The Modern Equine Vet

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Endocrine System in Donkeys

The Fight Against Resistant *R. equi*

Horses Also Suffering in Ukraine

Technician Update: Vertebral Abscess in a Foal

CARE CREDIT ON BUDGET-FRIENDLY PAYMENT OPTIONS

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The Modern Equine Vet

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Predicting Laminitis in Ponies

Information gathered from the clinical examination, blood analysis or the client's descriptions of the pony's management can all be used to assess laminitis risk, according to a recent study.

The basal or oral glucose insulin concentrations can be used to classify the animal's risk as high, medium or low, so that prevention strategies can be implemented among those at highest risk.

In this prospective study, researchers wanted to identify the most useful physical factors to predict laminitis development in ponies.

They collected data from a cohort of 374 ponies without laminitis every six months for up to 4 years, monitoring them for the development of laminitis. The ponies were between 5 and 32 years old (891 pony-years were included in the analysis). They spoke with the owners about the ponies' management, did a physical examination, noting information such as weight gain, etc., and collected blood for laboratory testing.

Metabolic data collected including basal plasma adrenocorticotropic hormone (ACTH), adiponectin, triglycerides, and glucose concentrations. The serum insulin concentrations were measured in the unfasted basal state.

Forty-three cases of laminitis were reported; 32 were confirmed by a veterinarian, 8 diagnosed by a farrier and 3 by the owner or person caring for the animal.

Laminitis development was associated with numerous factors, including serum insulin concentrations, plasma concentration of adiponectin, and divergent hoof growth. But ACTH was not independently associated with laminitis, according to the researchers.

One hundred twenty-eight ponies left the study for reasons other than laminitis: 33 died or were euthanized, and 70 moved or were sold. **MeV**

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For more information:

Knowles EJ, Elliott J, Harris PA, et al. Predictors of laminitis development in a cohort of nonlaminitic ponies. *Equine Vet J.* 09 March 2022 https://doi.org/10.1111/evj.13572
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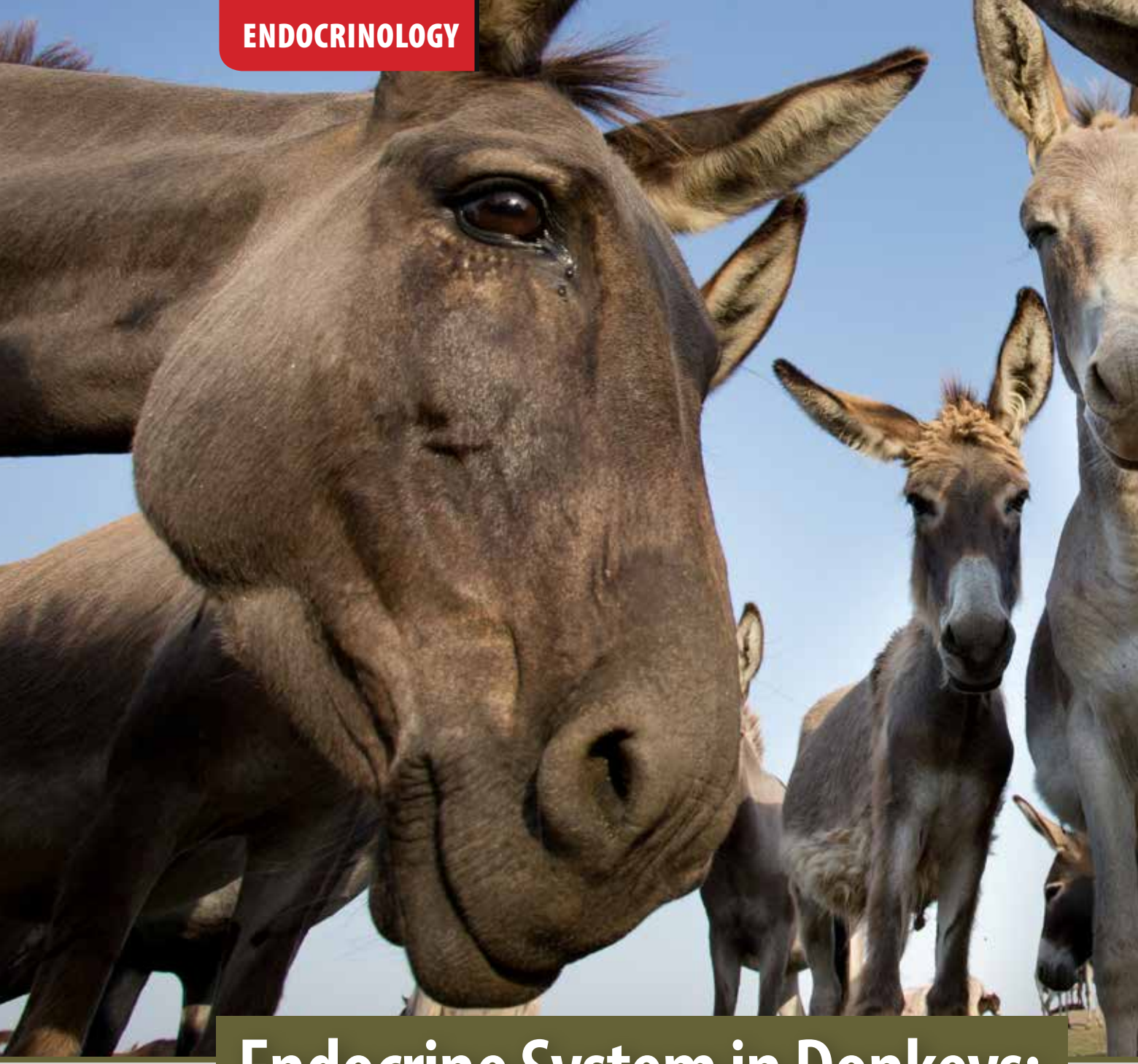

