

Merck Animal Health Equine Respiratory Update

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

Spotlight on Equine Herpesvirus-4

Study Confirms EHV-4 is a Predominant Virus Associated with Upper Airway Infection

A primary goal and benefit of the Biosurveillance Program is to continuously provide the industry new data on existing and emerging infectious upper respiratory disease threats. The data gathered through this program - with your help - has once again provided an important opportunity to better understand the prevalence of leading respiratory pathogens associated with upper airway infections.

A study report of data from this biosurveillance program has recently been submitted for publication and reconfirms that EHV-4 is a major upper respiratory viral pathogen.

Study Objective

To determine the frequency of EHV-4 nasal shedding and prevalence factors in 3,028 horses presented to primary care providers for acute onset of fever and/or respiratory signs. Nasal samples were collected from September 2012 to May 2016 and tested for common respiratory pathogens via quantitative polymerase chain reaction (qPCR).

These findings, collectively, underscore that EHV-4 is a predominant virus associated with upper airway infection.

Study Highlights

- Total number of horses testing qPCR- positive for EHV-4 was 326 (10.8%)
- Young horses, Thoroughbreds and pleasure use were proven to be significant risk factors for horses testing positive for EHV-4
- When compared to EHV-4 negative horses, EHV-4 positive horses were
 - Generally younger (<1 year of age)
 - More likely to originate from premises with more than one horse affected
 - More likely to have nasal discharge, ocular discharge and fever

Significance for you

The primary takeaway from these results is that attention should be paid to EHV-4.

“EHV-4 repeatedly is confirmed as the major virus associated with upper airway infection, particularly in young horses,” says Fairfield Bain, D.V.M., M.B.A., Dipl. ACVIM, ACVP, ACVECC, one of the study co-authors. “Even though it is generally thought of as a self-limiting infection, it remains a costly disease from lost training and/or performance days, in addition to the costs of treatment.”

Additionally, this set of clinical signs (nasal discharge, ocular discharge and fever) can be used by practitioners to help recognize EHV-4 with greater probability in suspected populations of horses. The study also revealed that despite many submissions with unknown vaccination history, the frequency of vaccination against EHV-4 was similar between both qPCR-positive and qPCR-negative groups.

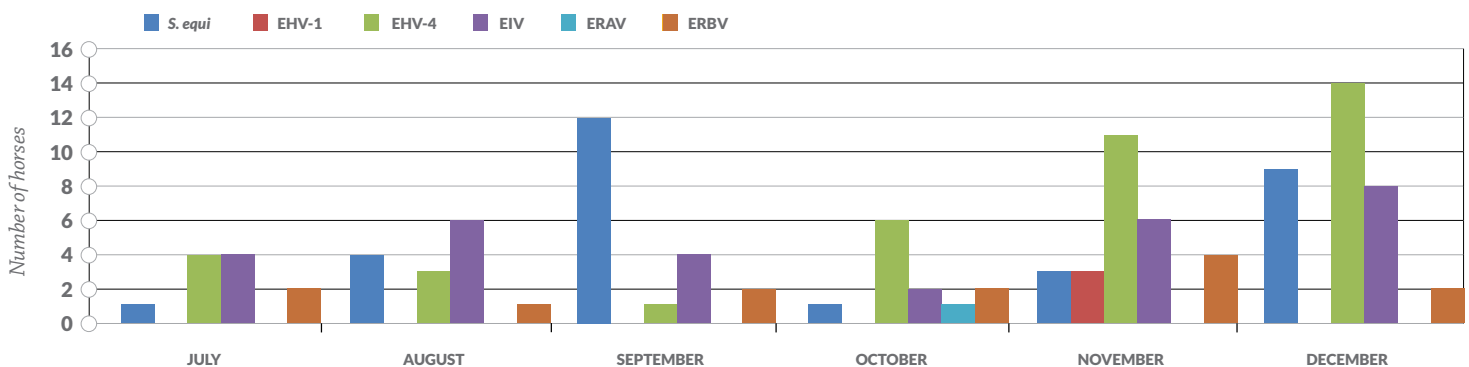
“This means the concept of biosecurity remains of utmost importance, and reliance on vaccination alone is not sufficient,” adds Dr. Bain.

Currently available vaccines against EHV-4 are considered as an aid in disease control and aid in reduction of virus shedding.¹ By enhancing herd immunity through vaccination, it is hoped to reduce the level of infectious virus circulating, leading to a reduction in individual clinical cases.

