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Merck Animal Health Equine Respiratory Update

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

Respiratory Case Study: Influenza in a Training Barn Without Testing, How Do You Know?

Editor's note: *Traditionally, we utilize the feature section of the newsletter to home in on a specific pathogen or explore more in-depth data on respiratory disease trends. In this edition, however, we're taking a different approach. We'll explore one practitioner's infectious respiratory disease case journey.*

The most powerful aspect of the Equine Respiratory Biosurveillance Program is the data—the diagnostic results delivered within 24 hours to provide crucial evidence-based guidance in dealing with a sick horse infected with an upper-respiratory disease agent. The data informs how you respond, what you communicate to the client, important safeguards you put in place to prevent disease spread, the path to recovery you set in motion for that horse, and preventive measures you critically assess moving forward for the benefit of not just that horse—but all the horses under your care.

Tennessee Equine Clinic has leveraged the benefits of the Biosurveillance Program for many years through ongoing sample submissions. Let's walk through a respiratory case with Dr. Christine Cocquyt that was submitted through the Biosurveillance Program.

Q: When you encounter a horse showing clinical signs of upper respiratory disease, what is your next step?

Dr. Cocquyt: We commonly encounter horses with fever and nasal discharge in our practice. Our protocol is to submit samples to the Merck Equine Respiratory Biosurveillance Program for these cases. The results proved especially helpful in the following scenario that occurred in a small training barn.

Horse A is a 12-year-old Tennessee Walking horse mare initially examined for lethargy and bilateral serous nasal discharge. She was found to have a temperature of 103.1° F. Per our protocol, respiratory disease testing was submitted through the Biosurveillance Program.

Q: What actions were taken while you awaited results on Horse A from the UC Davis laboratory?

Dr. Cocquyt: The mare was isolated as much as possible on the farm, and temperatures were checked on all other horses on the farm twice a day. Questioning revealed that a horse with nasal discharge was recently on the farm for approximately 24 hours.

Q: What were the results received from the UC Davis laboratory on Horse A, and how long did it take to receive them?

Dr. Cocquyt: Horse A tested PCR positive for equine influenza virus on the Biosurveillance results, which we received the following day.

Q: Upon receipt of the positive influenza results, how were the results conveyed to the owner of Horse A and what were your immediate recommendations?

Dr. Cocquyt: Based on the rapid test results, we were able to convince the farm owner to cease movement of horses on and off the farm. All the other horses on the farm were given booster vaccinations for influenza virus and equine herpesvirus, as the last vaccinations were over 6 months prior. Thorough cleaning and disinfection of the facility was performed.

Q: How did you treat Horse A?

Dr. Cocquyt: Horse A was not immediately given antibiotics, but the nasal discharge became purulent about a week later. Based on worsening of clinical signs, the horse was started on antimicrobials.

Q: Did the influenza spread to other horses?

Dr. Cocquyt: Two other middle-aged horses began having nasal discharge within a week of the first case. They did not have a fever. These horses had also been exposed to the horse that had

entered the facility with nasal discharge. Since these horses did not have fevers, testing for respiratory diseases was not submitted through the Biosurveillance Program. Test results from another laboratory did confirm that both horses were PCR positive for influenza and had heavy growth of *Strep zooepidemicus*.

Q: What decisions were made to help curb a potential outbreak?

Dr. Cocquyt: This facility had a large training clinic planned within two weeks of these cases developing. The positive influenza results helped us convince the trainer to move the clinic to a later date. The trainer also instituted stricter screening for signs of illness on horses that enter the property even transiently.

