

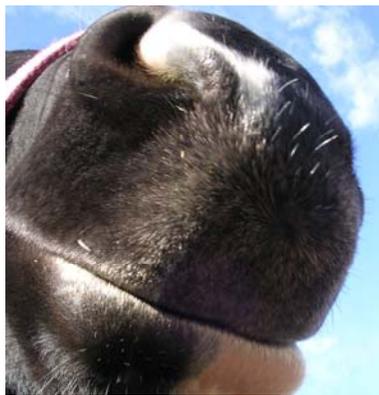
What Is Strangles?

- Strangles is an infection caused by the bacterium *Streptococcus equi* subspecies *equi*, which is usually just called **Streptococcus equi** or *S. equi*.
- Strangles was one of the first diseases ever described in horses. It has been recognized for hundreds of years.
- The infection is a **highly contagious**. The disease may occur in single horses, or it may cause large outbreaks.
- The disease is called “strangles” because in very severe cases, the extreme swelling of **abscessed lymph nodes** (glands) **in the head and neck** can actually cause the horse to suffocate.
- Not all horses that are exposed to *S. equi* get sick. After exposure, some horses may get sick, some may carry around the *S. equi* for a short period of time (**transient carriers**) or a long period of time (**persistent carriers**) while without getting sick, and some may not get infected at all.



How Common Is Strangles?

- *Streptococcus equi* is **endemic** in the horse population, which means it is always circulating within and between various groups of horses.
- A small percentage of horses carry *S. equi* in their **nose, throat** or **guttural pouches** at any given time. These carriers may be animals that were exposed to strangles but did not develop disease, or animals that were sick and got better, but have not yet completely gotten rid of the bacteria.
 - Many horses shed *S. equi* for a few weeks after they recover from an episode of strangles.
 - Approximately **10% of horses with strangles become long-term carriers**. These horses typically have *S. equi* in their **guttural pouches**, where it is more difficult to detect and to get rid of. These horses can be a source of infection for other horses for a long time.
 - Strangles can be **difficult to control** because ***S. equi* can be carried by apparently healthy horses**.
- Strangles is uncommon in very young foals. It is most common in horses 1-5 years of age.



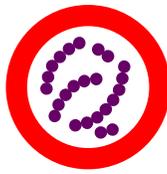
How Do Horses Get Strangles?

- To get strangles, a horse needs to be **exposed to *S. equi***. This can happen if the horse has **direct contact** with an infected/carrier horse, or if it has **indirect contact** with an **infected/carrier horse**. *Indirect contact occurs when horses touch a common surface, object or person, but not each other.* For example, touching tack, grooming equipment, water buckets, feed tubs, or even the hands and clothing of a person that has been touched by an infected/carrier horse constitutes indirect contact.
- *Streptococcus equi* enters the horse's body through the **nose or mouth**. Within a few hours, the bacteria can move to the **throat** and infects cells in the horse's tonsils. The infection then spreads to the **submandibular lymph nodes** (glands), which are in the bottom part of the head, between the jaws. It can also spread from there to **other lymph nodes**.

What Kind Of Disease Does Strangles Cause?

- Strangles may be a **very mild** infection in some horses, but it can also be **very severe**, even fatal, in others.
- The first sign of strangles is **fever**, which usually develops 3-14 days after exposure to *S. equi*.
- Affected horses may be quieter than normal and have a decreased appetite.
- **Nasal discharge** is very common, and is usually found coming from both nostrils.
- Next the **submandibular lymph nodes** (in the bottom part of the head between the jaws) become swollen, and eventually become abscessed. The lymph nodes become **hot and painful** to the touch, and they may even **rupture** and drain pus. **The pus is extremely infectious** to other horses because it is packed with *S. equi*.
- The **retropharyngeal lymph nodes** (behind the jaws) may also become enlarged.
- Infection can also spread to one or both of the **guttural pouches**. Sometimes this happens when a retropharyngeal lymph nodes ruptures into a guttural pouch.





Bastard Strangles

In a small percentage of horses, **other lymph nodes throughout the body** may also become infected. This is a very serious condition called bastard strangles. It can be very difficult to determine if lymph nodes in areas like the chest and abdomen are affected. It is also **very difficult to treat** the infection if these lymph nodes become abscessed, and other serious complications can occur. It has frequently been stated that early antibiotic use during a strangles infection may make horses more likely to develop bastard strangles, but this has not been proven. There is no known way to decrease the risk of a horse developing bastard strangles.



Purpura Hemorrhagica

In some horses, *S. equi* can cause an **excessive response of the immune system**, which leads to a condition called purpura hemorrhagica. This is another uncommon but well-recognized complication of strangles. Horses with this condition may develop severe swelling of the limbs, fever, depression and skin lesions. Purpura hemorrhagica **may develop weeks after** a horse has had, and recovered from, strangles, and it **can be fatal**.

How is Strangles Diagnosed?