Endocrine System in Donkeys:

IT'S JUST DIFFERENT

One of the most important things to realize when treating donkeys with endocrine disorders is that donkeys are not small horses.

"They are not," insisted **Ramiro E. Toribio,** DVM, MD, PhD, DACVIM, a professor of equine internal medicine and the Trueman Endowed Chair of Equine Medicine and Surgery at The Ohio State University, in Columbus.

Although they suffer similar endocrine conditions as horses, their metabolism is different and so they re-

By Marie Rosenthal MS

spond to tests differently and the clearance for many drugs used to manage endocrine conditions is different between horses and donkeys.

Donkeys suffer from a similar condition to equine metabolic syndrome (EMS) called asinine metabolic syndrome/donkey metabolic syndrome (AMS/DMS). Both have a genetic predisposition toward these metabolic problems.

"Energy efficiency predisposes donkeys to accumulate and mobilize fat, hyperinsulinemia and lamellar sensitivity to hyperinsulinemia," which leads to AMS/DMS, Dr. Toribio explained at the AAEP Annual Convention 2021.

The animal's mismanagement can lead to laminitis, obesity, hyperlipemia and other problems, he said. The signs are similar with regional adiposity, laminitis, insulin dysregulation or insulin resistance and hyperglycemia.

The major risk factors for donkeys are the humans who care for them, he said. Donkeys can exist in desert conditions with low-grade roughage. They evolved to digest poor-quality forage, so modern diets are too rich for the donkey's system. In addition, most donkeys are not used for work anymore, so they get less physical activity. High carbohydrates and less physical activity predispose them to AMS/DMS, he said.

Laminitis is a major concern in these animals. "The high insulin concentration [they develop] will alter the

