

Merck Animal Health Equine Respiratory Update

IN COLLABORATION WITH THE UNIVERSITY OF CALIFORNIA, DAVIS SCHOOL OF VETERINARY MEDICINE

Newly Published Data on Epidemiology of *Streptococcus equi* subsp. *equi*

Number of coinfections peaks researcher's interest

In the last issue (Fall 2022) of this newsletter, a rising trend in *S. equi* cases was reported. That trajectory has continued through the most recent 6-month reporting period (July-December 2022, see Figure 4 and Table 1). In the midst of increasing case numbers, researchers with the Biosurveillance Program published new findings in January 2023, [Voluntary Biosurveillance of *Streptococcus equi* Subsp. *equi* in Nasal Secretions of 9409 Equids with Upper Airway Infection in the USA](#). The study provides a natural opportunity to take a deeper look at this ubiquitous disease and the many reasons it continues to present a formidable challenge to horses.

The study is one of only a few looking at demographic and prevalence factors associated with strangles relative to other

upper respiratory tract diseases, and no other studies are of the same magnitude. It documents Biosurveillance Program findings from 2008 to 2020. More than 9,400 horses from across the United States with acute onset of fever and respiratory signs were tested via nasal secretion (qPCR) for *S. equi* and common respiratory viruses, which included equine influenza virus (EIV), equine herpesvirus-1 (EHV-1), equine herpesvirus-4 (EHV-4), and equine rhinitis A and B viruses (ERAV/ERBV).

The aim of the publication was two-fold:

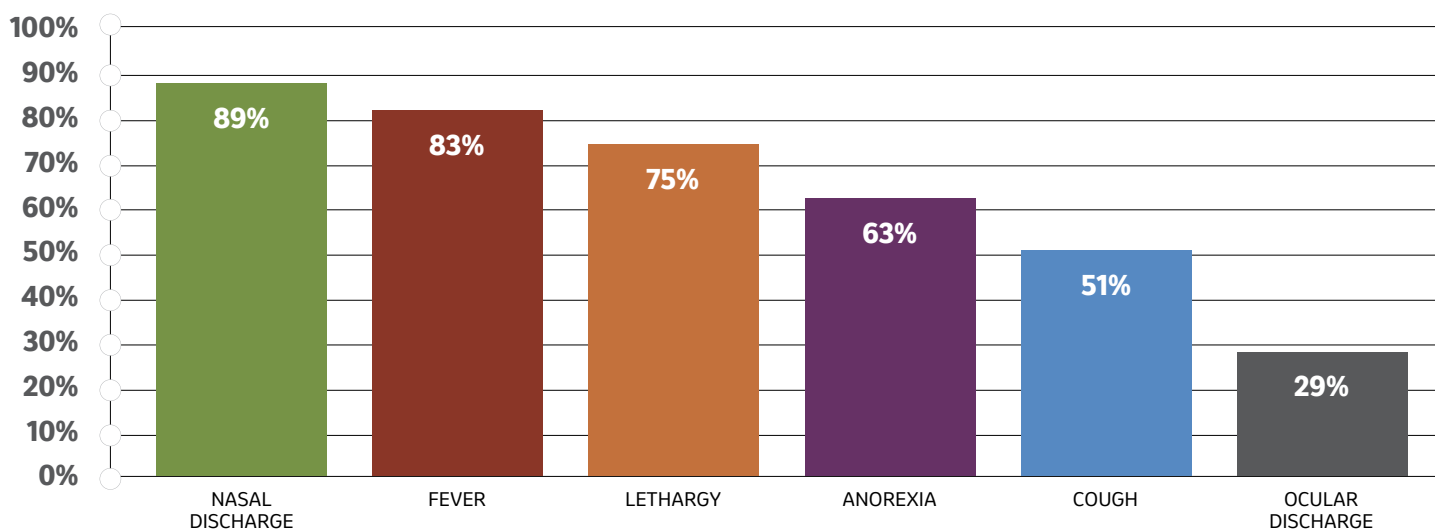
- 1) Describe prevalence factors associated with horses testing positive for *S. equi*
- 2) Determine the effect of *S. equi* vaccination on qPCR status.