The study corroborates findings of a 2011 study² that showed the highest PCR detection rate for EHV-4, followed by equine influenza virus (EIV), *Streptococcus equi* subspecies *equi* (*S. equi*) and EHV-1.

Disease Trends from July to December 2016³

A total of 422 samples were submitted from July to December 2016, as compared to 458 samples submitted during the same timeframe in 2015. While the number of submissions decreased, the disease occurrence pattern is the same—approximately 18% of total positive samples were attributed to EHV-4 during both timeframes. Overall, about 27% of total samples submitted tested positive for one of the six primary pathogens (*S. equi*, EHV-1, EHV-4, EIV, ERAV, ERBV).

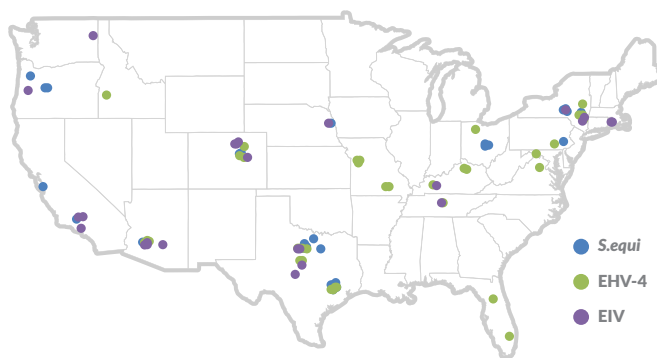


From July to December 2016, EHV-4 was the most prevalent infectious upper respiratory disease reported, followed by *S. equi* and EIV.

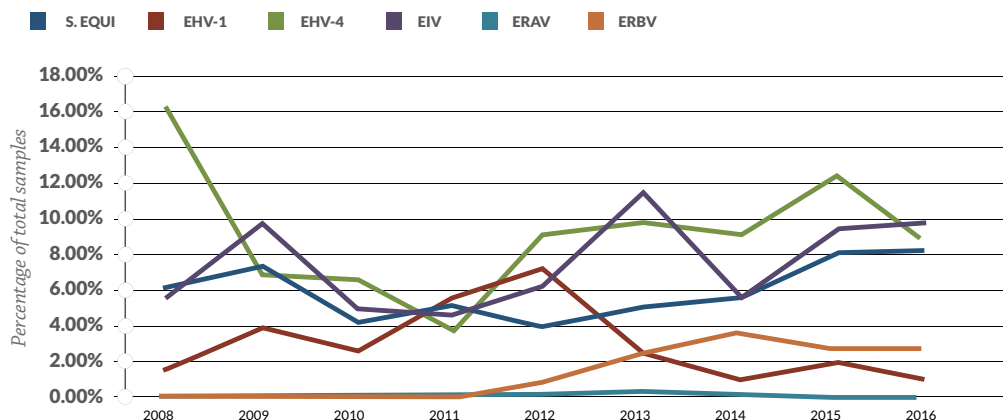
Demographic Summary	Median Age	Breed	Travel	Discipline
EHV-4 (39 Cases)	2 years Range: 4 months – 23 years ≤ 2 years (54%)	Quarter Horse	Yes 33% No 62% Unknown 5%	Pleasure; show
EIV (30 Cases)	7 years Range: 18 months – 19 years ≥ 6 years (60%)	Quarter Horse	Yes 47% No 53%	Pleasure
S. equi (30 Cases)	6 years Range: 6 months – 28 years ≥ 3 years (90%)	Quarter Horse	Yes 27% No 47% Unknown 27%	Show; pleasure

This table provides a summary of primary demographic parameters for the three major pathogens (July-December 2016).³

