Equine caretakers and veterinarians should work together to create a tailored vaccination schedule for each horse

Protecting Your Horse

PAY MIND TO **VACCINATION** SCHEDULING

By **AMANDA DUCKWORTH**

BUDGETING FOR VACCINES is a cornerstone of basic horse husbandry, no matter what career a horse may have. However, there is no one size fits all approach to vaccination schedules because what horses need depends on their job and their location.

Understanding what is best for each herd member is determined through working with a trusted veterinarian. It is also important to understand some of the expected effects vaccines can have, both on an individual horse and for horse populations at large.

Core vaccines are defined by the American Veterinary Medical Association as those "that protect from diseases that are endemic to a region, those with potential public health significance, required by law, virulent/highly infectious, and/or those posing a risk of severe disease. Core vaccines have clearly demonstrated efficacy and safety and thus exhibit a high enough level of patient benefit and low enough level of risk to justify their use in the majority of patients." They include tetanus, Eastern and Western equine encephalomyelitis (EEE and WEE), West Nile virus, and rabies.

Risk-based vaccines vary regionally but can include anthrax, botulism, equine herpesvirus (rhinopneumonitis), equine influenza, equine viral arteritis, leptospirosis, Potomac horse fever, rotaviral diarrhea, snake bite, strangles, and Venezuelan equine encephalomyelitis.

The American Association of Equine Practitioners goes in-depth explaining the importance of working with veterinarians when it comes to vaccination plans in the paper "The Science Behind Veterinarian-Administered Vaccines," by Dr. Tom Lenz.

"Vaccines are safest and most effective when administered by your veterinarian," explained Lenz. "Commercially available vaccines are regulated by the federal government and must meet rigid standards for stability, effectiveness and safety. If handled and administered properly, they are seldom the reason for vaccine failure. Each vaccine has a particular use and period for which they provide protection. A veterinarian can help create a vaccine protocol that includes the core vaccines as well as any additional vaccines based on the individual horse's risk level.

"If there is a complication with vaccine administration or if your horse develops a disease that it was vaccinated by a veterinarian against, the vaccine company generally wants to be involved in the resolution. They accept responsibility when a veterinarian has administered the vaccines because they trust that storage and administration were correctly performed. This is not the case if vaccines were administered by a lay person."

Much like in humans, it should come as no surprise that horses can feel the effects of receiving a vaccine immediately afterward. In July 2024, the Journal of the American Veterinary Medical Association published "Serum amyloid A

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For oral use in horses only. Do not inject EquiCoxib™. Do not use in horses intended for human consumption. EquiCoxib is contraindicated in horses with a hypersensitivity to firocoxib. A veterinarian should advise horse owners to observe for signs of potential drug toxicity. As a class, nonsteroidal anti-inflammatory drugs may be associated with gastrointestinal, hepatic and renal toxicity. Use with other NSAIDs, corticosteroids or nephrotoxic medication should be avoided. EquiCoxib has not been evaluated in horses less than 1 year of age or in breeding horses, or pregnant or lactating mares. For complete safety information on the use/handling of this product, see accompanying product insert located on page

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Temperature checks after vaccinations are likely to reveal fevers

ANNE M. EBERHARDT

increases following routine vaccination of healthy adult horses."

Serum amyloid A (SAA) is a protein in blood which increases in response to stress, infection, or injury. Due to this, SAA levels are often measured when trying to determine if a horse has an infection or is experiencing inflammation.

"SAA is a major acute-phase protein in horses with a low plasma concentration in healthy animals that increases > 100-fold in response to an inflammatory stimulus, whereas plasma concentration decreases rapidly with resolution of inflammation," explained researchers. "These characteristics make measuring SAA advantageous over other minor acute-phase proteins in horses by aiding clinicians in disease diagnosis and determining the length of medical treatment, as well as providing prognosis."

In all, 36 horses were used ranging in age and breed. Of those, 21 were healthy client-owned horses and 15 were owned by the Kansas State University College of Veterinary Medicine. Two experiments were conducted.

The first experiment, which used eight horses, was a blinded, randomized, prospective, crossover study. Horses were either vaccinated (rabies, tetanus, West Nile, Eastern and Western equine encephalomyelitis, equine herpesvirus-1/-4, influenza) or administered saline. SAA levels were measured at six, 12, and 24 hours and then daily for 10 days.