Study high points¹

- 7.6% of horses tested qPCR-positive for *S. equi*, making it the third-most-common upper respiratory disease in the U.S., following EHV-4 (10.5%) and EIV (9.7%)
- Of those testing positive for *S. equi*, **31.6% experienced co-infections** with EIV, EHV-4 and ERBV
- Quarter horses were more likely to test positive for *S. equi* than other breeds
- The median age of horses impacted by *S. equi* was 8
- Competition and ranch and farm horses were more likely to test positive for *S. equi* than horses used for other activities
- While no regional differences were observed, seasonally *S. equi* is more common in the winter and spring (though positive cases were reported during all four seasons)
- Nasal discharge, fever and lethargy were the most common clinical signs reported (Figure 1)
- Horses vaccinated against *S. equi* were less likely to test qPCR-positive for *S. equi*, however, data on the type of vaccine used and administration route was unavailable



¹Jaramillo-Morales, C.; James, K.; Barnum, S.; Vaala, W.; Chappell, D.E.; Schneider, C.; Craig, B.; Bain, F.; Barnett, D.C.; Gaughan, E.; et al. Voluntary Biosurveillance of *Streptococcus equi* Subsp. *equi* in Nasal Secretions of 9409 Equids with Upper Airway Infection in the USA. *Vet. Sci.* **2023**, *10*, 78. <https://doi.org/10.3390/vetsci10020078>

FIGURE 1: Clinical Signs Associated with *S. equi* (+) Horses¹(2008-2020)

Closer look at coinfections

The number of coinfections observed with *S. equi* has provided an interesting sidebar to the study. There was a significant difference in those horses testing qPCR-positive for *S. equi* and another pathogen as compared to horses with a qPCR-positive *S. equi* outcome only. In particular, researchers found a high rate of coinfection between *S. equi* and EIV, and ERBV and EHV-4.

Researchers theorize that “viral coinfections might predispose bacterial colonization of the respiratory tract,” making the horse more vulnerable to disease. The clinical impact between single infection and coinfections was not evaluated in this analysis. Questions remain and present an opportunity for further study. Why are coinfections occurring? Are there gaps in vaccination protocols that can be filled or other factors at play?

“It is not a rare event to find multiple respiratory pathogens in a horse with fever and respiratory signs.”

- Nicola Pusterla, DVM, PhD, DACVIM, AVDC-Equine

CLINICAL TAKEAWAYS

1. Clinical signs may look very similar in upper respiratory infections, and a single infectious pathogen may not be the sole cause of illness.
2. During coinfections, seasonal pathogen occurrence is less observed in outcomes.
3. Do not stop looking for the causative agent. Clinical assumptions based on fever and clinical signs will not identify the cause. Without a true diagnosis, we are left with a void in proper treatment plans, biosecurity decisions and long-range disease management.

Complete study results are available via the [published article](#).