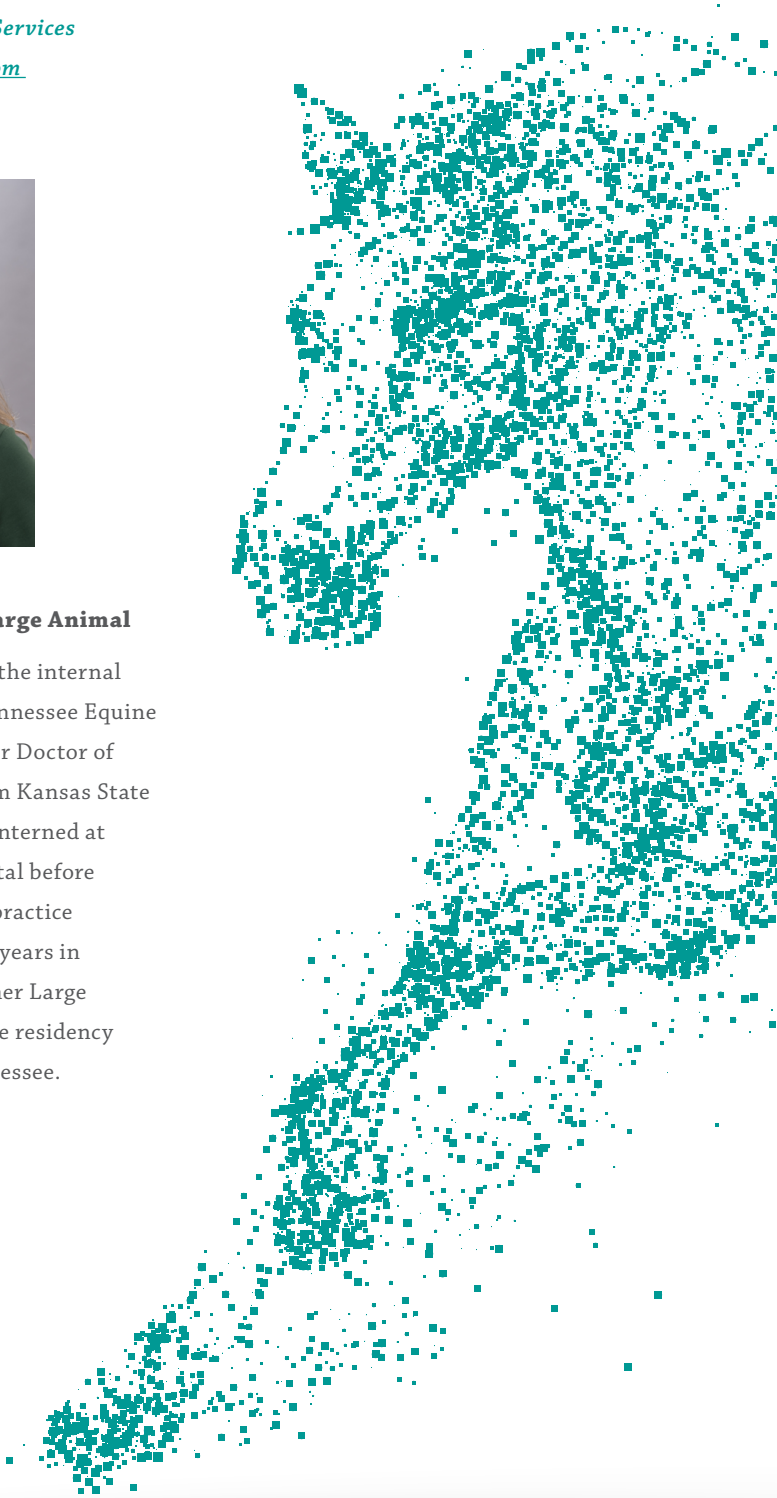
Q: Anything further you'd like to add, Dr. Cocquyt?

Dr. Cocquyt: The Merck Equine Respiratory Biosurveillance Program has proved invaluable in our practice. Many owners resist paying for testing even for sick horses, and it can be difficult to convince them to restrict travel without test results. Being able to offer free testing in the right cases and the incredibly rapid results provides us with more powerful arguments for isolation and control of disease transmission. Without the test results in the scenario above, it is possible that almost 50 horses from independent barns would have been exposed to influenza.

We'd like to thank Dr. Cocquyt for sharing this case experience. ***If your clinic has similar experiences you'd like to share, please contact Merck Animal Health Equine Veterinary Professional Services at USequinePV@merck.com or (866) 349-3497.***

Christine Cocquyt, DVM, Dipl. ACVIM – Large Animal

Dr. Christine Cocquyt is the internal medicine specialist at Tennessee Equine Hospital. She received her Doctor of Veterinary Medicine from Kansas State University in 2005. She interned at Blue Ridge Equine Hospital before entering private equine practice in New York. After a few years in practice, she completed her Large Animal Internal Medicine residency at the University of Tennessee.



