

Merck Animal Health Equine Respiratory Update

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

New Voluntary Surveillance Data Published on Equine Influenza Virus

Findings document disease trends and emphasize importance of pathogen identification in early management of outbreaks

One of the primary purposes of the ongoing surveillance program is to differentiate pathogens so veterinarians can make more informed decisions about disease management, biosecurity, and vaccination protocols. As we approach another equine influenza season (December-May), the latest publication from the ongoing Respiratory Biosurveillance Program reminds us of the importance of respiratory pathogen testing. The hallmark clinical signs of equine influenza virus (EIV) — fever, nasal discharge, cough and lethargy — also look like other upper respiratory diseases.

The 2023 paper, [Voluntary Surveillance Program for Equine Influenza Virus in the United States during 2008-2021](#), investigates the prevalence and epidemiology of equine influenza in equids from March 2008 to June 2021. Nasal swabs and whole blood samples from more than 9,700 horses across the United States with acute onset of fever and respiratory signs were submitted for qPCR evaluation for EIV, equine herpesvirus type 1 and type 4, *Streptococcus equi* subspecies *equi*, and equine rhinitis A and B virus. Samples were submitted from 333 veterinarians and/or clinics in 42 states.

Investing in ongoing respiratory surveillance to identify causative respiratory pathogen(s) will return dividends.



Key findings

- EIV continues to be one of the most common respiratory pathogens of the horse, running neck and neck with equine herpesvirus type-4 (EHV-4)
- 9.9% EIV positivity rate (qPCR)
 - 966 of 9,740 samples were positive for EIV
 - 35 states were represented
- There was an increasing trend in EIV-positive cases when evaluating time as a continuous factor from 2008 to 2021 (see Figure 1)
- The hallmark clinical signs of EIV—fever, nasal discharge, cough and lethargy—are similar to clinical signs of other upper respiratory diseases (see Figure 2), underscoring the importance of a timely diagnosis to properly manage outbreaks and treat the affected horse(s)
- While EIV affected all ages and breeds throughout the seasons, Quarter Horses less than 9 years of age with a history of recent travel (14 days) and disease occurrence in winter and spring were most represented
- No significant difference was observed between EIV qPCR-positive and EIV qPCR-negative outcomes with respect to the horse's use or occupation at the time of sample submission
- Positive cases were less likely in vaccinated horses
 - Note, a large population of horses had 'unknown' vaccination status at time of submission

Getting ahead of equine influenza season

The ongoing (2008-present) Respiratory Biosurveillance Program clearly supports an uptick in positive disease cases during the winter and spring seasons (Figure 3). While we see EIV throughout the year, the seasonality of EIV infection may warrant re-evaluation of the timing of routine vaccination. As an alternative to biannual vaccination strategies, practitioners may consider:

- Shifting August/September booster vaccinations to November/December
- Continuing with biannual vaccinations in spring and early fall with the addition of a third EIV booster vaccination in November/December for horses experiencing a high risk of exposure and potential loss in training/preparation for winter events. A modified-live vaccine such as Flu Avert® I.N. is an ideal choice in high-risk situations

Minimizing EIV impact

Equine influenza season soon will be upon us. As one of the most common upper respiratory diseases of the horse, EIV presents tremendous economic impact to the industry in lost training and competition time. And it's no picnic for our horses. Fortunately it carries a low mortality rate, but the morbidity rate is high (except for donkeys, who experience high morbidity and mortality). What's more, EIV can lead to secondary infections and pneumonia, which can be particularly challenging to manage.

Equine influenza is one of the most contagious and highly transmissible upper respiratory diseases of the horse. Timely determination of the causative pathogen via molecular diagnostics can substantially impact treatment recommendations and biosecurity measures.

SAMPLE SUBMISSION TIP

The collection of nasal swab samples early in the course of disease (within 3 days of clinical sign appearance) can lead to a greater opportunity to identify EIV versus waiting until clinical signs have been present for more than seven days when pathogen identification will be less likely (*note: the EIV incubation period is 1 to 3 days, and the shedding period can be up to 10 days*).