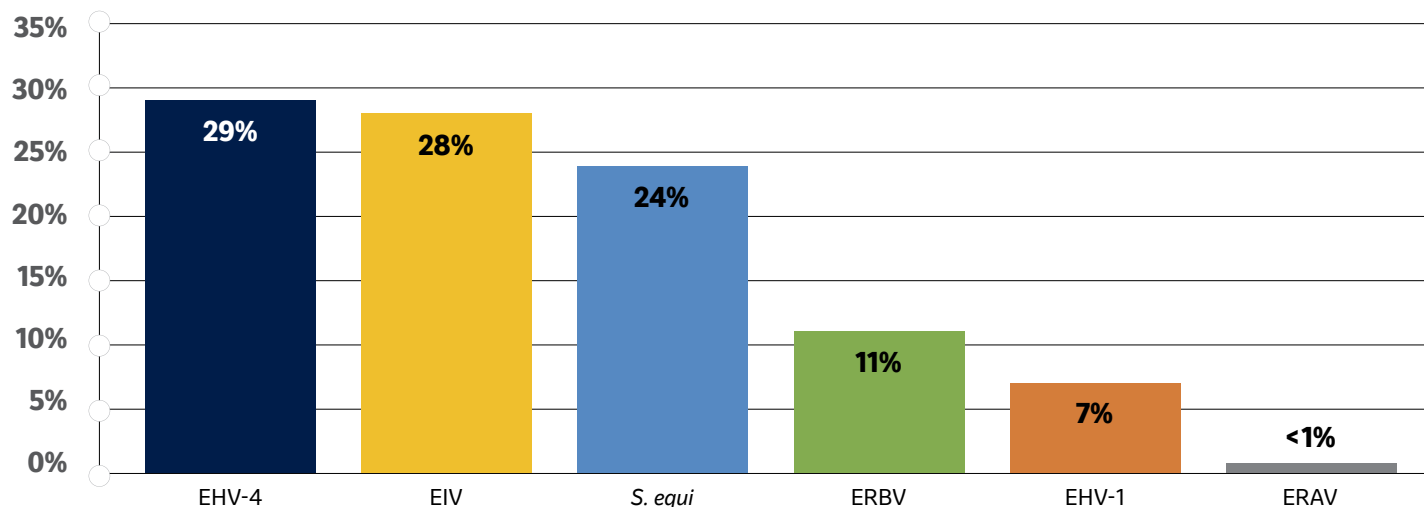
¹Jaramillo-Morales, C.; James, K.; Barnum, S.; Vaala, W.; Chappell, D.E.; Schneider, C.; Craig, B.; Bain, F.; Barnett, D.C.; Gaughan, E.; et al. Voluntary Biosurveillance of *Streptococcus equi* Subsp. *equi* in Nasal Secretions of 9409 Equids with Upper Airway Infection in the USA. *Vet. Sci.* **2023**, *10*, 78. <https://doi.org/10.3390/vetsci10020078>

Respiratory Biosurveillance Program Cumulative Disease Trends

More than 11,200 samples have been collected since the Biosurveillance Program began 15 years ago. Of those, 34% 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* (*S.equi*), which have been tracked from the inception of the program, and equine rhinitis A/B viruses (ERAV/ERBV), which were added in 2012.

FIGURE 2: Biosurveillance Program Disease Incidence: March 2008-December 2022²

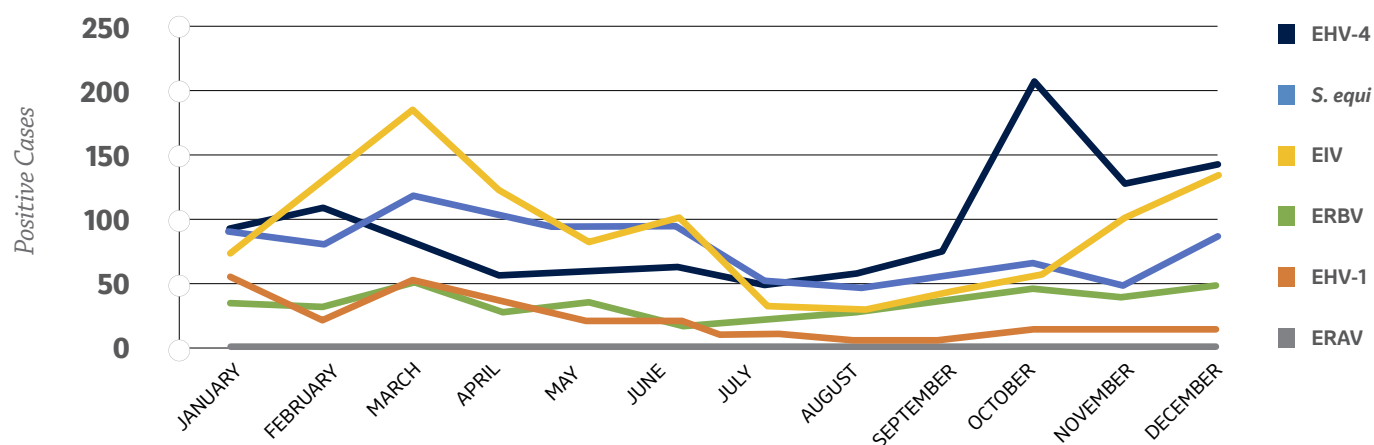
(As a percentage of total positive samples)



Through December 2022, EHV-4 was the most diagnosed infectious upper respiratory disease, comprising 29% of all positive samples, followed closely by EIV at 28% and then *S. equi* at 24%. Note, only 0.1% of cases came back positive for ERAV.