The second experiment, which used 28 horses, was a prospective, observational study that measured SAA after vaccination at 12 and 24 hours and daily until day 10.

"Over time, vaccinated horses had

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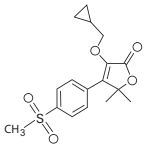
Description:

EquiCoxib™ (firocoxib) belongs to the coxib class of non-narcotic, non-steroidal anti-inflammatory drugs (NSAIDs). Firocoxib is a white crystalline compound described chemically as 3-(cyclopropylmethoxy)-4-(4-(methylsulfonyl)phenyl)-5,5-dimethylfuranone. The empirical formula is $C_{17}H_{20}O_5S$, and the molecular weight is 336.4. The structural formula is shown below:



Indications:

EquiCoxib Oral Solution is administered for up to 14 days for the control of pain and inflammation associated with osteoarthritis in horses.

Dosage and Administration:

Always provide the Client Information Sheet with the prescription. The recommended dosage of EquiCoxib (firocoxib) for oral administration in horses is 0.045 mg/lb (0.1 mg/kg) of body weight once daily for up to 14 days. In target animal safety studies, toxicity was seen at the recommended dose when the duration of treatment exceeded 30 days. **Only administer EquiCoxib with the provided dosing syringe.**

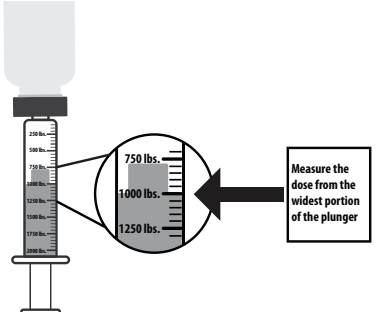
Each 1.25 mL volume will treat 250 pounds of body weight and each additional 0.25 mL volume corresponds to approximately a 50 lb weight increment. The provided dosing syringe is calibrated so that each line corresponds to a 50 lb weight increment. To deliver the correct dose, round the horse's body weight up to the nearest 50 pound increment (if the body weight is an exact 50 pound increment, do not round up).

FOR ORAL USE ONLY. DO NOT INJECT EQUICOXIB.
ONLY ADMINISTER WITH THE PROVIDED DOSING SYRINGE.

EquiCoxib Oral Dosing Guide

Body Weight (lb)	Dose Volume (mL)
250	1.25 mL
500	2.5 mL
750	3.75 mL
1000	5 mL
1250	6.25 mL

1) Remove draw-off cap. Peel off the foil-backed seal from the bottle.
2) Screw the draw-off cap tightly back on the bottle.
3) Remove the seal from the top of the cap exposing the cross-hatched opening in the center of the silicone liner.
4) Remove the provided oral dosing syringe from its plastic cover.
5) Insert the oral dosing syringe firmly into the cross-hatched opening of the cap's silicone liner.
6) Turn the bottle with attached syringe upside down. Pull back the syringe plunger until the widest portion of the plunger lines up with the line that corresponds with the animal's weight. Each line between the 250 lb increments corresponds to 50 lb.



7) Turn the bottle with attached syringe right side up and separate the dosing syringe from the bottle.
8) Give orally according to your veterinarian's instructions. DO NOT INJECT.

Contraindications:

Horses with hypersensitivity to firocoxib should not receive EquiCoxib Oral Solution.

Warnings:

For oral use in horses only. Do not use in horses intended for human consumption.

Human Warnings: Not for use in humans. Keep this and all medications out of the reach of children. Wash hands with soap and water after use. Consult a physician in case of accidental ingestion by humans.

Animal Safety: Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription.

Keep EquiCoxib in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

To report suspected adverse drug events, for technical assistance or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical at 1-888-215-1256 or www.aurorapharmaceutical.com. For additional information about adverse drug experience for animal drugs, contact FDA at 1-888-FDA-VETS or online at www.fda.gov/reportanimalae.

Precautions:

Horses should undergo a thorough history and physical examination before initiation of NSAID therapy. Appropriate laboratory tests should be conducted to establish hematological and serum biochemical baseline data before and periodically during administration of any NSAID. Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription. See **Information for Owner or Person Treating Horse** section of this package insert.

