

Spring Shots in the Dark?

As the snow begins to subside and the crocuses begin to rise from the earth, a knot is forming in your stomach. It's almost that time. Spring vaccines. A sea of acronyms swirl around your mind like the robins returning from their equatorial holiday. WNV, EHV, PHF, EVA, EEE, WEE, VEE. It is enough to make a VIP at MIT go ZZZ. Deciding which vaccines your horse needs, or doesn't need, this Spring can be a daunting task. The following is a brief explanation of vaccines available and rationale for use.

The American Association of Equine Practitioners divides Equine vaccines into two categories: Core and Risk Based. The AVMA defines core vaccinations as those "that protect from diseases that are endemic to a region, those with potential public health significance, required by law, virulent/highly infectious, and/or those posing a risk of severe disease. Core vaccines have clearly demonstrated efficacy and safety, and thus exhibit a high enough level of patient benefit and low enough level of risk to justify their use in the majority of patients." Core vaccines include: Tetanus, Western Equine Encephalitis(WEE), Eastern Equine Encephalitis(EEE), West Nile(WN), and Rabies. The WEE vaccine has been shown to be efficacious against the less common Venezuelan Equine Encephalitis(VEE).

While establishing a list of Core Vaccines is certainly helpful, a review of the diseases they protect against is appropriate. Tetanus is caused by the bacterium *Clostridium tetani*. The hardy *Clostridium tetani* is present in the intestinal tract of horses, and other animals, and may survive in soil for months even in cold weather. Transmission of tetanus requires exposure of the bacterium to a puncture or open wound. Affected animals exhibit a spastic paralysis that often progresses to death.

The Eastern, Western and Venezuelan Encephalidities are cause by a blood borne virus. The virus is spread by bloodsucking insects such as mosquitoes. Transmission generally occurs when blood from natural vectors such as wild rodents and birds, is exchanged with horses and humans. Horse to human or human to horse transmission is rare. While WEE has a mortality rate of approximately 50%, EEE may be fatal in more than 90% of affected horses. EEE("TripleE") is not uncommon in the eastern US, and although WEE is rare, variants have caused clinical disease on the East coast.

West Nile Virus is another encephalitis virus transmitted by blood sucking insects. Although there has been a marked decline in clinical cases, likely due to strict vaccination and natural immunity, WNV still accounts for the majority of equine and human encephalitis cases. Unlike EEE, WNV is only fatal in approximately 1/3 of affected equines. Although horses that recover may continue to show neurologic signs for up to 6 months post-infection.

The last of the core vaccines is Rabies. Although Rabies is a rare cause of neurologic signs in horses, it is always fatal. Transmission occurs through a bite wound from an affected animal. In contrast to the previously discussed viruses, the Rabies virus is not spread through the blood. Once saliva containing the virus punctures the skin the virus spreads via nerves from the site of the bite, to the spinal cord and brain. The conventional image of a rabid animal is the aggressive or "furious" form. However, horses and other herbivores tend to exhibit the "dumb" form, where they are simply dull or comatose. Therefore Rabies should be suspected in any atypical neurologic presentation.

Now it's decision time. The following vaccines should be administered based on what you and your veterinarian feel is your horse's level of risk. The AAEP's category of "Risk-Based" vaccines includes Anthrax, Botulism, Equine Herpes Virus(EHV/Rhinopneumonitis), Potomac Horse Fever(PHF), Lyme, and Strangles.

Anthrax, caused by the bacterium *Bacillus anthracis*, is a rapidly fatal disease spread by inhalation, ingestion, or contamination of wounds. While even the name alone strikes fear in the hearts of many, Anthrax is extremely rare and is only endemic in the south western US. Vaccination of horses against Anthrax is done using a modified live preparation, and is therefore only recommended in endemic areas, and never for pregnant mares.

While both Tetanus and Botulism are caused by bacteria, the symptoms that occur are completely opposite. While Tetanus causes a spastic, or stiff paralysis, Botulism infection results in a flaccid, or weak paralysis. There are four main variants of Botulism. Similar to tetanus, "wound botulism" occurs when the *Clostridium botulinum* spores come in contact with an open wound. A second form affects horses via ingestion of feed. Horses may become affected from eating pre-formed Botulism toxin in spoiled hay. Lastly, the form of Botulism that has received the most attention is the cause of Shaker Foal Syndrome. This occurs when spores are ingested and begin to produce the B toxin within the foal's intestinal tract. While there are 8 different Botulism toxins, Type B & C are responsible for most clinical cases. The only Botulism vaccine proven to be efficacious is against the B toxin, and is therefore primarily for use in foals.