FIGURE 3: Seasonal Incidence of Equine Infectious Upper Respiratory Disease²

Monthly Cumulative 2008-2022



The monthly cumulative depicts the seasonal effect of respiratory pathogens spanning 15 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.

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

Current Six-Month Update

A total of 391 samples were submitted from July to December 2022. Overall, 45% of total samples submitted tested positive for one of the six primary pathogens (*S. equi*, EIV, EHV-4, ERAV/ERBV, EHV-1). During this timeframe, *S. equi* was the most prevalent upper respiratory disease reported, followed by EIV.

FIGURE 4: Six-Month Disease Trends July to December 2022²

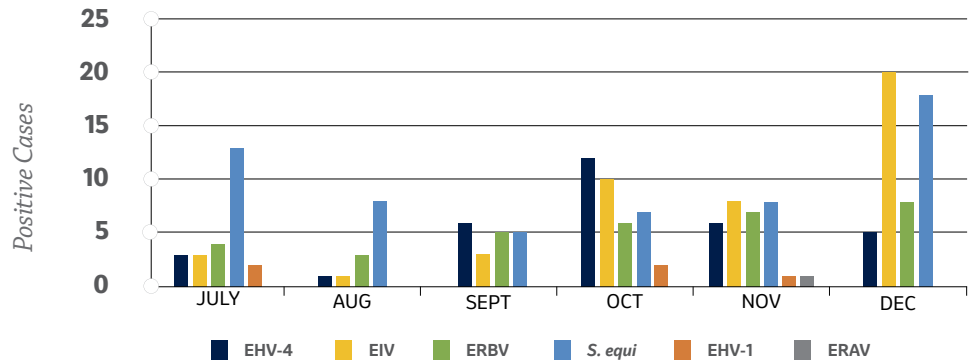
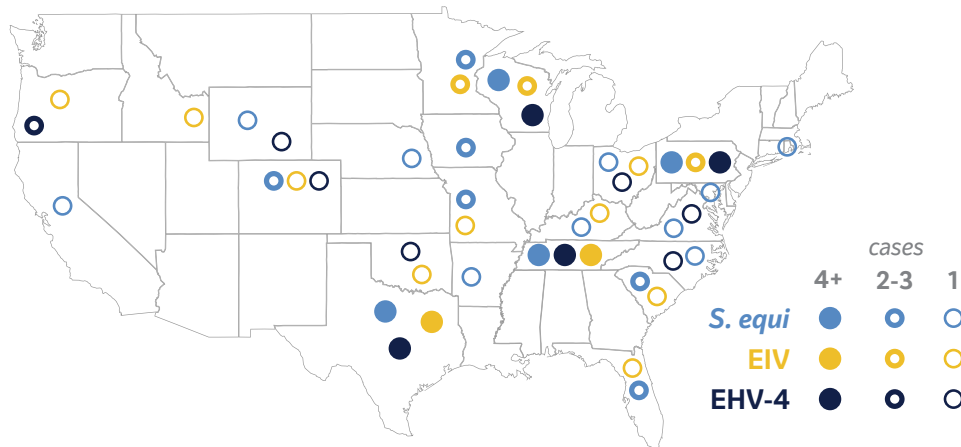


TABLE 1: Summary of Primary Demographic Parameters for the Three Major Pathogens (July–December 2022)²

Demographic Summary	<i>S. equi</i> (59 cases)	EIV (45 cases)	EHV-4 (33 cases)
Median Age	5 years Range: 2 months – 25 years	3.5 years Range: 5 months – 18 years	3 years Range: 5 months – 32 years
Predominant Breed(s)	Quarter Horse	Quarter Horse	Quarter Horse
Travel	Yes 22% No 64% Unknown 14%	Yes 63% No 24% Unknown 13%	Yes 36% No 46% Unknown 18%
Primary Discipline	Show 49% Pleasure 26% Other/Unknown 25%	Show 47% Pleasure 33% Other/Unknown 20%	Show 37% Pleasure 33% Other/Unknown 30%

FIGURE 5: Geographic Representation of the Top Three Pathogens July–December 2022²



Map represents states with positive cases of *S. equi*, EIV and EHV-4 during the reporting period (July–December 2022).