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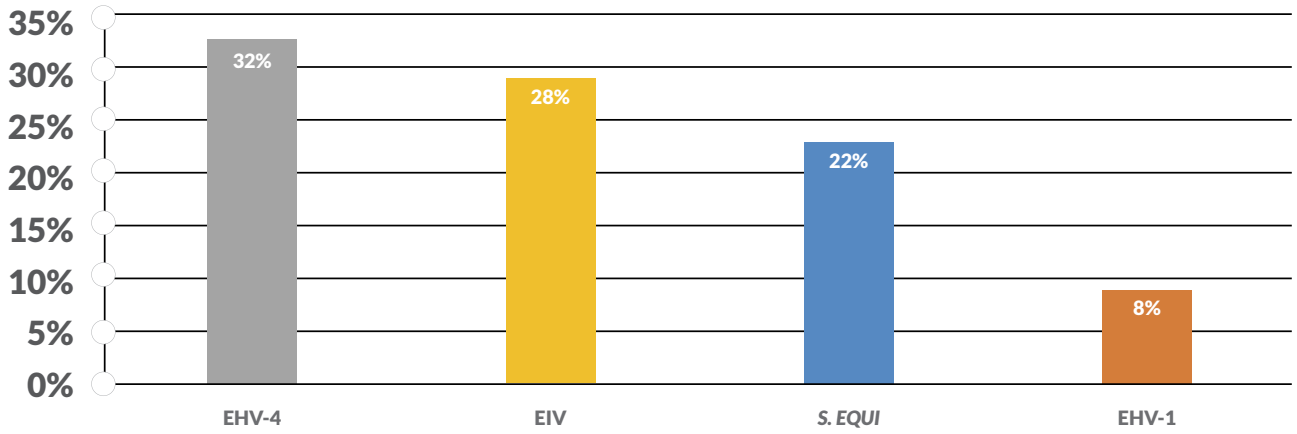
Biosurveillance Program Disease Incidence: March 2008–December 2019[1]

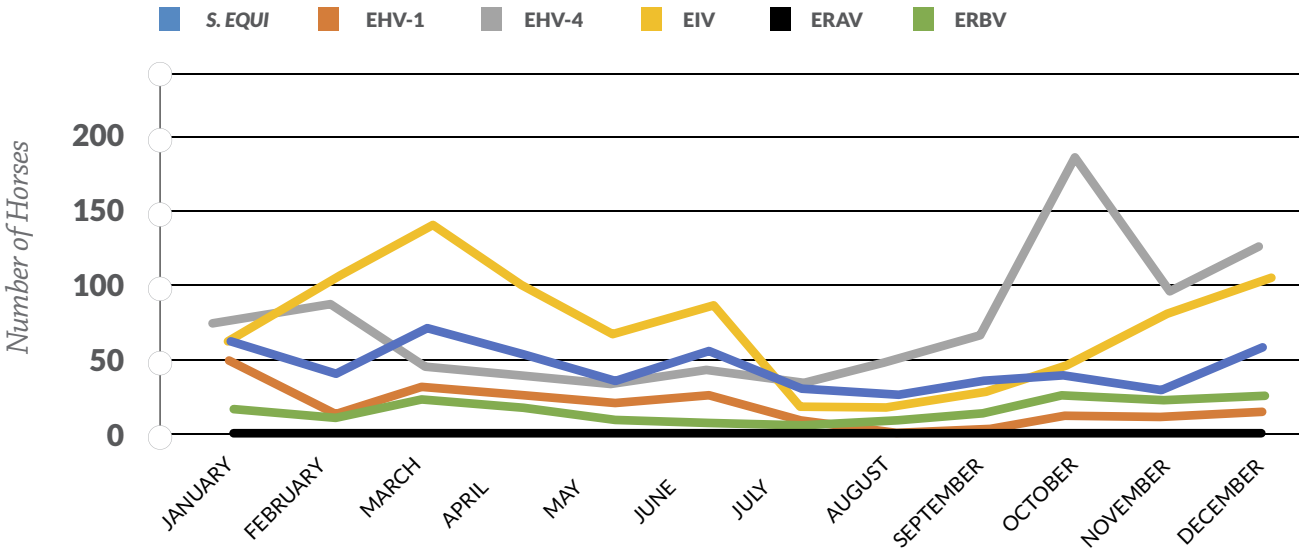
More than 9,000 samples have been collected since the Biosurveillance Program began nearly 12 years ago. Of those, 32% have returned positive for one of six pathogens tracked, including equine herpesvirus types 1 and 4 (EHV-1, EHV-4), equine influenza virus (EIV) and *Streptococcus equi*, which have been tracked from the inception of the program, and ERAV and ERBV, which were added in 2012.

