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Merck Animal Health Equine Respiratory Update

In Collaboration with the University of California, Davis School of Veterinary Medicine

A Case Study (or two) on Strangles

Two practitioners share their approach to managing an S. equi *diagnosis*

Streptococcus equi subs. *equi* – better known as strangles – is one of the most challenging upper respiratory diseases of the horse. This stubborn and highly contagious bacterial infection can stick around even after the horse has recovered from clinical signs, making the individual a silent carrier that can infect other horses. This is why a strangles diagnosis comes with a bit more complexity.

We asked two Biosurveillance Program participants, Hollie Stillwell, DVM, and Laszlo Hunyadi, DVM, MS, Dipl. ACVIM (Large Animal), to share their experiences with a strangles diagnosis.

Q: When a horse presents with clinical signs, what expectations do you have at the time of sample collection?

A: **Dr. Stillwell:** Sometimes I have a hunch of what I'm dealing with but have been surprised ultimately. For example, I had an imported horse come through our CEM quarantine that had a low-grade fever and slightly swollen lymph nodes and tested positive for rhinitis B virus on nasal swab, but negative for *S. equi*. Two days later the mare's nodes grew and burst. She cultured *S. equi*. Another horse on the same plane had the same pattern. In the future, I will keep an eye out for that and not rest easy if I get a rhinitis result back on any horse because this was not the only case of co-infection on this import plane.

A: **Dr. Hunyadi:** Personally, I don't employ a wait and see approach. Clinicians may find themselves treating lab results instead of the patient. Clinical signs, history, basic bloodwork and thoracic ultrasound yields a high index of suspicion of bacterial vs. viral diseases. In the case of a suspected strangles infection, endoscopy and guttural pouch examination is always key. I was personally pleased with the quality and consistency of results the Biosurveillance Program yielded along with the consistent turnaround time. It afforded me the ability to plan better rechecks and isolation protocols.

Q: What disease management action steps occur while you wait for results?

A: **Dr. Stillwell:** Strict isolation protocols.

A: **Dr. Hunyadi:** If strangles or a viral insult was suspected, and the client was amenable, horses would be isolated until test results came back. The predictable turnaround (for diagnostic results) made isolation more financially feasible.

Q: The nasal swab result is *S. equi* positive. What action/next steps are prompted by a strangles diagnosis?

A: **Dr. Stillwell:** ACVIM protocols. *(Editor's note: For more information and highpoints on ACVIM protocols, see notes on the next page accompanying this section along with a link to the 2018 ACVIM Consensus Statement on* S. equi.*)*

A: **Dr. Hunyadi:** Isolation, target directed therapy if needed, biosecurity at hospital/clinic and on-farm, recheck examinations.

If strangles lands on your list of differentials, one thing is clear: Isolation is step one to help contain disease spread. Proper and timely diagnosis and treatment is of primary importance for disease management, particularly with regard to persistently infected horses.

The Biosurveillance Program continues to show a high frequency of *S. equi* in non-traveling pleasure horses, underscoring the importance of preventing exposure from horses traveling on and off the farm and proper biosecurity practices. This may be a result of silent shedders in the herd.

While vaccination may be helpful in some instances, no consensus on the effectiveness of vaccination has been reached within the profession. Again, the importance of proper biosecurity to help prevent disease spread cannot be emphasized enough with horse owners.

Highlights from 2018 ACVIM Consensus Statement on S. equi[1]

The Consensus Statement is available (open access) at https://onlinelibrary.wiley.com/doi/full/10.1111/jvim.15043

Aspects of Pathogenesis Important in Control and Prevention

- ***Being proactive may pay off:*** Shedding does not usually begin until a day or two after the onset of fever, making it possible to isolate new cases before infection can be transmitted.
- ***Contagion lingers:*** Nasal shedding continues for 2 to 3 weeks in most animals, and a horse can remain infectious for at least 6 weeks after purulent discharge has dried up.
- ***Watch for silent carriers:*** Intermittent shedding can occur for years in a horse with a persistent guttural pouch infection.

Quarantine and Screening

- ***Isolation key:*** Limiting exposure still remains the best method to prevent *S. equi* infections.
- ***Biosecurity measures are paramount,*** including quarantine and screening of all new arrivals, appropriate disinfection and cleaning of potentially contagious equipment, and education of caretakers on proper hygiene.

