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Merck Animal Health Equine Respiratory Update

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

Disease Trends, Case Demographics Underscore Importance of Good Biosecurity

Surprising trends are taking shape as we reflect on the eighth year of the respiratory biosurveillance program. One conclusion is certain: Sound biosecurity measures are more important than ever.

The last six months of data highlight the fact that clusters of infectious respiratory disease outbreaks remain hallmarks of the program, particularly equine herpesvirus-4 (EHV-4) and equine influenza virus (EIV). As we study the historical and signalment information associated with these cases, long-held beliefs are being reevaluated. For one, influenza is no longer a disease of only the young – it can affect horses of all ages and any operation. Data collected from 2008 to 2011 reinforced that influenza was predominantly found in 1 to 5 year olds; however, 2012-2015 data confirmed positive influenza cases in broader age groups.[1] We're also seeing a broad distribution of demographics, as demonstrated in recent outbreaks showing ages ranging from 8 months to 22 years, and representation from a variety of disciplines, breeds and travel patterns.

Of additional concern is an increase in positive influenza cases from horses vaccinated with inactivated virus vaccines. Since the biosurveillance program's inception, 36% of EIV positive cases have been from vaccinated horses. To-date, EIV isolate sequencing in U.S. horses from this respiratory surveillance program has been Clade 1. A clade is a biological classification given to a group of organisms with a common ancestor. In this case, Clade 1 is a subtype of the current American lineage (Florida sublineage) of Equine Influenza A (H3N8) virus. The viruses detected in the United States have been characterized as Clade 1 by the World Organization for Animal Health (OIE).

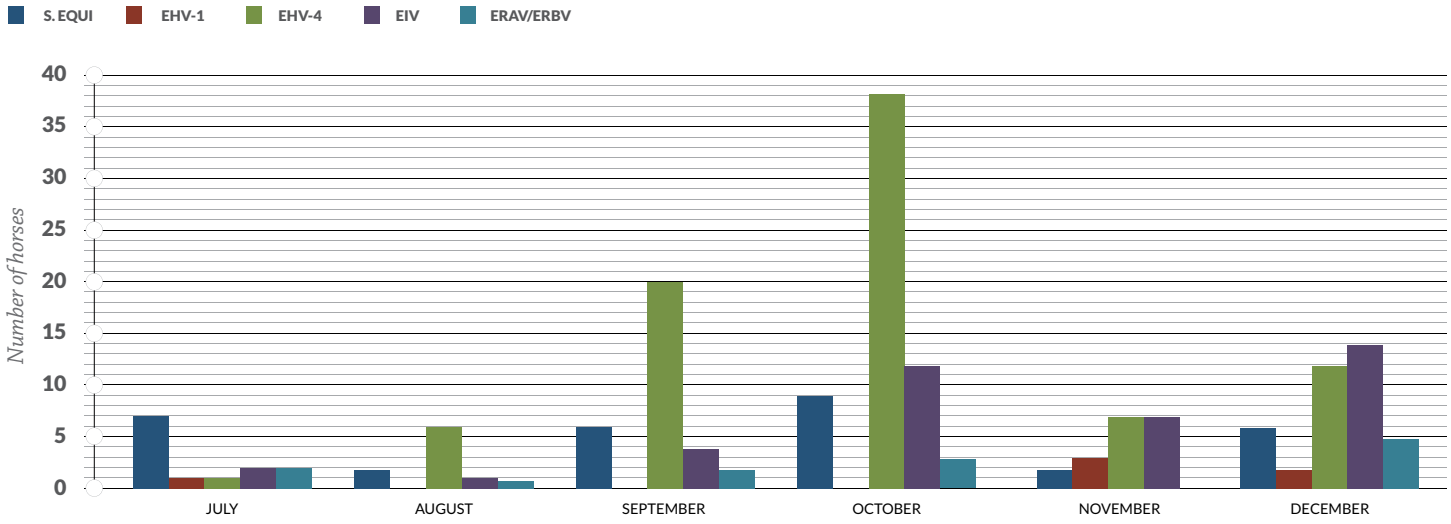
The most common respiratory pathogen continues to be EHV-4. This is reflected in the past six months, as well as study results to-date. Of the 458 samples submitted from July to December 2015, 84 cases (18%) were confirmed EHV-4 positive. This was followed by EIV with 40 positive cases (9%), 32 positive cases (7%) of *Streptococcus equi* subspecies *equi (S. equi)*, 13 cases (3%) of equine rhinitis A/B viruses (ERAV/ERBV), and 6 cases (1%) of EHV-1.

Nearly half of all EHV-4 positive cases were reported in October, of which we saw clusters of outbreaks in Texas and New York.