Disease Incidence 2008–2019[1] (As a percentage of total positive samples)



Through December 2019, equine herpesvirus type 4 (EHV-4) was the most diagnosed infectious upper respiratory disease, comprising 32% of all positive samples, followed closely by equine influenza at 28% and then Streptococcus equi *at 22%.*

Biosurveillance Results Monthly Cumulative 2008–2019

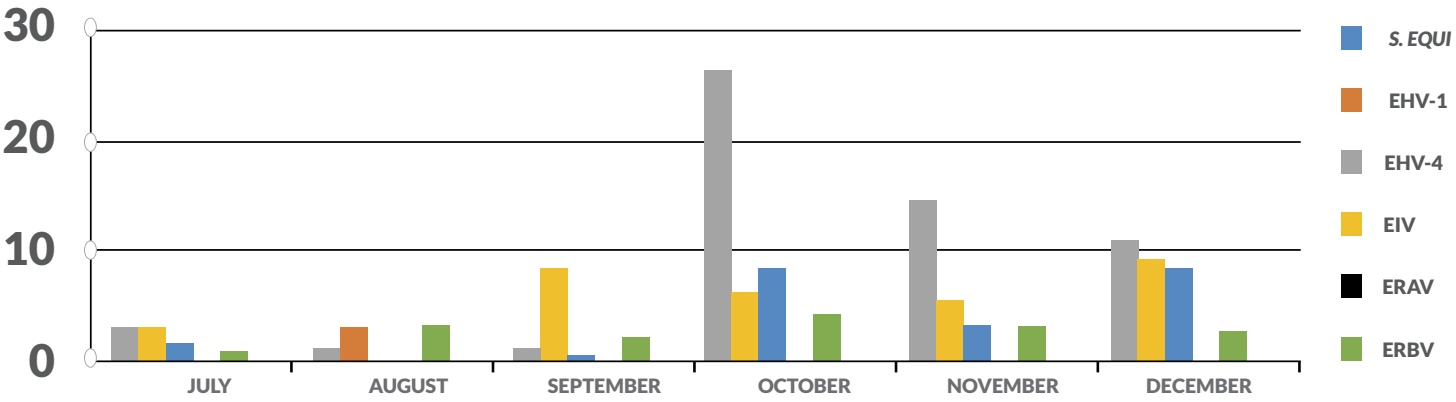


The monthly cumulative depicts the ***seasonal effect of respiratory pathogens*** *spanning 142 months—nearly 12 years—of surveillance. EHV-4 continues to be more prevalent in the fall months, in contrast to the other respiratory pathogens (especially EIV) that are more prevalent in the winter and spring months.*

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

Six-Month Disease Trends July to December 2019[1]

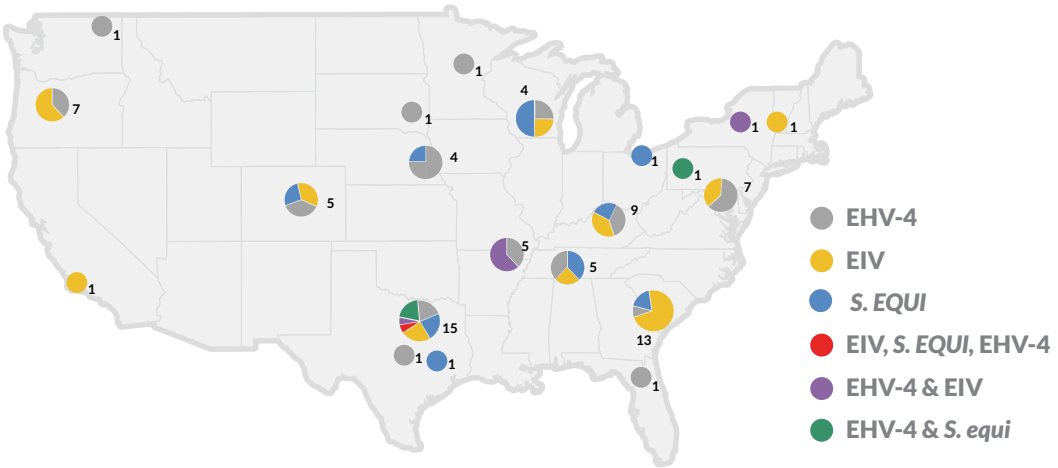
A total of 367 samples were submitted from July to December 2019. Overall, 40% of total samples submitted tested positive for one of the six primary pathogens (*S. equi*, EHV-4, EIV, ERBV, EHV-1, ERAV).