This map shows positive EHV-4, EIV, S. equi cases from July to December 2016.³

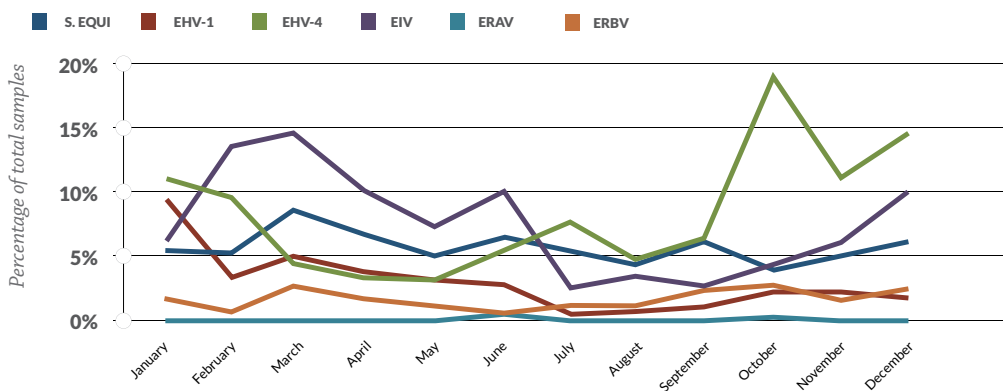


Biosurveillance Results 2008-2016³



Of the more than 6,300 samples submitted from 260 participating clinics across the United States, greater than 27% have returned positive pathogen results. (The primary four pathogens have been tracked from the inception of the program. ERAV and ERBV were added in 2012.)

Biosurveillance Results Monthly Cumulative 2008-2016³



The monthly cumulative since program inception depicts the seasonal effect of respiratory pathogens. Interestingly, EHV-4 appears to be most prevalent in the fall months, in contrast to the other respiratory pathogens that are more prevalent in the winter and spring months.

Point of View:

EHV in a Sentinel Surveillance System

- By Earl Gaughan, D.V.M., Dipl. ACVS

Scan equine health news sources this winter and it seems EHV-1 has overtaken the headlines, with outbreaks in Louisiana, Kentucky and other states. As scientists and medical practitioners, we may ask: EHV-1 seems to be everywhere, yet data from the Merck Animal Health Biosurveillance Program shows that EHV-4 is by far the most diagnosed of the EHV family of pathogens being evaluated. So, what gives?

Most veterinarians submit samples through their state diagnostic laboratory if they suspect a reportable disease such as EHV-1. This is one explanation of why the Biosurveillance Program contains fewer reports of EHV-1 cases. Reportable diseases must be confirmed by state animal health officials.

Much of the news on EHV-1 is being driven by the Equine Disease Communication Center (EDCC), a valuable new program with the goal of providing national reporting of a wider variety of equine infectious diseases. EDCC provides continual updates on disease outbreaks, and the website, www.equinediseasecc.org, provides a wealth of information on specific diseases, biosecurity measures and resources, with the goal of helping to harmonize infectious disease recognition and control across federal, state and private sectors of the horse industry. The EDCC relies on state by state reporting, including all reportable disease cases that are typically conveyed to the EDCC by state animal health officials.

The Merck Animal Health Biosurveillance Program is a diagnostic service based on the “sentinel” case concept, whereby veterinarians in the field identify one or more active cases of infectious upper respiratory disease. Rapid test results help veterinarians provide their clients with real-time identification and control of important infectious respiratory diseases and help us better understand a current and active presence of respiratory disease.

“Data collected in a well-designed sentinel system, such as the Biosurveillance Program, can be used to signal trends, identify outbreaks and monitor the burden of disease in a community, providing a rapid, economical alternative to other surveillance methods.”

Because sentinel surveillance is conducted only in selected locations; however, it may not be as effective for detecting rare diseases, or diseases that occur outside the areas of the sentinel sites.


Both the Biosurveillance Program and the EDCC are serving the veterinary profession and equine industry well, but with different purposes. Data generated by the Biosurveillance Program coupled with the disease reporting system managed by the EDCC provide real-time information about current disease trends. The two programs are also building a comprehensive database that allows the profession to monitor trends over time.

Practice Tip

Merck Introduces New Applicator for Flu Avert® I.N. Vaccine

Merck Animal Health recently introduced a new, proprietary intranasal applicator for administering the Flu Avert I.N. equine influenza vaccine. The new applicator, which is just 1-inch long, is administered from just inside the ventral nares, making it well-tolerated by most horses and easier to use for you. It uniquely atomizes the vaccine into a very fine mist, delivering it in a much smaller particle size than with other applicators. This allows the vaccine to reach further into the nasal cavity and cover a broader surface area of the nasal and pharyngeal mucosa.⁴



 [Click to watch a short video that depicts the Flu Avert I.N. mode of action.](#)

The Flu Avert I.N. Difference

- Modified-live intranasal vaccine; no adjuvant
- Cold-adapted, non-pathogenic strain of KY'91
- Stimulates broad immune responses similar to natural infection (humoral, CMI, mucosal)
- Stimulates non-specific innate immune response⁵
- Stimulates antibodies for surface HA/NA glycoproteins AND internal viral proteins
- Single dose for primary immunization or as a booster following other EIV vaccines
- Rapid onset of immunity (5-7 days in naïve horses)⁶
- Safe in horses stressed by transport and exercise⁷

What Veterinarians are Saying About the New Applicator

I found the new applicator to be very beneficial. It is less invasive and horses tolerate administration with less restraint, so application is definitely improved.