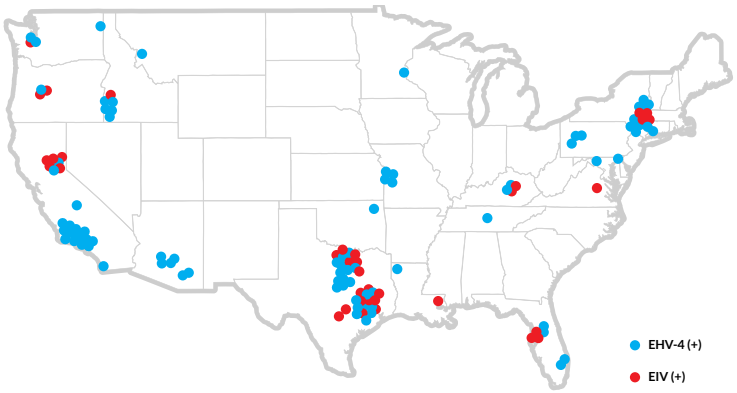
These outbreak clusters display a broad distribution of demographics, emphasizing the need for biosecurity measures to be part of treatment and prevention plans. Biosecurity planning and application will provide a broader net of protection through:

1) Emphasis on isolation and daily monitoring post-travel
2) Stressing the need for isolation and daily monitoring of new arrivals to stable/farm/ranch
3) Recognition that age does not preclude infectious respiratory disease
4) Vaccination status with inactivated vaccines, alone, may reduce clinical signs of disease and shorten recovery period, but may not provide complete protection, as hoped or often expected
5) Increased hygiene and cleanliness.

Disease Trends from July to December 2015[1]



From July to December 2015 EHV-4 was the most prevalent infectious upper respiratory disease reported, followed by EIV.

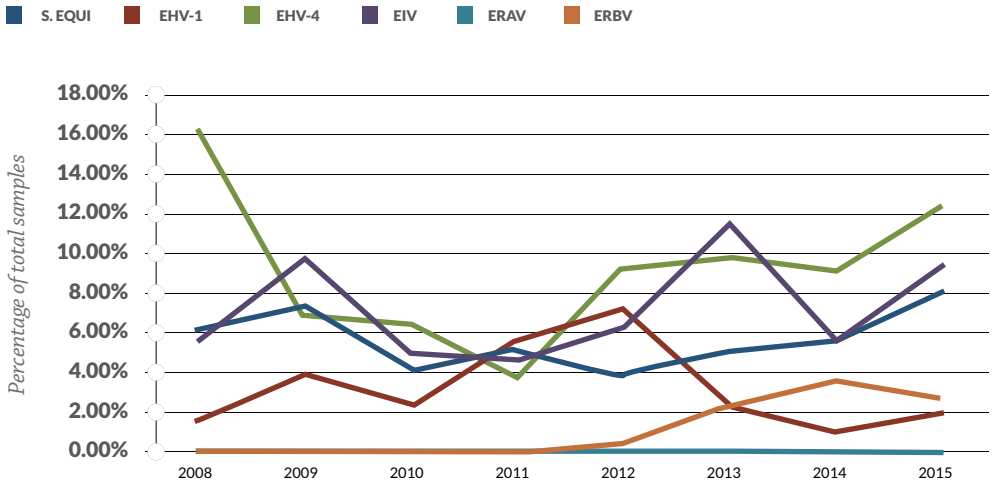


This map shows positive EHV-4 and EIV cases from July to December 2015.

Demographic summary	EHV-4 (84 cases)	EIV (40 cases)
Median Age	2 years Range: 3 months – 23 years ≤ 2 years (57%)	4 years Range: 2 months – 22 years ≥ 3 years (64%)
Breed	Quarter Horse; Thoroughbred	Quarter Horse (50%)
Discipline	Show/performance; pleasure	Show/performance; racing

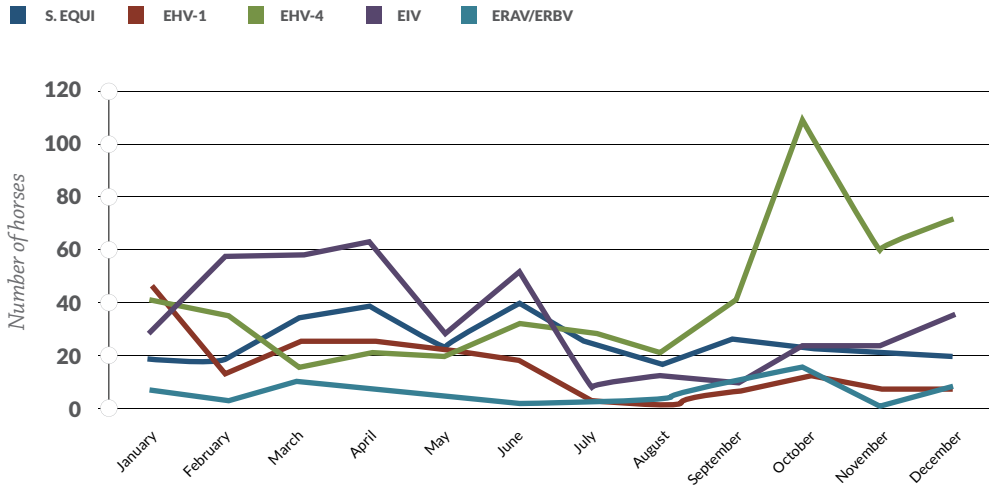
The above table provides a summary of primary demographic parameters for the two major pathogens (July-December 2015). [1]

Biosurveillance Results 2008-2015[1]



Of the more than 5,400 samples submitted from 260 participating clinics across the United States, greater than 26% 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 2008-2015[1]



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.