The most recent six months of data (July to December 2019) show that EHV-4 was the most prevalent infectious upper respiratory disease reported, followed by EIV and S. equi.

Demographic Summary	EHV-4 (58 Cases)	EIV (33 cases)	*S. EQUI* (30 Cases)
Median Age	3 years Range: 13 days – 36 years	2 years Range: 6 months – 24 years	9.5 years Range: 4 months – 26 years
Predominant Breed(s)	Quarter Horse	Quarter Horse; Thoroughbred	Quarter Horse
Travel	No 57% Yes 31% Unknown 12%	No 45% Yes 36% Unknown 18%	No 53% Yes 27% Unknown 20%
Primary Discipline	Show 43% Pleasure 31% Other/Unknown 26%	Pleasure 27% Show 45% Other/Unknown 27%	Pleasure 33% Show 37% Other/Unknown 30%

The above table provides a summary of primary demographic parameters for the three major pathogens (July – December 2019).[1]



Geographic representation of the top three pathogens July-December 2019.[1] Pie represents the proportion of total positive EHV-4, EIV and S. equi cases in an area. Areas of disease overlap are also represented (e.g., cases of EHV-4 and EIV).

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

Biosurveillance Program Survey Results

Last fall we sent out a survey requesting your input on the Respiratory Biosurveillance Program. We appreciate the time you took to answer the short survey and provide valuable feedback to help us enhance the program. Overall, you are pleased with the program, which is great to hear! We've compiled a few highlights of survey results below. Remember, your feedback is always welcome by contacting the Merck Animal Health Equine Veterinary Professional Services team at (866) 349-3497.

Top three program benefits:

- *Pathogen identification*
- *Rapid test results*
- *No cost to clients*

The respiratory biosurveillance program provides value to your practice primarily because of:

- *Accurate, timely and comprehensive diagnostic results provided by the UC Davis Equine Infectious Disease Research Laboratory.*
- *The opportunity to share results with clients as reinforcement for recommendations*

Survey participants also said the program provides:

- *Information needed to make the best treatment plan for a horse(s) with an upper respiratory disease*

  4.8/5 RATING ★★★★½

- *Equips participants to make better decisions regarding biosecurity and potential needs for quarantine*

  4.9/5 RATING ★★★★½

When asked where we could improve, suggestions included:

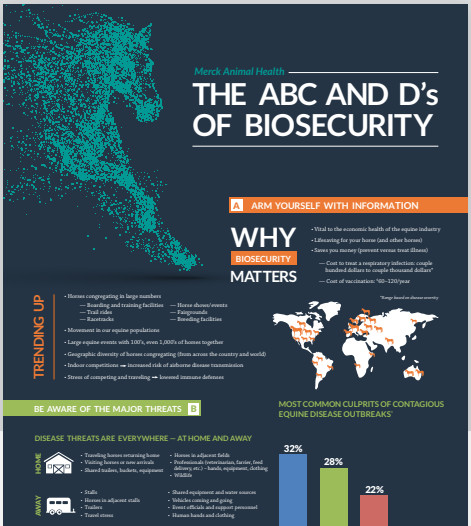
- *Expanding data sharing*
- *Including additional pathogens in the diagnostic panel*
- *Providing more sample kits*

You also told us that you would benefit from more information to evaluate vaccination protocols. We appreciate your feedback and will continue to deliver information and key insights to support vaccination recommendations. In addition, we are continually evaluating ways to enhance the value of this program both in terms of reporting and monitoring for evolving disease threats.

> ***Absolutely love it! Can offer clients diagnostics they may not otherwise elect to do, which gives me a little edge. Thanks for all you do, you guys are great!***
>
> ***-Dr. Linda Quodomine***

Quick Tips For Clients

There's no better time than now to remind clients of the important role of biosecurity in managing infectious disease. Please feel free to share this infographic electronically with clients via your social media pages or website or contact your Merck Animal Health equine sales representative to request posters you can hand out to clients for their barns.



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About the Newsletter

This bi-annual newsletter is being sent to inform the reader about the information generated through 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 (Drs. Barnett, Vaala, Gaughan, Craig, Bain and Chappell) and Nicola Pusterla, DVM, Department of Medicine and Epidemiology, UC Davis.

If you have questions about the program or **to request past issues of the newsletter,** please call our professional services team at (866) 349-3497, or email us 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 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 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 9,000 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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