Control of Outbreaks

At the beginning of a suspected outbreak:

- ***A detailed history*** should be collected from horse owners, stable managers and caretakers
  - o Travel history, management practices and vaccine history
- ***Implement a logical and practical biosecurity plan*** for the facility impacted. This should be discussed in collaboration with the owner/manager, with key consideration given to:
  - o Identifying and segregating infected horses to prevent further spread of infection
  - o Identifying any subclinical *S. equi* carriers
  - o Compliance with local laws regarding reporting and movement restrictions.

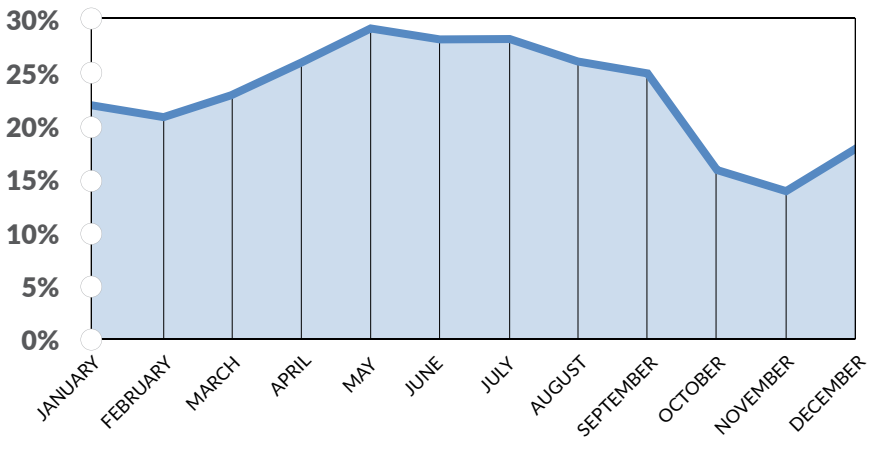
For additional reference and detail, Table 2 within the 2018 ACVIM Consensus Statement summarizes "Aims and associated measures used to aid in control and transmission of *S. equi*."

S. equi is the third most diagnosed pathogen through the Equine Respiratory Biosurveillance Program, accounting for 22% of total positive case samples since 2008.

(Editor's Note: Strangles is a ubiquitous disease and these numbers do not indicate all cases of strangles, particularly since it is not a reportable disease in every state. In addition, ***nasal swabs are not the preferred sampling technique to diagnose the disease. Preferred sampling techniques are guttural pouch lavage, nasal wash or deep nasopharyngeal swab.)***

FIGURE 1: S. equi Seasonal Disease Incidence[2]

(As a percentage of total positive cases)