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

PRACTICE TIPS

Maximizing the Benefits of the Merck Animal Health Biosurveillance Program

As a member of a participating veterinary practice, the Biosurveillance Program provides access to tools that can help keep your practice one step ahead of infectious upper respiratory disease outbreaks. The program offers accurate disease identification, timely results and regional insights that you can leverage to your practice's advantage. Here are a few tips on using the program to support your practice and perspectives from participating veterinarians on how they are seeing the value in their own practices.

Accurate Pathogen Identification

For participating veterinarians, the benefit provided by the Biosurveillance Program is unmatched. Specific disease identification ensures that you can not only confidently diagnose but also optimize treatment plans. Samples are tested via quantitative PCR at the University of California, Davis, for the most common infectious upper respiratory disease pathogens (see figures 2-4 above).

Putting a name and a number on a pathogen is important for us to make appropriate decisions. We feel the Biosurveillance Program instills confidence in our clients and also in us. And it lends assurance to us as practicing veterinarians that we are vaccinating for specific viral antigens in an effective fashion. It adds a tremendous amount of value to us on a day-in-and-day-out basis and then reflectively to our patients and clients. - David H. Stephens, DVM, Weems and Stephens Equine Hospital

The PCR testing provides the veterinarian with more information on causative agents very quickly. We are then able to treat more appropriately with more judicious use of antibiotics and improved knowledge of necessary biosecurity measures. - Christine (Cocquyt) Montgomery, DVM, DACVIM, Tennessee Equine Hospital

Results Within 24 Hours

When an infectious respiratory disease is suspected, quick action is key to managing disease spread and ensuring an optimal outcome for the infected horse (and surrounding horses). The Biosurveillance Program uniquely offers rapid results in 24 hours, allowing you to provide an accurate diagnosis to your clients in a timely manner. Most labs take up to 10 days to provide results, and by then the disease could have run its course. Quick results allow you to swiftly administer proper treatment and take the steps needed to manage a disease outbreak.

Time is everything. We need answers as veterinarians, and our clients expect answers. The longer the diagnostic process rolls out, more patients especially in large training centers or farm settings might be exposed or become infected. People's patience is very limited when it comes to their horses or animals. [Clients] want to know what's going on now and what do we need to do in a proactive sense to address this challenge. So, for us, having that rapid turnaround is very important. - David H. Stephens, DVM, Weems and Stephens Equine Hospital

Test turnaround time is a constant hindrance to appropriately treating a case. The rapid return on the Merck panel and the availability of the lab technicians greatly enhances our ability to manage cases. - Christine (Cocquyt) Montgomery, DVM, DACVIM, Tennessee Equine Hospital

Insights into Local Disease Incidence

The Biosurveillance Program has collected more than 11,200 samples from infected horses representing different breeds, genders and ages from participating practices across the U.S. The clinics participating in the study not only receive accurate and quick results, but also help us identify regional outbreak trends that can benefit all practices. Visibility of regional and national disease prevalence patterns provides important insight into what disease pathogens you should be looking out for.

With the information the Biosurveillance Program gives us, we know when there are changes, drifts and increased pressure of specific viruses. And when our horses are going to ship outside of our practice to shows, events and competitions it allows us to strategically booster where needed ... and tailor a preventative health program specific to a given operation or locale. - David H. Stephens, DVM, Weems and Stephens Equine Hospital

Being able to reference test-positive cases reinforces our recommendations for vaccination to those owners who may not otherwise vaccinate. - Christine (Cocquyt) Montgomery, DVM, DACVIM, Tennessee Equine Hospital

OWNER TIPS

3-Step Disinfection Protocol to Help Ward off Infectious Disease

Arguably more important than managing a disease outbreak is minimizing the chance that one occurs in the first place. When used with the vaccination protocol recommended by your veterinarian, this disinfection protocol helps reduce the risk of infectious diseases in barns, boarding facilities, transport trailers and more. Driven by an Unconditional commitment to equine health, Merck Animal Health is collaborating with ByoPlanet® to curate a disinfectant product suite that is safe for use around horses and people.

STEP 1. CLEAN

- Remove organic debris, buckets, feed tubs and bedding from the area.
- Clean the area using standard procedures with a liquid detergent solution to soften and remove dried organic material. If cleaning stalls, rinse them as a final step, beginning at the top of walls and working toward the drain.
- Allow surfaces to dry before applying disinfectant.