- Robert Ball, D.V.M., Bracken Equine Clinic

The difficulty of administration has been removed from the discussion, and no one can argue with the data behind Flu Avert and its efficacy. The fine mist makes it much less dramatic for the horse, and it's incredibly easy to administer—even for me as a 5-foot-4 veterinarian.

- Erica Lacher, D.V.M., Springhill Equine

 [Watch Dr. Lacher administer Flu Avert with the new applicator.](#)

Remember to Submit Fecal Samples for ECoV Testing

Equine coronavirus (ECoV) testing is now being offered for a limited time as a free service to veterinarians enrolled in the Merck Animal Health Biosurveillance Program, courtesy of the Equine Infectious Disease Research Laboratory, University of California, Davis.

The ECoV study is intended to help identify cases that don't have a specific pathogen associated with them, thus providing more information on potential emerging disease threats impacting our horses. To participate, simply continue to submit samples as you currently would under the respiratory disease surveillance program plus one to two fresh fecal balls in a fecal cup or zip lock bag.

About ECoV

- Traditionally considered an intestinal disease of foals, it has only recently been associated with emerging infections in adult horses
- Highly contagious, ECoV spreads from horse to horse by fecal-oral transmission
- Clinical signs include fever, anorexia and lethargy (less frequently diarrhea, colic and neurological deficits). To date, respiratory signs have not been associated with ECoV.
- Horses with ECoV can shed virus without showing any clinical signs
- In an outbreak, morbidity rates tend to be high, while mortality rates are quite low
- Biosecurity measures are paramount to preventing disease spread

For more information on ECoV sampling and submission procedures, please contact Dr. Nicola Pusterla at (530) 752-1039 or a Merck Animal Health Equine Veterinary Technical Services veterinarian.

Quick Tips For Clients

The following tips are provided to help you share information with clients on common infectious respiratory diseases in horses. Click the link to download and use this on your website or through your social media properties. Don't forget to ask your Merck Animal Health representative about the new [biosecurity infographic poster](#) — a great resource on biosecurity for in-clinic use and as an educational giveaway for your clients.

 [Click to download and share the tips below.](#)

Worried About EHV-4? For Good Reason.

Studies show equine herpesvirus type 4 (EHV-4) is a major upper respiratory virus concern. It can cause disease that varies in severity, and while it is typically associated with upper respiratory disease in younger horses, it can affect horses of any age. EHV-4 is spread via coughing horses and by direct and indirect contact and nasal secretions. Clinical signs of EHV-4 include:

- Nasal and ocular discharge
- Fever
- Lethargy
- Anorexia

Talk to your veterinarian today about EHV-4 vaccination, and be sure to take sound biosecurity measures at home and away.

About the Newsletter

This bi-annual newsletter is being sent as a value-added service to clinics enrolled in 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 Technical Services (Drs. Barnett, Vaala, Gaughan, Craig, Bain and Chappell) and Nicola Pusterla, D.V.M., Department of Medicine and Epidemiology, UC Davis.

If you have questions about the program, please call our technical services team at (866) 349-3497, or email one of the technical services veterinarians at the addresses listed below.

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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 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.
- 2) [“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.
- 3) [“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.
- 4) [“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.

¹ Compendium of Veterinary Products, EHV-4 vaccine label indications.

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

³ Merck Animal Health and University of California, Davis School of Veterinary Medicine (Nicola Pusterla). Infectious Upper Respiratory Disease Surveillance Program. Ongoing research 2008-present.

⁴ Data on file, Merck Animal Health.

⁵ HL Pecoraro, D. Koch, G Soboll, Hussey, L Bentsen, GA Landolt. Comparison of innate immune responses in equine respiratory epithelial cells to modified-live equine influenza vaccine and related wild-type influenza virus. Proceedings ACVIM Annual Forum 2014.

⁶ Townsend HGG. Onset of protection against live-virus equine influenza challenge following vaccination of naïve horses with a modified-live vaccine. Unpublished data.

⁷ Lunn DP, Steve Hussey S, et al. Safety, efficacy, and immunogenicity of a modified-live equine influenza virus vaccine in ponies after induction of exercise-induced immunosuppression. *JAVMA* 2001;218(6):900-906

About the 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 6,300 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: Depression, anorexia, 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 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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