While vaccination remains the gold standard of protection, disease still can occur, particularly in unvaccinated and undervaccinated populations. The Biosurveillance Program provides fast identification of the causative pathogen so you can intervene early to control patient suffering and disease spread.

Note: The Respiratory Biosurveillance Program is an ongoing sentinel study. Voluntary submissions were received from representative individual(s) acutely affected in a respiratory outbreak. It is not a comprehensive sampling of every affected animal in an outbreak.



FIGURE 1: A Rising Trend in EIV 2008-2021¹

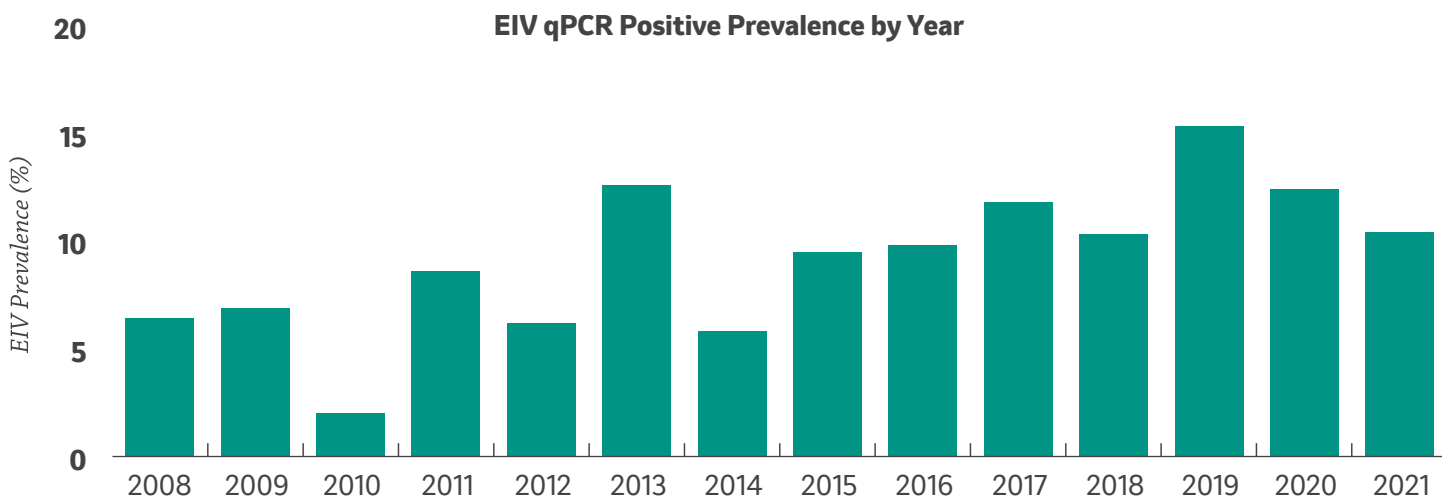
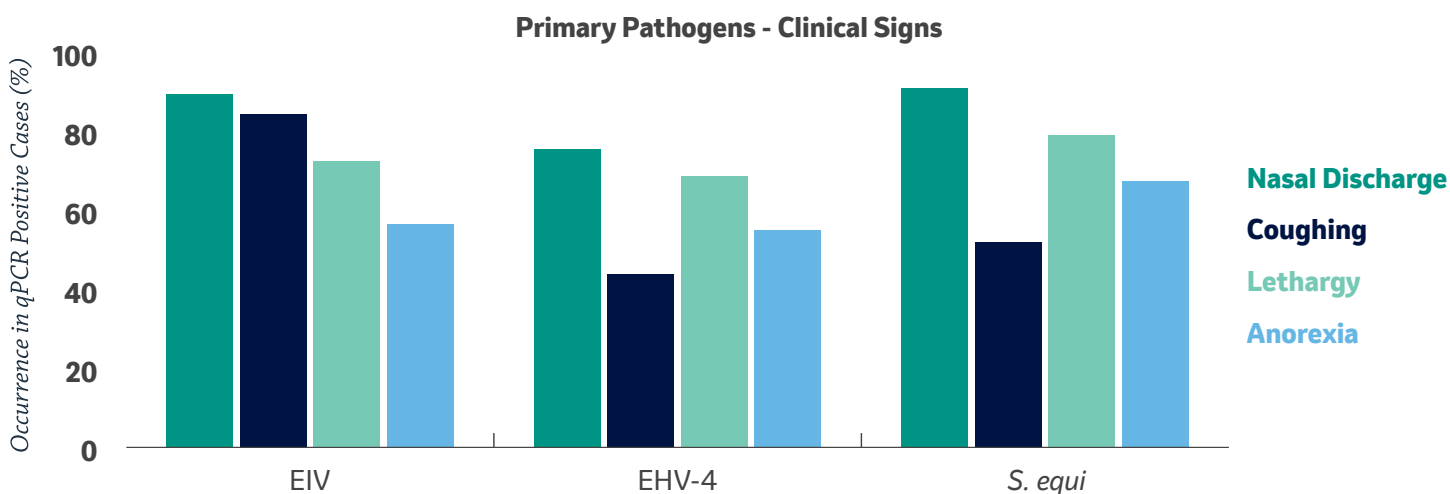
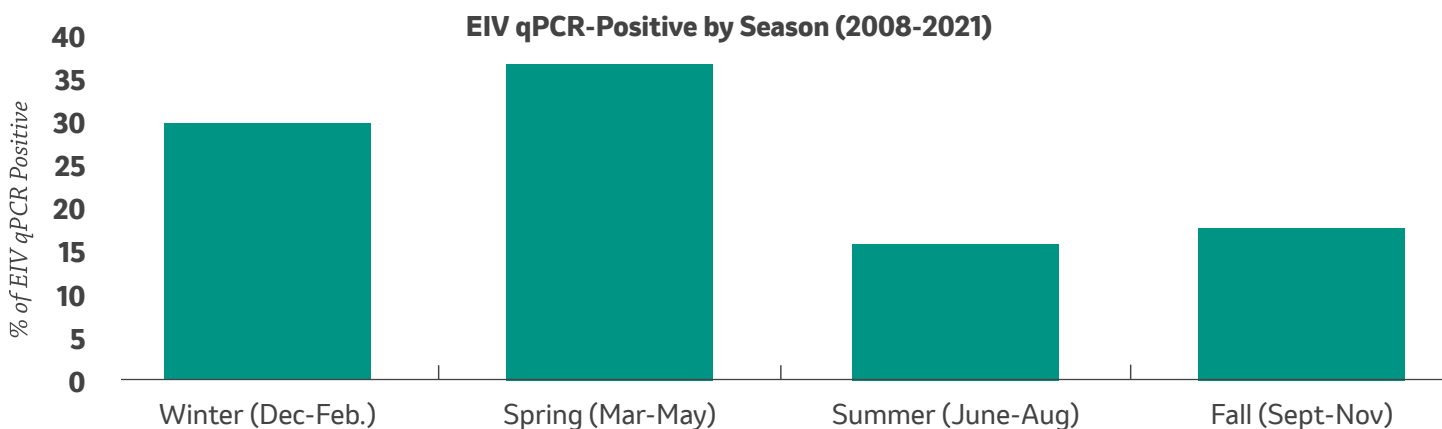