The Equine Herpes Viruses(EHV) warrant a paper by themselves. However, for space sake this article will only discuss ENV-1 and EHV-4. EHV-1 and EHV-4 are like the Donny and Marie of the Herpes family. There are other siblings but few people care who they are or what they do. EHV-2 is similar to the human "Epstein-Barr." It causes vague clinical signs, and many horses have natural exposure immunity. However, exposure to EHV-2 may exacerbate EHV-1 and EHV-4 symptoms. EHV-3 causes coital exanthema, or pox blisters on the genitalia. EHV-3 is only spread by direct contact during an active infection, and there is no available vaccine. EHV-5 is very similar to EHV-2 although it is more common in young horses and only occasionally associated with respiratory signs.

EHV-1 and EHV-4 or Rhinopneumonitis are commonly vaccinated against. Both can cause fever, abortion and respiratory disease. However, EHV-1 may also cause sporadic neurologic signs. Vaccination is recommended to prevent abortion in pregnant mares and for horses in stressful situations, such as show horses or young horses coming into a new farm. There are two types of vaccine available: killed and modified live. The modified live vaccine has been shown to have superior clinical efficacy when compared to the killed vaccine. While the modified live form can not be recommended for use in the pregnant mare, due to the inherent risk of vaccine induced abortion, it is frequently administered and thought by many to be worth the risk for the superior protection. Frequent vaccination may dampen clinical signs during an acute infection.

The Equine Influenza A Type 2 is virtually endemic as a cause of respiratory disease in US horses. The vaccine is recommended for show horses. The vaccine is only efficacious if administered every 6 months. The modified live intranasal is more efficacious, and has a longer duration of action than the killed, but is not recommended

for pregnant mares. A new canary pox vector vaccine has good efficacy and may be used in young foals and in pregnant mares.

Potomac Horse Fever is caused by the blood parasite *Neorickettsia risticii*. Conventionally thought of as a disease along the Potomac River, PHF has become virtually endemic within the Hudson Valley Region as well. The only available vaccine is a killed form which has been shown to have poor clinical efficacy. Therefore the killed vaccine is only recommended for mares beyond 7 months of gestation, which are at high risk. High risk includes horses in a geographic area that has had reported PHF cases in recent years.

Lyme disease is caused by the bacteria *Borrelia burgdorferi*. In recent years, to vaccinate against Lyme Disease or not, has indeed been *the* question. Clearly Lyme disease isn't just for Connecticut horses anymore. Currently, there is no approved Lyme vaccine for horses. A new study out of Cornell's College of Veterinary Medicine suggests that an efficacious recombinant equine Lyme Vaccine is on the horizon. Horses vaccinated against Lyme disease will always be positive on the Snap Test. Therefore to determine if a vaccinated horse's clinical signs are truly from Lyme, blood must be submitted for a Western Blot analysis.

Lastly, but certainly not least, is the other headline grabber: Strangles. *Streptococcus equi* subspecies *equi* is the bacterium responsible for the highly contagious disease, Strangles. Strangles is typically transmitted via direct contact with an affected individual or a sub-clinical animal shedding the organism. Strangles derives its name from the typical clinical signs which includes a marked enlargement, with abscessation, of the retropharyngeal and submandibular (near the throat) lymph nodes. Enlargement of these lymph nodes may actually lead to difficulty swallowing and breathing, hence "strangles."

As with many other vaccines there are two forms of the strangles vaccine: Killed and Modified Live. The killed vaccine is administered intra-muscularly and has been associated with more vaccine site reactions than is typical of other vaccines. The modified-live, an intra-nasal vaccine, has been shown to be more efficacious than the killed product. However, the intranasal vaccine should always be administered after all other injectable vaccines, as it may lead to injection site abscessation if contamination occurs. Generally horses are only at high risk if they travel for shows, or are at a barn that frequently brings in animals of unknown vaccination history. Vaccination may also be contraindicated in the face of an acute outbreak.

Your horse's vaccinations should be a combination of the core recommendations as well as you and your veterinarian's assessment of risk factors for your horse. Please refer to the AAEP Vaccination guidelines(http://www.aaep.org/vaccination_guidelines.htm) for more complicated vaccine scheduling such as with pregnant mares and foals. This year, don't let your vaccination decisions be just a shot in the dark.

If you have any further questions or concerns regarding vaccinations, we recommend you consult with your veterinarian, and, as always, feel free to contact Drs. Kristen Pastir or Jacqueline Bartol at New England Equine Medical & Surgical Center.