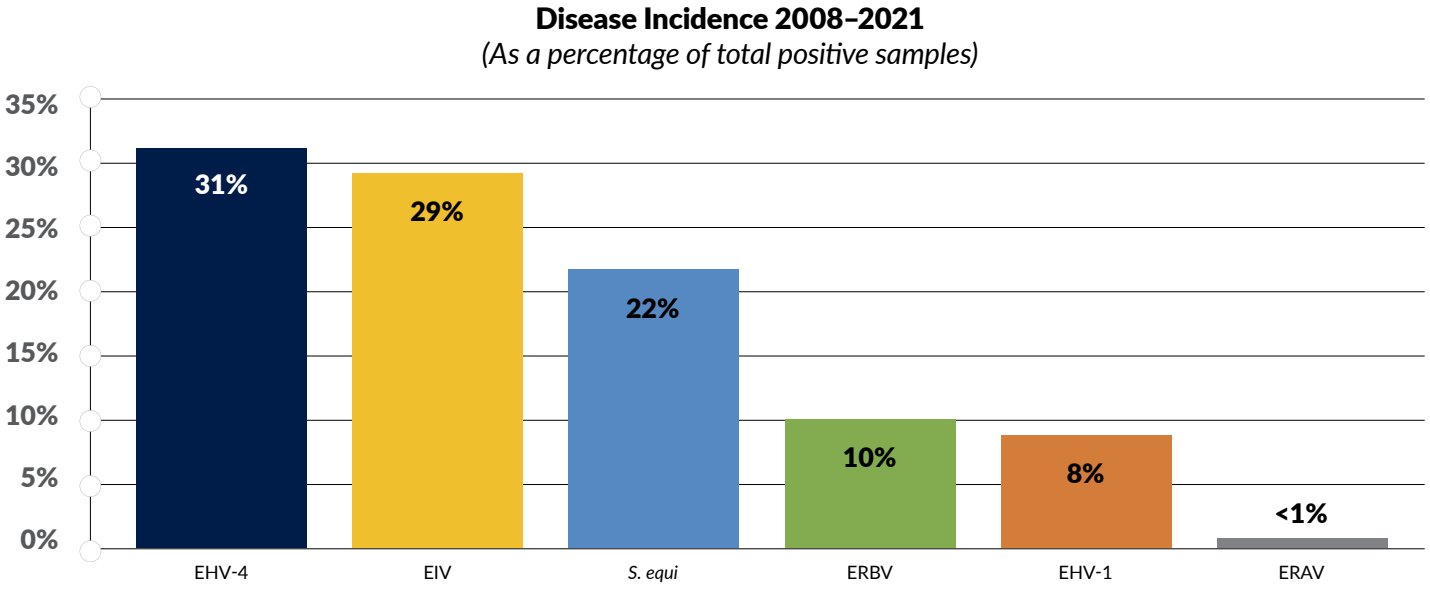


[1] Boyle, A., Timoney, J., Newton, J., Hines, M., Waller, A. and Buchanan, B. (2018), *Streptococcus equi* Infections in Horses: Guidelines for Treatment, Control, and Prevention of Strangles—Revised Consensus Statement. *J Vet Intern Med*, 32: 633-647. https://doi.org/10.1111/jvim.15043

[2] Merck Animal Health and University of California, Davis (Nicola Pusterla). Infectious Upper Respiratory Disease Surveillance Program. Ongoing research 2008–present.

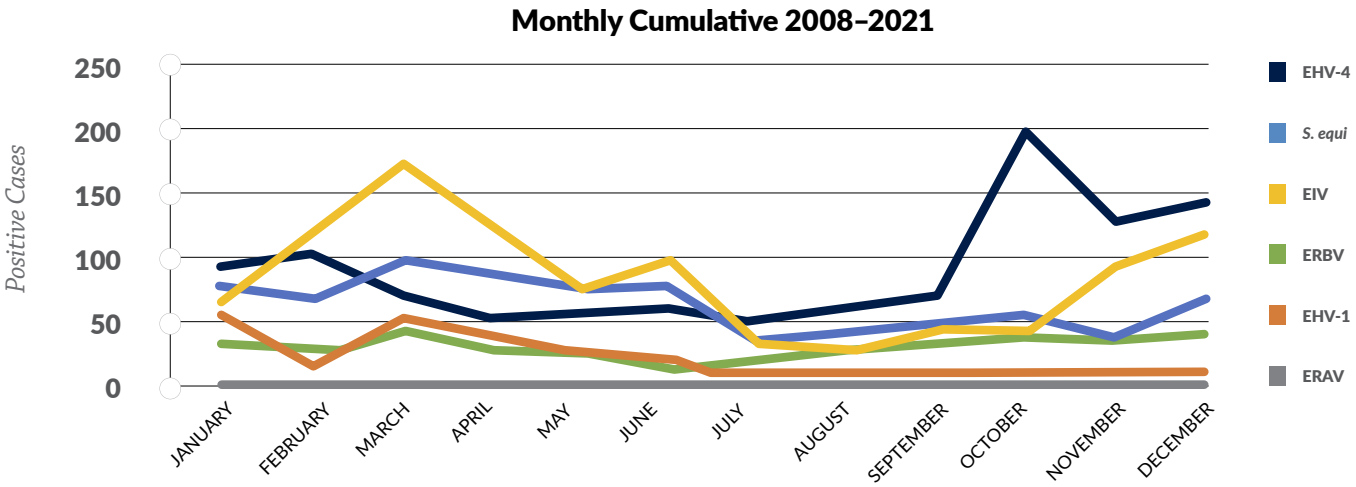
FIGURE 2: Biosurveillance Program Disease Incidence: March 2008-December 2021[2]

More than 10,400 samples have been collected since the Biosurveillance Program began 14 years ago. Of those, 32% have returned positive for one of six pathogens tracked, including equine herpesvirus types 1 and 4 (EHV-1, EHV-4), equine influenza virus (EIV) and *Streptococcus equi*, subspecies *equi*, which have been tracked from the inception of the program, and equine rhinitis A/B viruses (ERAV/ERBV), which were added in 2012.



Through December 2021, EHV-4 was the most diagnosed infectious upper respiratory disease, comprising 31% of all positive samples, followed closely by EIV at 29% and then S. equi at 22%.