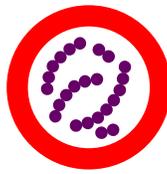
- **Culture** of *S. equi* from draining pus or samples collected from lymph nodes by your veterinarian is the most common and easiest way to diagnose strangles in a horse.
 - Culture of **throat swabs, throat washes** or **guttural pouch washes** can be used to detect carrier animals. Throat washes are better for detecting carriers than swabs.
- **Polymerase chain reaction (PCR)** is a DNA-based type of test that can be used to detect *S. equi* DNA in samples, and it can usually produce results faster than culture methods. However, PCR cannot distinguish between live and dead *S. equi*, so it is **best to confirm PCR results with culture**. False negative results can also occur with PCR sometimes if there are very high numbers of *S. equi* or substances in the sample that interfere with the molecular reactions needed to run the test.
- **An antibody (blood) test for *S. equi*** is also available, but its usefulness is limited. Detection of antibodies against *S. equi* does not necessarily mean that a horse currently has strangles or is shedding *S. equi*, because the antibodies could be from a previous infection. If a horse's antibody level increases sufficiently over a two-week period, this can be used to diagnose strangles, but **culture is a faster and more definitive**.
 - Antibody testing may be more useful for diagnosing **bastard strangles**, for detecting horses with very high antibody levels that might be predisposed to **purpura hemorrhagica**, and for determining if it might be **unsafe to vaccinate** a horse because of an already very high antibody level.



How is Strangles Treated?

- Treatment depends on where an individual horse develops abscesses, and how sick the animal is.
- In **classical strangles** cases, where the main problem is abscessed submandibular lymph nodes, **getting the abscesses to drain is the key**.
 - As the abscesses mature, at one point they will usually **burst on their own**. Sometimes this process can be sped up by applying hot packs to the area.
 - The abscesses can also be **lanced** (surgically opened) by your veterinarian, but it is very important that the abscesses are sufficiently mature before this is done.
 - Draining abscess should be **cleaned** out once a day with a 3-5% povidone iodine solution until the drainage stops.
 - **Remember that any pus or discharge from a draining lymph node is extremely infectious.** Ensure that any contamination is contained, especially when lancing or flushing an abscess.
 - **Antibiotics are rarely needed in these cases.** Once the abscesses are drained horses generally recover well on their own.
- If the retropharyngeal lymph nodes are abscessed, they may need to be drained as well. This is more difficult to do compared to draining submandibular lymph nodes because of their location.
- Treating a horse with antibiotics without draining any obvious abscesses is usually not effective, because **it is very difficult for the antibiotics to penetrate the abscesses** themselves. Drugs might slow the progression of the disease, but their use is unlikely to result in a cure.
 - Antibiotics, along with other treatments, may be indicated in horses that are very sick (e.g. high fever, very depressed, not eating or drinking), or when the retropharyngeal lymph nodes are so large that they might interfere with breathing.





- In **severe strangles** cases, when enlarged lymph nodes may start to obstruct the horse's airway, a **tracheostomy** might be required. This procedure involves inserting a tube into the trachea (windpipe) in the upper part of the horse's neck through a surgical incision. This allows the horse to **breathe through the tube**, bypassing the obstructed part of the airway at the level of the throat. The tracheostomy is only temporary, but it can keep the horse alive while the enlarged lymph nodes are treated.
- If there is **persistent infection of the guttural pouches**, your veterinarian may need to flush the guttural pouches, possibly with antibiotics. This is often done using an endoscope.
- **Deep abscesses** (e.g. in the chest or abdomen, as occur with bastard strangles) are very difficult to treat, even with long-term antibiotics.

What Should I Do With My Horse If It Has Strangles?

- **Immediate isolation of affected horses is critical** to prevent infection of other horses.
- **Prevent** all **direct** and as much **indirect contact** as possible between the infected horse and other horses.
- Ideally, horses with strangles should be kept in a **separate barn**. If this is not possible, they should be kept in a stall as far away from other horses as possible, and in a low-traffic area.
 - The isolation stall should be clearly marked (e.g. with a sign) so that everyone knows that the horse in it needs to stay isolated.
- No one should have contact with the infected horse unless it is absolutely necessary. Preferably the person who handles the strangles horse should not handle any other horses, otherwise the strangles horse should always be looked after last, after any and all other horses have been cared for.



- Anyone handling the infected horse or entering its stall should wear some type of **protective outerwear** (e.g. coveralls, long lab coat) that is only used around that horse. They should also wear **designated overboots or footwear** that is always left immediately at the entrance to the horse's stall. **Gloves** should always be worn when handling the horse or anything in its stall. **Hands must be washed** after removing gloves, and after any type of direct or indirect contact with the horse or the stall environment.



- Designated feed bins, water buckets, hay nets and other items should be assigned to use only with the infected horse. These items should be thoroughly cleaned and disinfected before being used again elsewhere, or should be discarded after the affected horse recovers.

Should I Vaccinate My Horse Against Strangles?

There are several factors to consider when deciding whether or not to vaccinate your horse for strangles. The **risk of exposure to *S. equi* is highly variable** between farms, and even between horses on the same farm. Vaccination should be considered for animals that have **contact with many different horses**, especially those that travel to shows or events where they may encounter horses carrying *S. equi*. **Talk to your veterinarian** about designing an appropriate vaccination program that is tailored to your horse's needs.