Treatment with EquiCoxib should be terminated if signs such as inappetance, colic, abnormal feces, or lethargy are observed. As a class, cyclooxygenase inhibitory NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. Sensitivity to drug-associated adverse events varies with the individual patient. Horses that have experienced adverse reactions from one NSAID may experience adverse reactions from another NSAID. Patients at greatest risk for adverse events are those that are dehydrated, on diuretic therapy, or those with existing renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be carefully approached or avoided. NSAIDs may inhibit the prostaglandins that maintain normal homeostatic function. Such anti-prostaglandin effects may result in clinically significant disease in patients with underlying or pre-existing disease that has not been previously diagnosed. Since many NSAIDs possess the potential to produce gastrointestinal ulcerations and/or gastrointestinal perforation, concomitant use of EquiCoxib Oral Solution with other anti-inflammatory drugs, such as NSAIDs or corticosteroids, should be avoided. The concomitant use of protein bound drugs with EquiCoxib Oral Solution has not been studied in horses. The influence of concomitant drugs that may inhibit the metabolism of EquiCoxib Oral Solution has not been evaluated. Drug compatibility should be monitored in patients requiring adjunctive therapy. The safe use of EquiCoxib Oral Solution in horses less than one year in age, horses used for breeding, or in pregnant or lactating mares has not been evaluated. Consider appropriate washout times when switching from one NSAID to another NSAID or corticosteroid.

Adverse Reactions:

In controlled field studies, 127 horses (ages 3 to 37 years) were evaluated for safety when given firocoxib at a dose of 0.045 mg/lb (0.1 mg/kg) orally once daily for up to 14 days. The following adverse reactions were observed. Horses may have experienced more than one of the observed adverse reactions during the study.

Adverse Reactions Seen in U.S. Field Studies

Firocoxib was safely used concomitantly with other therapies, including vaccines, anthelmintics, and antibiotics, during the field studies. The safety data sheet (SDS) contains more detailed occupational safety information.

To report suspected adverse drug events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical Inc. at 1-888-215-1256 or www.aurorapharmaceutical.com. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or online at www.fda.gov/reportanimalae.

Adverse Reactions	Firocoxib n=127	Active Control n=125
Abdominal pain	0	1
Diarrhea	2	0
Excitation	1	0
Lethargy	0	1
Loose stool	1	0
Polydipsia	0	1
Urticaria	0	1

Information for Owner or Person Treating Horse:

You should give a Client Information Sheet to the person treating the horse and advise them of the potential for adverse reactions and the clinical signs associated with NSAID intolerance. Adverse reactions may include erosions and ulcers of the gums, tongue, lips and face, weight loss, colic, diarrhea, or icterus. Serious adverse reactions associated with this drug class can occur without warning and, in some situations, result in death. Clients should be advised to discontinue NSAID therapy and contact their veterinarian immediately if any of these signs of intolerance are observed. The majority of patients with drug-related adverse reactions recover when the signs are recognized, drug administration is stopped, and veterinary care is initiated.

Clinical Pharmacokinetics / Pharmacodynamics:

Pharmacokinetics: When administered as a 0.045 mg/lb (0.1 mg/kg) dose in oral paste to adult horses with normal access to roughage, feed, and water, the absolute bioavailability of firocoxib from oral paste is approximately 79%. Following oral administration, drug peak concentration (Cmax) of 0.08 mcg/mL can be reached at 4 hours (Tmax) post-dosing. However, in some animals, up to 12 hours may be needed before significant plasma concentrations are observed. Little drug amount distributes into blood cells. The major metabolism mechanism of firocoxib in the horse is decyclopropylmethylation followed by glucuronidation of that metabolite. Based upon radiolabel studies, the majority of firocoxib is eliminated in the urine as the decyclopropylmethylated metabolite. Despite a high rate of plasma protein binding (98%), firocoxib exhibits a large volume of distribution (mean Vd(ss) = 1652 mL/kg). The terminal elimination half-life ($T_{1/2}$) in plasma averages 30-40 hours after IV or oral paste dosing. Therefore, drug accumulation occurs with repeated dose administrations and steady state concentrations are achieved beyond 6-8 daily oral doses in the horse. Dose linearity exists from 1X-2X of 0.1 mg/kg/day.