FIGURE 3: Seasonal Incidence of Equine Infectious Upper Respiratory Disease[2]

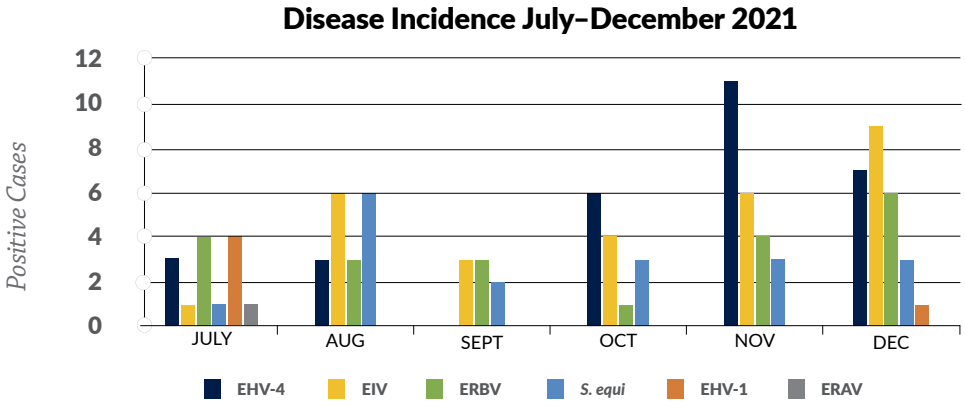


*The monthly cumulative depicts the **seasonal effect of respiratory pathogens** spanning nearly 14 years of surveillance. EHV-4 continues to be more prevalent in the fall months, in contrast to the other respiratory pathogens (especially EIV) that are more prevalent in the winter and spring months.*

[2] Merck Animal Health and University of California, Davis (Nicola Pusterla). Infectious Upper Respiratory Disease Surveillance Program. Ongoing research 2008–present.

FIGURE 4: Six-Month Disease Trends July to December 2021[2]

A total of 333 samples were submitted from July to December 2021. Overall, 31% of total samples submitted tested positive for one of the six primary pathogens (EHV-4, EIV, ERBV, *S. equi*, EHV-1, ERAV).

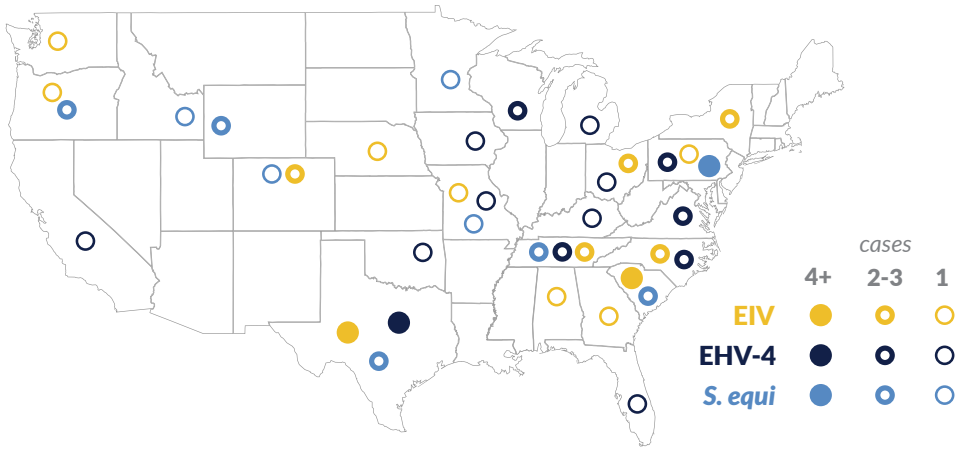


The most recent six months of data (July to December 2021) identifies EHV-4 and EIV as the most prevalent infectious upper respiratory diseases reported.

TABLE 1: Summary of Primary Demographic Parameters for the Three Major Pathogens (July–December 2021)[2]

Demographic Summary	**EHV-4** (30 cases)	**EIV** (29 cases)	***S. equi*** (18 cases)
Median Age	2 years Range: 6 months – 18 years	7 years Range: 8 months – 23 years	4.5 years Range: 5 months – 12 years
Predominant Breed(s)	Quarter Horse	Quarter Horse	Quarter Horse
Travel	**No 43%** Yes 33% Unknown 23%	**Yes 59%** No 27% Unknown 14%	**No 50%** Yes 45% Unknown 5%
Primary Discipline	Show 47% Pleasure 20% Other/Unknown 33%	Pleasure 52% Show 24% Other/Unknown 24%	Pleasure 55% Show 28% Other/Unknown 17%

FIGURE 5: Geographic Representation of the Top Three Pathogens July–December 2021[2]



Map represents states with positive cases of EHV-4, EIV and S. equi *during the reporting period (July-December 2021).*

[2] Merck Animal Health and University of California, Davis (Nicola Pusterla). Infectious Upper Respiratory Disease Surveillance Program. Ongoing research 2008–present.