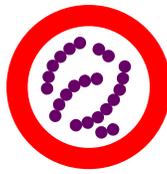


What Kinds Of Strangles Vaccines Are Available?

There are two types of strangles vaccine currently available in North America:

- **Extract vaccines:** These vaccines are made from parts of dead *S. equi* bacteria, and must be given by **intramuscular** injection (within a muscle).
 - Initially two to three doses are given at two-week intervals, and then a booster is given annually.
 - Pregnant mares should receive their booster approximately one month before foaling.
 - It takes 7-10 days for a good antibody response to develop after vaccination.
 - It is not uncommon for vaccination with these products to cause mild adverse reactions, particularly muscle soreness.
- **Modified live vaccine:** This vaccine is a live form of *S. equi* that has been altered to make it less able to grow in the horse and cause disease. It is administered by squirting it up the nose of the horse (**intranasally**). The advantage to this type of vaccine is that it **acts more like natural *S. equi***, so the horse should develop a similar immune response.
 - Initially two doses are given at a 2-3 week interval, then a booster is given annually.
 - **The modified live vaccine MUST NOT be injected intramuscularly.**





- The modified live vaccine contains live bacteria which can form an abscess. There have also been many instances where abscesses have formed after administration of other vaccines because bacteria from the strangles vaccine contaminated the hair of the neck and were carried into muscle by the vaccine injection. For this reason, **any other vaccines** should either **not be given at the same time** as intranasal *S. equi* vaccine, **or they should all be given before** intranasal vaccine is given to any animal in the group.
- Sometimes, **mild signs of infection** are noted after intranasal vaccination, including fever and enlarged lymph nodes. This is simply a **response to the vaccine strain** of the bacterium and should resolve without treatment.

Are There Horses That Should NOT Be Vaccinated For Strangles?

There is always some risk of adverse reactions to any vaccine. Although still uncommon, the **risk of a serious reaction appears to be higher** with strangles vaccines in horses that **already have a high level of natural antibodies** to *S. equi*. This may include horses that have previously had strangles and horses that have recently been exposed to strangles. Some of these horses may develop **purpura hemorrhagica** in reaction to the vaccine.

- **Horses should not be vaccinated during a strangles outbreak** unless it is certain that the animals in question have not already been exposed to *S. equi*.
- **Horses that have previously had strangles** may still have a high antibody level. It is best to **measure the blood antibody level** of these horses before vaccinating them. If the level is already high, then vaccination should not be performed (and is likely unnecessary anyway).



What Should I Do If My Horse Is Exposed To *S. equi*?

- **Monitor your horse closely for a fever**, as this is the first sign of infection in horses. Horses are typically not infectious to other animals until 1-2 days after the onset of fever. If a fever is detected, your horse should be isolated immediately. This will decrease the risk that your horse will infect others.
- If **antibiotics** are given when fever first develops, before the lymph nodes become enlarged, it is possible to eliminate *S. equi* before it reaches the lymph nodes and thereby stop strangles from developing. **However**, horses that are treated in this manner do not develop an immune response to the bacteria, so they **remain very susceptible** to infection as soon as the antibiotics are stopped.
 - Early antibiotic treatment should only be considered if strict infection control measures are in place, or when there is no risk of further exposure. **Outbreaks can be prolonged by repeatedly treating horses with antibiotics**, because early infection is eliminated, but horses don't develop any significant immunity and keep getting infected because *S. equi* transmission on the farm is not properly controlled.
 - Antibiotic treatment for strangles is only useful under very specific circumstances. **Antibiotics should only be used to treat your horse if they are expressly recommended by your veterinarian.**

Does *Streptococcus equi* Survive In The Environment?

- The environment can be contaminated with *S. equi* from pus or nasal secretions of infected or carrier horses.
- ***Streptococcus equi* can survive for a short period of time in the environment**, outside the horse.
 - Studies have reported long term (up to 63 days) survival of *S. equi* in laboratories, but this is not necessarily applicable to a farm situation where bacteria may be exposed to sunlight, temperature and humidity changes, and other environmental bacteria.
 - A study of *S. equi* survival on wood rails, feed bins and water buckets reported that ***S. equi* typically only survives for a day or two in a "natural" environment**. This study was performed outdoors during the summer, in an area with daily exposure to sunlight. It is possible that the bacterium could survive longer indoors, in shady area or at different temperatures. However, survival of *S. equi* in the barn environment, even under these different conditions, is probably still fairly short.
- The optimal amount of time for which to **quarantine *S. equi* contaminated areas** such paddocks, pastures and stalls is unknown. **One to two weeks** is likely adequate, especially if proper cleaning and disinfection of high risk or highly contaminated surfaces is performed.



Can A Horse Get Strangles More Than Once?

- **Yes**, but this is uncommon. About 75% of horses that get strangles will also develop a very strong immune response against *S. equi*, making them **immune to reinfection for a long time**, if not for the rest of their lives.