STEP 2. DISINFECT

- Disinfect environmental surfaces. Disinfectant solutions require appropriate surface contact time and should be applied according to product label directions.
- Choose disinfectants that are EPA-registered, have documented effectiveness in the presence of organic matter and are safe to use around horses and humans. Read all disinfectant labels and implement necessary protective equipment prior to disinfection.
- For complete surface coverage, use an electrostatic sprayer to apply the disinfectant (see the recommended products below).
- To disinfect, use a continuous path through the space, working from low to high areas in a sweeping motion until surfaces are thoroughly wet.
- Do not wipe surfaces following electrostatic disinfection and allow surfaces to dry thoroughly before applying an antimicrobial solution.

Recommended products:

- **Clean Republic Multi-Purpose Disinfectant.** With an EPA Category IV toxicity rating (the lowest available level of toxicity), this non-corrosive, non-bleaching pH-neutral product kills 99.9% of bacteria and is made with only salt, water and electricity. It contains no fragrances or harsh fumes.
- **ByoPlanet® electrostatic sprayers.** Applying disinfectant with ByoPlanet electrostatic sprayers provides 360° of surface coverage with less waste, quicker re-entry into the environment and better efficacy against pathogens in hidden areas.

STEP 3. PROTECT

- Using a spray-on antimicrobial solution in conjunction with cleaning and disinfecting protocols provides a protective coating against the growth of bacteria, fungi, mold and algae.

Recommended product:

- **Armatrex™ spray-on antimicrobial solution.** Safe for use in many live-animal settings and on a variety of surfaces, such as stalls and cross ties, Armatrex provides up to 90 days of protection. ByoPlanet electrostatic sprayers are the recommended application system.

Repeat this protocol as needed based on the duration of efficacy noted on the product labels of your chosen disinfectants and antimicrobial solutions.

We are always looking for practical ways to increase biosecurity on a working ranch. With so many horses in and out each season, there is an increased risk of contagious disease introduction. We found the duration of action of Armatrex, along with its widespread applicability and safety around live animals, appealing for our program. – Carly Turner, DVM, DACT, head veterinarian at Lazy E Ranch in Guthrie, Oklahoma

 [Click to download](#)

About the Newsletter

This biannual newsletter provides information generated through and related to the Biosurveillance Program. Driven by an Unconditional commitment to the horse and those who serve them, Merck Animal Health 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. Merck Animal Health Equine Veterinary Professional Services and Nicola Pusterla, DVM, PhD, DACVIM, AVDC-Equine, UC Davis, will provide technical veterinary advice, interpretation and case management support.

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) "[Voluntary Biosurveillance of Streptococcus equi Subsp. equi in Nasal Secretions of 9409 Equids with Upper Airway Infection in the USA](#)"
Jaramillo-Morales, C.; James, K.; Barnum, S.; Vaala, W.; Chappell, D.E.; Schneider, C.; Craig, B.; Bain, F.; Barnett, D.C.; Gaughan, E.; et al. *Vet. Sci.* 2023, 10, 78.
- 2) "[Voluntary Surveillance Program for Equine Influenza Virus in the United States during 2008–2021](#)"
Chappell, D.E., Barnett, D.C.; James, K.; Craig, B.; Bain, F.; Gaughan, E.; Schneider, C.; Vaala, W.; Barnum, S.M.; Pusterla, N. *Pathogens* 2023, 12, 192. <https://doi.org/10.3390/pathogens12020192>
- 3) "[Frequency of Detection and Prevalence Factors Associated with Common Respiratory Pathogens in Equids with Acute Onset of Fever and/or Respiratory Signs \(2008–2021\)](#)"
Pusterla, N.; James, K.; Barnum, S.; Bain, F.; Barnett, D.C.; Chappell, D.; Gaughan, E.; Craig, B.; Schneider, C.; Vaala, W. *Pathogens* 2022, 11, 759. <https://doi.org/10.3390/pathogens11070759>
- 4) "[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.
- 5) "[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., Pusterla, N. *ACVIM* 2017 abstract.
- 6) "[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.
- 7) "[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.
- 8) "[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.
- 9) "[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 11,200 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.



The Science of
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