PRACTICE TIPS

The Ins & Outs of Vaccination Protocols

Welcome to the second installment in our new series on vaccination recommendations. This is designed to help you distill the AAEP vaccination guidelines and help clients understand the importance of immunization while reinforcing your specific vaccination recommendations. After all, client communications are a critical part of what you do every day. You're in the driver's seat when it comes to educating and preparing horse owners for what to expect when it comes to vaccination.

Each series will be presented with client-friendly information and guidance for vaccinating horses of a variety of ages and circumstances.

SERIES 2: Vaccinating the naïve or under-vaccinated horse

It is estimated that about two-thirds of horses are receiving vaccines[3]. Unfortunately, that leaves a third of horses unprotected (or under protected), which is the subject of this issue: Vaccination recommendations for the naïve or under-vaccinated horse.

For this purpose, horses have been divided into three groups (excluding broodmares):

1) **Naïve** – an adult horse (greater than 1 year of age) that has never been vaccinated

2) **Under vaccinated** – an adult horse (greater than 1 year of age) that has not received booster vaccinations at the correct revaccination interval

3) **Infrequently vaccinated** – an adult horse (greater than 1 year of age) that has not received booster vaccinations at the correct interval or has an unknown vaccination history

You're likely encountering at least one of these horses regularly in your practice. Conveying the importance of vaccination and best protocols for each scenario to horse owners can be challenging. The simple message is, when in doubt, repeat a priming series.

For the naïve horse or horse with an unknown vaccination history, the AAEP guidelines is a great reference point.

- Focus on core vaccines and assess risk-based needs
- After the initial vaccine series, annual or semiannual boosters help keep horses protected

Let clients know that if enough time passes between boosters, horses' immune systems may be vulnerable to infection. Repeating a priming series may be recommended to reestablish protective immunity. This is a good opportunity to reinforce that repeating a priming series is more expensive than simply keeping the boosters current.

The under-vaccinated horse may receive an initial vaccine series but miss recommended annual or semiannual boosters. An example may be a 6-month booster for highly contagious respiratory diseases like EHV-1, EHV-4 and EIV.

Save and share the following client guidance for vaccinating adult horses, along with the reference to the American Association of Equine Practitioners (AAEP) vaccination guidelines for adult horses. Clients will benefit from understanding the importance of keeping their horses' vaccinations up to date, and you'll have a great discussion starter for client conversations.

AAEP VACCINATION GUIDELINES

[3] USDA NAHMS 2015 Equine Study. https://www.aphis.usda.gov/animal_health/nahms/equine/downloads/equine15/Equine15_is_Vaccination.pdf (accessed 2May2022)

OWNER TIPS

Vaccinating the Naïve Horse or Horse with Unknown History

Welcoming a new horse to your herd? Or maybe this is your first foray into equine ownership. One of the most important aspects of horse care is prevention of disease. However, it can be confusing to understand which vaccinations are needed, especially if the horse has an unknown or limited vaccination history. Fortunately, your veterinarian has you covered and can help walk you through the process of getting your horse's immune protection in topnotch shape.

For the adult horse who has never been vaccinated, it's important to establish an immune foundation. This happens over a series of vaccinations, generally two or three doses spaced about four weeks apart (depending on the vaccine). Start with the essential (or core) vaccines. These are defined as those that protect against diseases that are endemic to a region, are virulent/highly contagious, pose a risk of severe disease, those having potential public health significance, and/or are required by law. Risk-based vaccines such as equine herpesvirus types 1 and 4 and equine influenza virus may be recommended by your veterinarian as well.

For the horse that hasn't been vaccinated regularly, it's important to get back to a strong baseline.

If enough time passes between boosters, a horse's immune system can return to a nearly unvaccinated state, making them vulnerable to infection.

Repeating a priming series may be recommended by your veterinarian to reestablish protection. It's much easier (and less expensive) to keep up on annual or semiannual boosters than starting over again.