Mode of action: EquiCoxib (firocoxib) is a cyclooxygenase-inhibiting (coxib) class, non-narcotic, non-steroidal anti-inflammatory drug (NSAID) with anti-inflammatory, analgesic and antipyretic activity[1] in animal models. Based on in vitro horse data, firocoxib is a selective inhibitor of prostaglandin biosynthesis through inhibition of inducible cyclooxygenase-2-isoenzyme (COX-2)[2]. Firocoxib selectivity for the constitutive isoenzyme, cyclooxygenase-1 (COX-1) is relatively low. However, the clinical significance of these in vitro selectivity findings has not been established.

Effectiveness:

Two hundred fifty-three client-owned horses of various breeds, ranging in age from 2 to 37 years and weighing from 595 to 1638 lbs, were randomly administered firocoxib oral paste or an active control drug in multi-center field studies. Two hundred forty horses were evaluated for effectiveness and 252 horses were evaluated for safety. Horses were assessed for lameness, pain on manipulation, range of motion, joint swelling, and overall clinical improvement in a non-inferiority evaluation of firocoxib oral paste compared to an active control. At study's end, 84.4% of horses treated with firocoxib oral paste were judged improved on veterinarians' clinical assessment, and 73.8% were also rated improved by owners.
Horses treated with firocoxib oral paste showed improvement in veterinarian-assessed lameness, pain on manipulation, range of motion, and joint swelling that was comparable to the active control.

Animal Safety:

In a target animal safety study, firocoxib was administered orally to healthy adult horses (two male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 30 days. Administration of firocoxib at 0.3 and 0.5 mg/kg body weight was associated with an increased incidence of oral ulcers as compared to the control group but, no oral ulcers were noted with 0.1 mg/kg. There were no other drug-related adverse findings in this study.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (four males or male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 42 days. Administration of firocoxib at 0.1, 0.3 and 0.5 mg/kg body weight was associated with delayed healing of pre-existing oral (lip, tongue, gingival) ulcers. In addition, the incidence of oral ulcers was higher in all treated groups as compared to the control group.

Clinical chemistry and coagulation abnormalities were seen in several horses in the 0.5 mg/kg (5X) group. One 5X male horse developed a mildly elevated BUN and creatinine over the course of the study, prolonged buccal mucosal bleeding time (BMBT), and a dilated pelvis of the right kidney. Another 5X male had a similar mild increase in creatinine during the study but did not have any gross abnormal findings. One female in the 5X group had a prolonged BMBT, bilateral tubulointerstitial nephropathy and bilateral papillary necrosis. Tubulointerstitial nephropathy occurred in one 3X female, two 3X male horses, and the 5X female horse discussed above with the prolonged BMBT. Papillary necrosis was present in one 1X male horse and the 5X female horse discussed above. Despite the gross and microscopic renal lesions, all of the horses were clinically healthy and had normal hematology, clinical chemistry and urinalysis values.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (three females, two male castrates and one male per group) at 0, 0.25 mg/kg, 0.75 mg/kg and 1.25 mg/kg (2.5, 7.5 and 12.5X the recommended dose of 0.1 mg/kg) for 92 days. An additional group of three females, two male castrates and one male per group, was dosed at 1.25 mg/kg for 92 days but was monitored until Days 147-149. There were treatment-related adverse events in all treated groups. These consisted of ulcers of the lips, gingiva and tongue and erosions of the skin of the mandible and head. Gross and microscopic lesions of the kidneys consistent with tubulointerstitial nephropathy were seen in all treated groups. Papillary necrosis was seen in the 2.5X and 12.5X groups. In addition, several 12.5X horses had elevated liver enzymes (GGT, SDH, AST and ALT). One 2.5X horse had increased urine GGT and urine protein levels which was due to renal hemorrhage and nephropathy. Gastric ulcers of the margo plicatus and glandular area were more prevalent in the 2.5X and 7.5X groups, but not seen in the 12.5X group. The group of horses that were monitored until Days 147-149 showed partial to full recovery from oral and skin ulcers, but no recovery from tubulointerstitial nephropathy.

Storage Information:

Store below 77°F (25°C). Brief excursions up to 104°F (40°C) are permitted.