FIGURE 2: Clinical Signs* of the Top Three Respiratory Pathogens²



*Submission criteria to qualify for the surveillance program includes a temperature ≥ 101.5 °F

FIGURE 3: Seasonal Impact of Equine Influenza¹



¹Chappell, D.E.; Barnett, D.C.; James, K.; Craig, B.; Bain, F.; Gaughan, E.; Schneider, C.; Vaala, W.; Barnum, S.M.; Pusterla, N. Voluntary Surveillance Program for Equine Influenza Virus in the United States during 2008-2021. Pathogens 2023, 12, 192. <https://doi.org/10.3390/pathogens12020192>

²Chappell, D.E., et al. Voluntary Surveillance Program for Equine Influenza Virus in the United States During 2008-2021. AAEP Proceedings 2022, Vol. 68.

Current Six-Month Update

A total of 336 samples were submitted from January 1 to June 30, 2023. 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 EHV-4.

FIGURE 4: Disease Incidence January-June 2023³

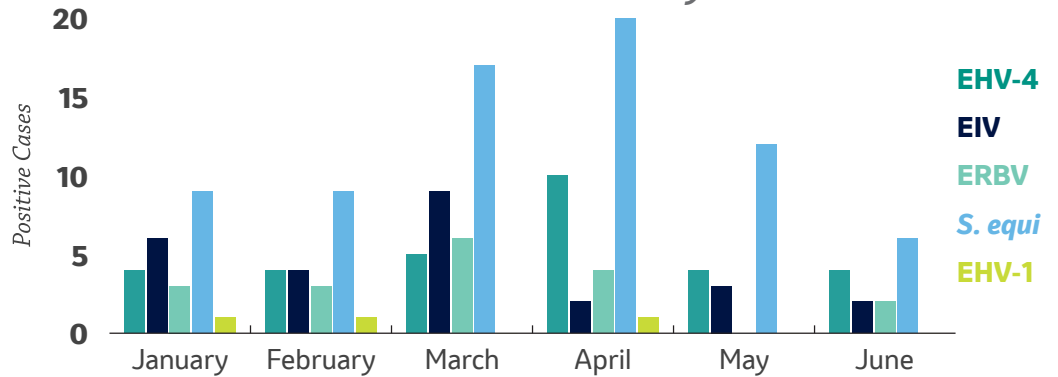
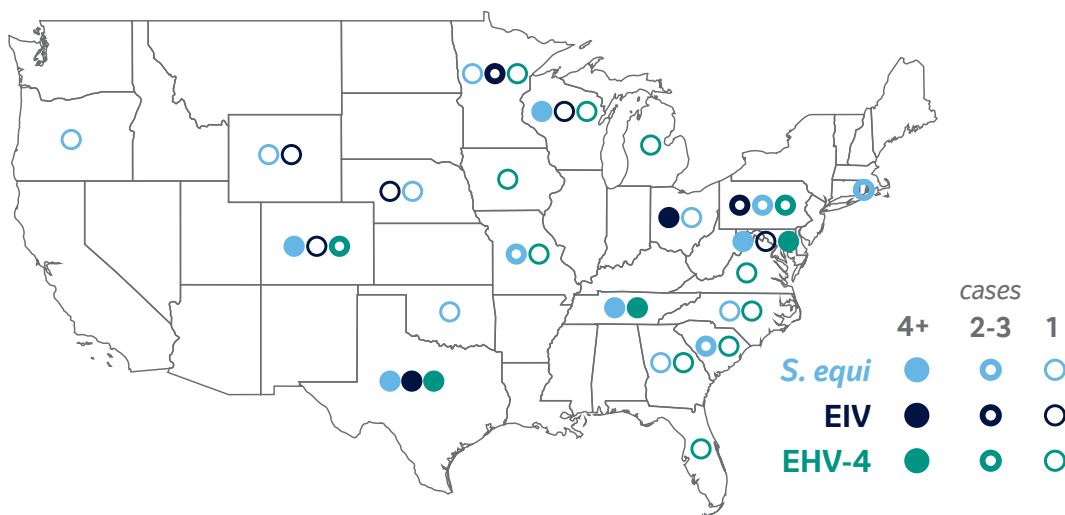


TABLE 1: Summary of Primary Demographic Parameters for the Three Major Pathogens (January-June 2023)³

Demographic Summary	<i>S. equi</i> (73 cases)	EHV-4 (31 cases)	EIV (26 cases)
Median Age	8.5 years Range: 6 weeks – 28 years	3 years Range: 6 weeks – 28 years	5 years Range: 5 months – 24 years
Predominant Breed(s)	Quarter Horse	Quarter Horse	Quarter Horse
Travel	Yes 23% No 69% Unknown 8%	Yes 19% No 74% Unknown 7%	Yes 39% No 46% Unknown 15%
Primary Discipline	Show 31% Pleasure 47% Other/Unknown 22%	Show 23% Pleasure 35% Other/Unknown 42%	Show 50% Pleasure 27% Other/Unknown 23%

FIGURE 5: Geographic Representation of the Top Three Pathogens January-June 2023³



Map represents states with positive cases of *S. equi*, EHV-4 and EIV during the reporting period (January-June 2023).