Infectious Disease and Biosecurity Resources

There are several resources available to help monitor and manage infectious disease. The Equine Disease Communication Center (EDCC) was recently launched to help provide infectious disease outbreak information to the horse industry in North America. The communication system is designed to seek and report real time information about disease outbreaks similar to how the Centers for Disease Control and Prevention (CDC) alerts the human population about diseases in people. It also provides valuable biosecurity tips and information. www.equinediseasecc.org.

Other valuable resources include:

- AAEP infectious disease guidelines (www.aaep.org), providing guidance on respiratory, gastrointestinal, neurologic and vesicular infectious disease control.

- United States Animal Health Association (www.usaha.org), through its Infectious Disease of Horses Committee (IDOHC) provides information on testing procedures, risk assessment, quarantine protocol, as well as an EHM guidance document.

- Equine Biosecurity Risk Calculator – a self-quiz for horse owners provided by the University of Guelph (www.equineguelph.ca). A unique tool geared to the horse owner, and developed in partnership with Colorado State University and the AAEP.

- Biosecurity Toolkit for Equine Events, California Department of Food & Agriculture (www.cdfa.ca.gov)

Biosecurity starts with the horse owner. To enhance and support client awareness on this important subject, consider including a short tip on your website or through your social media properties, such as the following:

Click to download and share the tips below.

Before you leave home this spring for your equine adventures, vaccinate to help prevent the spread of infectious diseases. Call us today to make an appointment, and remember these biosecurity tips when you're on the road:

- *Minimize nose-to-nose contact*
- *Don't share items*
- *Monitor your horse's temperature daily*
- *Clean tack, equipment and stalls regularly*
- *Practice good hand hygiene (hand sanitizers work well in the absence of soap and water)*
- *Separate and monitor horses when returning home*

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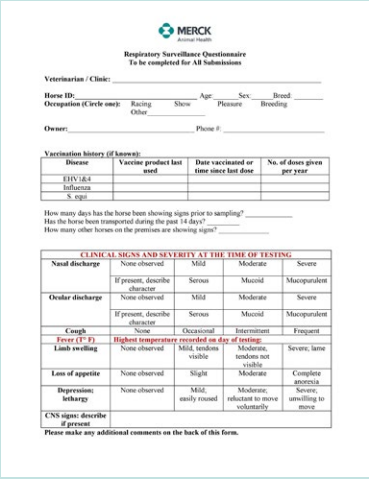

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Respiratory Surveillance Questionnaire
To be completed for All Submissions

Veterinarian / Clinic: _____

Horse ID: _____ **Age:** _____ **Sex:** _____ **Breed:** _____
Occupation (Circle one): Racing Show Pleasure Breeding
Other_____

Owner: _____ Phone #: _____

Vaccination history (if known):

Disease	Vaccine product last used	Date vaccinated or time since last dose	No. of doses given per year
EHV1&4			
Influenza			
S. equi			

How many days has the horse been showing signs prior to sampling? _____
Has the horse been transported during the past 14 days? _____
How many other horses on the premises are showing signs? _____

CLINICAL SIGNS AND SEVERITY AT THE TIME OF TESTING

Nasal discharge	None observed	Mild	Moderate	Severe
	If present, describe character	Serous	Mucoid	Mucopurulent
Ocular discharge	None observed	Mild	Moderate	Severe
	If present, describe character	Serous	Mucoid	Mucopurulent
Cough	None	Occasional	Intermittent	Frequent
Fever (T° F)	**Highest temperature recorded on day of testing:**			
Limb swelling	None observed	Mild, tendons visible	Moderate, tendons not visible	Severe, lame
Loss of appetite	None observed	Slight	Moderate	Complete anorexia
Depression; lethargy	None observed	Mild, easily roused	Moderate, reluctant to move voluntarily	Severe, unwilling to move
CNS signs: describe if present				

Please make any additional comments on the back of this form.

Don't Forget the Respiratory Surveillance Questionnaire

The power of this surveillance program lies in the information submitted with each sample. Each diagnostic kit includes a "Respiratory Surveillance Questionnaire" that is required with each patient sample submission. Your continued help in completing these questionnaires to provide the most complete and accurate historical data is greatly appreciated. This information already has allowed us to provide important prevalence and epidemiological updates to the industry. Examples include the trend we noted earlier of an increase in influenza cases in horses vaccinated with inactivated vaccines, and the knowledge that age does not preclude infectious respiratory disease. However, with your help in making sure the questionnaire is completed, we can do even more. **Please continue to gather and document patient information, including signalment, clinical signs, vaccination status and recent travel history.**

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

UCDAVIS VETERINARY MEDICINE

MERCK Animal Health

About the Program

Since 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 5,400 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, 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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