How Supplied:

EquiCoxib is available in 90 mL bottles, sufficient to treat a 1250 lb. horse for up to 14 days, and 400 mL bottles, sufficient to treat four 1250 lb. horses for up to 14 days.

References:

[1]McCann ME, Rickes EL, Hora DF, Cunningham PK et al. In vitro effects and in vivo efficacy of a novel cyclooxygenase-2 inhibitor in cats with lipopolysaccharide-induced pyrexia. Am J Vet Res. 2005 Jul;66 (7):1278-84

[2]McCann ME, Anderson DR, Brideau C et al. In vitro activity and in vivo efficacy of a novel COX-2 inhibitor in the horse. Proceedings of the Academy of Veterinary Internal Medicine. 2002. Abstract 114, p.789.

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Rev No. 04/2024

increased model-adjusted SAA compared to unvaccinated horses without clinical evidence of adverse reaction," researchers concluded. "In experiment 1, the model-adjusted SAA after vaccination peaked on day 2 and returned to normal by day 9 after vaccination. In experiment 2, vaccinated horses had increased SAA over time; temperature and SAA were not correlated.

"The results of our study indicated that routine vaccination results in an increased SAA concentration. This may provide evidence that, when advising owners considering travel or competition for their horse, practitioners should recommend the horse undergo a period of convalescence following vaccination. Further studies investigating the effect of travel or competition on antibody response are required. Measuring SAA for 10 days following vaccination cannot be reliably used as an indicator of illness."

These results are consistent with other studies, but importantly, according to the researchers, this was the first study in horses to follow SAA concentrations for 10 days. They found that 85.7% of horses' SAA returned to normal within those 10 days.

Another factor to consider is where the horses being vaccinated are coming from. In July 2023, the Journal of Equine Veterinary Science published "Acute Phase Protein Response in Native and Imported Horses After Routine Combination Vaccination Protocol."

According to the American Association of Equine Practitioners, "Commercially available vaccines are regulated by the federal government and must meet rigid standards for stability, effectiveness and safety."

This was a prospective cohort study evaluating SAA, fibrinogen, and rectal temperature following a standard combination vaccination. During the study, blood for measurement of SAA and serum fibrinogen as well as rectal temperatures were obtained before and repeatedly after vaccination.

"After vaccination, SAA and fibrinogen increased in all horses," researchers concluded. "Imports had elevated SAA from 24-168 hours, whereas native horses returned to baseline by 168 hours. Compared to native horses, SAA was significantly higher in imports. Fibrinogen increased significantly from 24 to 168 hours postvaccination, but groups did not differ. Absolute rectal temperatures were significantly higher in imports throughout, including 0 hour.

"At 24 hours postvaccination when temperatures significantly increased above baseline in both groups, there was a small but significant difference in the percent change relative to baseline. A standard combination vaccination protocol elicited an acute phase response in all horses. Compared to native previously vaccinated horses, imports had a stronger SAA response. The observed response is worthy of consideration when examining recently vaccinated imported horses."

One of the key reasons to vaccinate a horse appropriately is to help slow or stop the spread of disease. As the AAEP explains: "Programs for the control of infectious diseases are important components of good managerial practices directed toward maximizing the health, productivity, and performance of horses. Infectious disease in an individual horse, or outbreaks of infection within a group of horses, occurs when a sufficient quantity of an infectious agent overcomes the resistance acquired through prior natural exposure to the disease agent or through vaccination." While that may seem straightforward, continuing education for owners remains an important part of the process.

In November 2023 Animals (Basel) published "Cross-Sectional Survey of Horse Owners to Assess Their Knowledge and Use of Biosecurity Practices for Equine Infectious Diseases in the United States."

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1. Zycosan® Freedom of Information Summary NADA 141-559

Proof of a horse having received an influenza vaccination is shown at a British racecourse

"Horses are transported in the United States more than any other livestock species and co-mingle at various events; therefore, they are considered to be at an increased risk for infectious disease transmission," explained researchers. "The fragmented movement of horses combined with numerous sites of co-mingling makes tracing the potential spread of a disease outbreak a necessary part of an infection control plan, both locally and nationally. The cross-movement of personnel with horses and the persistence of endemic diseases make biosecurity implementation an ongoing challenge."