Remember, the best vaccination program is one that is tailored to your horse and considers:

- Region of the country
- Endemic diseases on the farm
- Risk of disease exposure

The American Association of Equine Practitioners (AAEP) vaccination guidelines for adult horses offer a great explanation of vaccination recommendations tailored to the adult horse (over the age of 1), including the horse that has not been vaccinated or has a limited vaccination history. **Please consult with your veterinarian on all vaccination programs.**

Click to download

About the Newsletter

This biannual newsletter provides information generated through and related to the Biosurveillance Program. Merck Animal Health is passionate about this program and is providing this newsletter to customer veterinarians to help them stay up to date on the latest trends and historical information the study has yielded to date. Technical veterinary advice, interpretation and case management support will be provided by Merck Equine Veterinary Professional Services and Nicola Pusterla, DVM, PhD, DACVIM, Department of Medicine and Epidemiology, UC Davis.

If you have questions about the program please call our team at (866) 349-3497, or email us at the addresses listed below. For more information and to access past issues of the newsletter, visit www.Merck-Animal-Health-USA.com.

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Relevant Supporting Research

For more information on the latest respiratory disease published research from Merck Animal Health, click on the links below.

1) "Prevalence Factors Associated with Equine Influenza Virus Infection in Equids with Upper Respiratory Tract Infection from 2008 to 2019."
Vaala W, Barnett DC, James K, Chappell D, Craig B, Gaughan E, Bain F, Barnum SM, Pusterla N. *AAEP Proceedings*. 2019 Vol 65.

2) "Prevalence Factors Associated with EHV-2/5 Among Equines with Signs of Upper Respiratory Infection in the US."
James, K., Vaala, W., Chappell, D., Barnett, D.C., Gaughan, E., Craig, B., Bain, F., Pusteria, N. ACVIM 2017 abstract.

3) "Prevalence factors associated with equine herpesvirus type 1 infection in equids with upper respiratory tract infection and/or acute onset of neurological signs from 2008 to 2014"
Pusterla, N., Mapes, S., Akana, N., Barnett, D.C., Mackenzie, C., Gaughan, E., Craig, B., Chappell, D., Vaala, W. *Vet Rec.* 2015; doi: 10.1136/vr.103424.

4) "Voluntary Surveillance Program for Equine influenza Virus in the United States from 2010 to 2013"
Pusterla, N., Kass, P.H., Mapes, S., Wademan, C., Akana, N., Barnett, D.C., Mackenzie, C., Vaala, W. *J Vet Intern Med* 2015; 29:417-422

5) "Surveillance programme for important equine infectious respiratory pathogens in the USA"
Pusterla, N., Kass, P.H., Mapes, S., Johnson, C., Barnett, D.C., Vaala, W., et. al. *Vet Rec.* 2011 July 2;169(1):12. doi: 0.1136/vr.d2157.

6) "Voluntary surveillance program for important equine infectious respiratory pathogens in the United States"
Pusterla, N., Kass, P.H., Mapes, S., Johnson, C., Barnett, D.C., Vaala, W., Gutierrez, C., et. al. AAEP Proceedings 2010.

About the Biosurveillance Program

Since March of 2008, Merck Animal Health has been conducting an ongoing, voluntary equine biosurveillance program to study the prevalence and epidemiology of relevant viral and bacterial respiratory pathogens. More than 10,430 samples from U.S. equids of all ages, genders and breeds presenting with fever and signs of acute upper respiratory disease and/or acute neurological disease have been collected since the study began. Samples are submitted by participating Merck Animal Health customer clinics and tested via quantitative PCR at the University of California, Davis, School of Veterinary Medicine (UC Davis). **To be eligible for testing, horses must have an unexplained fever (T ≥ 101.5°F) AND one or more of the following signs: Lethargy, nasal discharge, cough, and/or acute onset of neurologic disease.** The results are then returned to the Merck Animal Health customer within 24 hours and provide invaluable diagnostic and treatment information.

Four-Fold Purpose:

1) To provide a valuable diagnostic tool to participating Merck Animal Health customers to assist in obtaining an accurate and timely diagnosis during an acute respiratory disease outbreak so they can provide optimal treatment, quarantine recommendations and vaccination strategies to their clients and patients.

2) To provide the horse industry with a better understanding of the prevalence and epidemiology of these respiratory pathogens.

3) To identify and monitor the current circulating strains of major equine respiratory pathogens.

4) To evaluate the efficacy of current vaccination protocols.

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