaccine development as vaccine companies continue to search for the best way to prevent disease. Horse owners are advised to discuss an appropriate vaccination programme with their veterinarian.

VOLUNTARY CODE FOR STRANGLES

A number of countries have promoted the adoption of voluntary codes as a way to handle disease outbreaks. If you suspect you have a case of strangles we would recommend you take the following steps immediately:

- Isolate the horse and any horses that have had nose-to-nose contact with the suspect horse away from other horses on the property.
- If possible create three groups
  - Infected horses
  - Horses that have had close contact with the infected horses
  - Clean horses
- Call your veterinary surgeon to make a diagnosis. This will generally require sampling and the submission of the samples for laboratory testing.
- Discuss with your veterinary surgeon isolation and handling procedures, and implement these as quickly as possible. Immediate introduction of strict hygiene between the groups will reduce the risk of spread and the time taken to control the outbreak.
- Separate the groups by ideally 25 metres.
- As few people as possible should handle affected horses with application of strict hygiene standards.
- If possible separate staff for the separate groups.

- Attend unaffected horses first if separate people are not available.
- Protective clothing, ideally disposable, should be available.
- Ensure separate water troughs, grooming, cleaning and feeding equipment.
- Careful disposal of bedding, uneaten food and water.
- Do not allow any horses onto or off the property at this time.
- Discourage visitors to the property and confine pets such as cats and dogs.
- Contact the owners of the affected horses and owners of other horses on the property.
- Notify any neighbouring properties with horses that you have a suspected case of strangles and recommend that they check their horses.
- No previously infected horse should leave the property until it has had negative culture results to 3 consecutive nasopharyngeal swabs over a 2 week period or an endoscopically guided gutteral pouch lavage.

THE IMPLICATION OF STRANGLES TO THE INTERNATIONAL MOVEMENT OF HORSES

Strangles may spread very rapidly in a susceptible population of horses, with serious consequences. Thus it is a serious threat to horses in transport, both domestically and internationally as the dusty hot conditions in trucks and aircraft can assist the spread of the disease if there is an infected horse in the shipment. In such cases the rate of infection is high and the stress of travel exacerbates an already critical situation. Added to this, the need for special emergency treatment and isolation of infected horses on arrival at their destination, particularly if overseas, is an unwelcome and frankly embarrassing situation.

To reduce the likelihood of these problems occurring, declarations from the owners and their veterinarians that strangles has not being diagnosed on their premises of origin within a defined period before embarkation must be accurate and honest. It is critical that, in answering the questions relating to the health status that the entire property, including run-off and temporary off-property holdings are considered. Only the highest ethical conduct is acceptable in certification of freedom from disease. Careless certification, not only reflects on the professionalism of the owner and their advisors but the industry as well, and the exporting country whose reputation can be damaged.

In addition whenever new horses are introduced to a property or a horse returns from an event where it has contacted other horses, you should be aware of the risk of inadvertent introduction of disease. Be vigilant and if you are concerned call your veterinarian.

COMMONLY ASKED QUESTIONS ON STRANGLES

1. What is the cause of strangles?

Strangles is a bacterial infection that affects the respiratory tract of horses. The infection can spread to other areas of the horse resulting in complications. This disease is very contagious, especially in young horses.

2. How can my horse get strangles?

The bacteria is spread by direct contact with infected horses or from horse handlers, buckets, feed, water troughs and tack that has been contaminated with nasal discharges from infected horses. Some horses become carriers of the infection and intermittently shed the bacteria.

3. My horse has a cold - could this be strangles?

The first signs of a horse with strangles is often an increased temperature (39.5-41°C), followed by a discharge from the nose that is clear but quickly becomes thick and yellow. The horse becomes depressed and does not eat. In some strangles cases, horses develop swellings in the throat and lower jaw region. Therefore horses with a cold could be infected with the strangles bacteria.

Does my horse with nasal discharge have strangles?

4. **My horse has swollen glands around the throat and is having trouble breathing, could this be strangles and what should I do?**

   Swollen glands around the throat region could be caused by viral or other bacterial infections besides strangles. Foreign bodies such as grass seeds may result in swellings in this area. A horse that is having trouble breathing should be kept very quiet, with minimal stress and isolated from other horses. The horse should not be given any food or water until the vet assesses the case. Seek veterinary advice as soon as possible.

5. **Can my horse become infected with strangles a second time?**

   Yes, 25 percent of infected horses do not develop good immunity and can become reinfected within 6 to 12 months. The other 75 percent do develop strong immunity, however this is not life-long.

6. **Can I vaccinate against this disease?**

   Yes, two types of vaccines are available to control strangles. They are injectable vaccines called Equivac™ S and Equivac™ 2 in 1 (combined tetanus and strangles vaccine in one injection) or an intranasal vaccine called Pinnacle™ I.N. These vaccines are used as part of a control program. Other management practices need to be carried out to minimize the risk of strangles in any horse group.

7. Will the vaccines stop my horse from getting strangles?

No respiratory vaccine offers complete protection from disease. They do reduce the severity and incidence of the disease. The spread of the disease is also reduced in vaccinated horses.

8. What is the strangles vaccination program?

The Equivac™ S or 2 in 1 program requires three initial doses given a minimum of two weeks apart, followed by a yearly booster dose. The vaccine is administered into the muscle of the neck region. Pinnacle™ I.N vaccine requires two initial doses administered intranasally 2-3 weeks apart, followed by an annual booster. Foals should commence the program after 3-months-of-age. In high infection-risk groups, booster doses may be given every six months. Mares should be given a booster dose one month before foaling. It is best to vaccinate horses well in advance of any riding events and to rest the horse on the day of vaccination.

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SUPPORT
The New Zealand Equine Research Foundation

The New Zealand Equine Research Foundation is a charitable trust created to foster education and research in the NZ Horse Industry. It is working hard to increase the opportunities in the industry for bright, young New Zealanders and to provide a healthy and secure future for the industry and our horses.

To expand our activities we need the support of others. There are many ways you can help:

- Cash contributions
- Financially supporting research into specific horse problems
- Establishing or assisting with new scholarships
- Financially assisting us to bring overseas experts to New Zealand
- Financially assisting the purchase of new technologies
- Financially assisting with educational seminars on specific topics
- Making bequests, legacies, gifts of securities, real estate or life insurances

Those interested in assisting us should contact:

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Support the
NZ Equine Research Foundation
and help provide a better tomorrow
for our horses

www.nzerf.co.nz