Researchers wanted to determine horse owners' understanding and knowledge of biosecurity practices for preventing infectious diseases in the country. Questions for their survey covered owner demographic information, including horse use, which was divided into 10 categories including: pleasure/trail riding, lessons/school, Western show, English show, breeding, farm/ranch, retired, racing, driving, and other.

Other questions were used to determine the horse owner's response to vaccine use, disease risk due to horse and human contact, knowledge of biosecurity techniques, and preferences regarding information presentation. A total of 2,413 responses were collected.

"Owners are the primary decision maker for their horse's medical care (91.6%) compared to trainers and veterinarians, and when selecting the top three sources for infectious disease information, veterinarians ranked highest (98.8%)," researchers concluded. "Owners rely on veterinarians (93.2%) to determine the appropriate vaccine for their horses, with 78.6% of vaccines administered by veterinarians."

However, researchers noted that collectively horse owners could do a better job in terms of education and concern in this area.

"Significant differences by horse use were identified for vaccination, biosecurity planning, use of isolation, disease risk, monitoring for diseases, co-mingling of horses, sanitation, medical decision making and health record requirements for horse events," concluded researchers. "In summary, the results suggest that most owners are not highly concerned about the risk of disease or the use of biosecurity."

Of course, this concern is not solely confined to the United States. In January 2025, Equine Veterinary Journal published " 'I want to be the sort of owner that he wants me to be': Rationales for biosecurity implementation among British horse owners."

"Horse owners play a critical role in mitigating the risk of pathogen spread between horses," explained researchers. "However, little is known about how they view biosecurity and whether they experience barriers to the uptake of preventive measures."

Researchers conducted a qualitative study using semi-structured interviews across Great Britain and concluded that participants felt a moral obligation to prioritize their horse's happiness, which became a challenge when certain biosecurity measures (e.g., quarantine) were perceived as compromising their horse's happiness or comfort. The other theme they identified was that a lack of biosecurity was the social norm among shared yards and competition venues, which made it difficult for participants to implement biosecurity measures effectively on their own.

"In contrast to biosecurity measures that relied on separation, vaccines were generally regarded by participants as an acceptable choice to protect their horse's health while minimizing the horse's risk of discomfort," researchers said. "Some participants felt that the effort, cost, and emotional considerations of vaccinating their horse were less than those associated with their horse contracting a disease."

However, continuing education with horse owners on the importance of vaccines was also noted.

"Identifying risks and benefits of vaccines was challenging for participants, and many expressed difficulties in understanding the nuances surrounding vaccines," concluded researchers. "This was further

As part of a study, a survey was conducted among horse owners to determine their knowledge of biosecurity practices

THIS PAGE, TOP: EDWARD WHITAKER/RACING POST; BOTTOM: RICK SAMUELS; OPPOSITE PAGE: ANNE M. EBERHARDT

Among United States livestock, horses are transported the most, putting them at increased risk for infectious disease transmission

complicated by the communications about equine influenza distributed by veterinarians, equestrian bodies, and government agencies, which some horse owners found confusing and lacking sufficient explanation about why vaccines were needed."

The reality is that the baseline cost of keeping a horse happy and healthy is rarely a small one. In November 2024, the Journal of the American Veterinary Medical Association published "National survey reveals elastic price sensitivity for select equine veterinary services."

"The objective of this study was to estimate the price elasticity of demand for three common equine veterinary services: vaccinations (a routine service), lameness examinations (an elective service), and emergency colic surgery (an urgent service)," explained researchers.

For the study, researchers collected data via a nationwide online survey of horse owners from Aug. 15 to Sept. 11, 2023, eliciting their willingness to pay for each service. The target audience was U.S. residents aged 18 or older who were financially responsible for at least one horse, pony, mule, or donkey. The survey received a total of 4,915 usable responses, with at least one response from every state in the country.

"Results revealed elastic demand for all three services and subsample analyses provided reassurance as to the robustness of the results, suggesting that quantity demanded of these services would decrease more in a relative sense as compared to the increase in price," concluded researchers. "Demand for spring vaccinations was always elastic, meaning that a practice's total revenue would decrease if the price of vaccinations increased."

Equine health is a multi-faceted puzzle, but working with a trusted veterinarian to create a responsible vaccine schedule for each herd member is critical both in terms of individual well-being and the safety of the other horses whose paths they may cross. BH