³Merck 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

This is the fourth installment in our series on vaccination recommendations. The series 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 in regard to vaccination.

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

SERIES 4: Vaccinating the senior horse

Vaccination ins and outs may be second nature to you, but clients could have plenty of questions, especially about vaccinating their older horses. Take a moment to share this critical vaccination information with your senior horse owners.

Senior horses experiencing immunosenescence require special consideration. With many of these horses

continuing to be very active, both recreationally and competitively, well into their golden years, vaccination strategies become paramount to protection. Geriatric horses may also benefit from additional risk-based vaccinations and more stringent farm-wide biosecurity measures to help minimize contact with young horses and performance horses at highest risk of infectious disease, especially EHV-1/4, EIV and *S. equi*. For senior horses still performing or being actively ridden, vaccinate them as you would any adult horse, referencing the [AAEP vaccination guidelines](#).

Studies have shown, particularly with equine influenza, that some modified-live vaccines are advantageous for senior horses. [Flu Avert® I.N.](#) is a non-adjuvanted, non-injectable intranasal vaccine, simply administered through a short nasal applicator, that can be used in those senior horses who have experienced past adverse reactions associated with injectable vaccines. Flu Avert I.N. does not require a booster dose and features a rapid onset of immunity, within 5-7 days of administration.⁴ An intranasal EIV vaccine is recommended for use during outbreaks.⁵



⁴ Townsend HGG. Onset of protection against live-virus equine influenza challenge following vaccination of naive horses with a modified-live vaccine. Unpublished data.

⁵ AAEP Vaccination Guidelines: aaep.org

OWNER TIPS

Disease prevention for the senior horse

It's estimated that senior horses – those 15 years of age and older – account for 20-30% of the entire horse population.⁶ Senior horses may have a diminishing immune system, which means they may be more susceptible to infectious disease and might not respond adequately to vaccination as a preventive measure. As a result, vaccinations and disease prevention are specialized for seniors. Your veterinarian may recommend risk-based vaccinations in addition to routine core vaccinations.

It also helps your older horse when you adhere to a farm-wide biosecurity program. Ideally, seniors would have minimal contact with young horses and performances horses that are at highest risk of infectious disease exposure due to travel and training. Diseases to watch for include EHV-1/4, equine influenza and strangles.

If your senior horse is still performing or being actively ridden, you should follow the vaccine guidelines for a performance horse because commingling with other horses increases risk of infectious disease. However, if your horse is in a low-risk situation, like a relatively stable

herd of horses that do not travel or are permanently retired, his vaccination needs may be different from the traveling group.

In addition, studies have shown, particularly with equine influenza, that some modified-live vaccines, for example [Flu Avert® I.N.](#), are advantageous for senior horses. Flu Avert I.N. is a non-adjuvanted intranasal influenza vaccine that is often used for senior horses who have experienced past adverse reactions associated with injectable vaccines. It requires just a single dose and elicits a rapid immune response, within 7 days of administration, making it ideal in high-risk or outbreak situations.

Ask your veterinarian for a risk-based analysis to determine the vaccines and level of protection necessary for your senior horse, and then read the [AAEP guidelines](#) on core vaccines and at-risk vaccines.

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. Driven by an Unconditional commitment to the horse and those who serve them, Merck Animal Health is providing this newsletter to 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.

- [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.
- [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.
- [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.
- [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.
- [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.
- [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.
- [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.
- [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.
- [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 11,600 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 returned to the Merck Animal Health customer within 24 hours and provide invaluable diagnostic and treatment information.

Four-Fold Purpose:

- 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.
- To provide the horse industry with a better understanding of the prevalence and epidemiology of these respiratory pathogens.
- To identify and monitor the current circulating strains of major equine respiratory pathogens.
- To evaluate the efficacy of current vaccination protocols.



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