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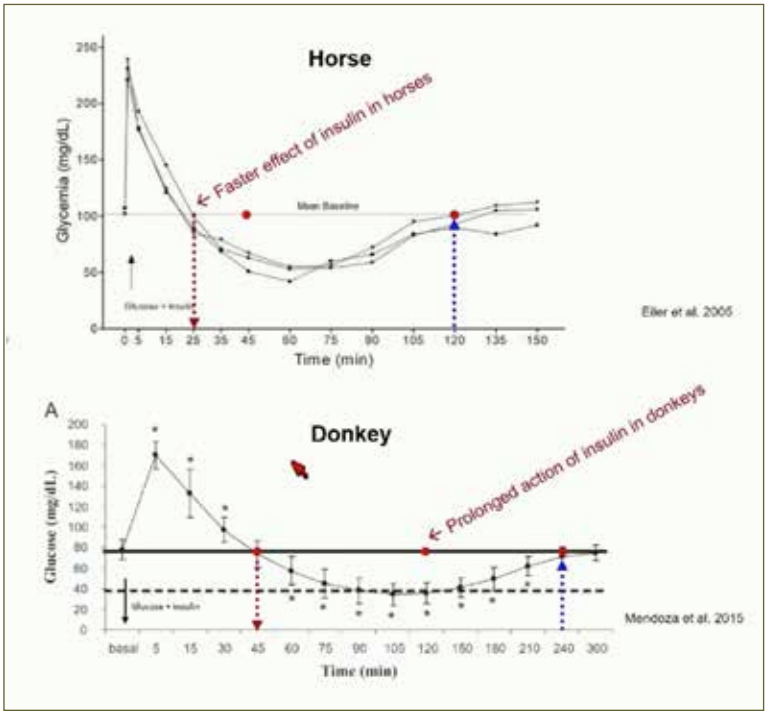
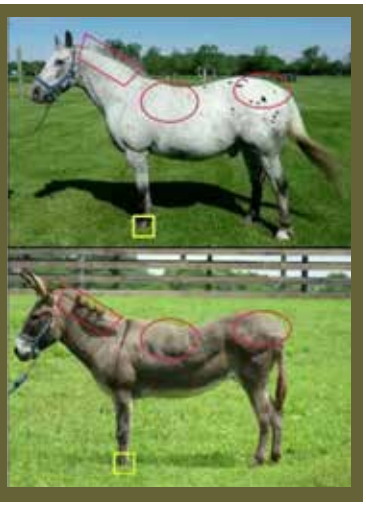


METABOLIC SYNDROME

- **Equine metabolic syndrome** and **Asinine metabolic syndrome** are recently described conditions
- These animals have:
  - **Obesity** (regional adiposity)
  - **Laminitis**
  - **Hyperinsulinemia**
  - **Hyperglycemia**



Images from Dr. Toribio's presentation at the AAEP Annual Convention

behavior of the cells in the lamella of the hoof and then it will detach," he said.

Where the horse and donkey part ways is in testing and management, he explained. The glucose levels of a glucose tolerance test will peak at different times in a horse than a donkey. When IV glucose and insulin are given at the same time, at about 25 minutes, the glucose is back to baseline in a horse. In a donkey that will take about 45 minutes, according to Dr. Toribio.

"The effect of insulin is faster in horses," so a veterinarian cannot use equine values to interpret the test because of the different glucose dynamics.

The other thing to consider is the donkey's body condition score, he warned. "The higher the BCS in the donkey, the higher the insulin concentration and the more likely the animal will be insulin resistant."

A small study done by his group showed that using 45 mL/kg of corn syrup produces a very strong activation of insulin secretion in donkeys.

"Do not extrapolate from horses, because if you extrapolate from horses, you can misdiagnose many donkeys," he said, either as a false-positive or a false-negative.

"The diagnosis is made with clinical findings like in horses, resting glucose, resting insulin concentrations, and dynamic tests, similar to horses, but using different reference values," he said.

Management is similar: weight loss (but not too quickly), increase physical activity, increase insulin sensitivity, hoof care and pain control.

The best diet for a donkey with AMS/DMS is low-quality hay, but "good luck with convincing clients because [donkeys] 'need a little bit of sweet feed,'" he said his clients often tell him.

"They don't," he insisted. "They need 'crappy hay.'"

Donkeys are efficient at mobilizing fat, which predisposes them to develop hyperlipemia, a common problem in donkeys that are sick or not eating. This condition can be fatal in donkeys.

Another endocrine condition affecting donkeys is pituitary pars intermedia dysfunction (PPID), which also puts them at risk for laminitis. Clinical findings of hirsutism, weight loss, fat redistribution, secondary infections and laminitis—often recurrent—are the same as seen in other animals, Dr. Toribio said.

Just as in horses, ACTH concentrations are measured to determine if the donkey has PPID. Remember though, that ACTH concentrations are higher in healthy donkeys than in horses. Resting ACTH is >50 pg/mL in a donkey, but 35 pg/mL in a horse. The ACTH response to a TRH-stimulation test will be >110 pg/mL in a donkey in about 10 minutes. ACTH secretion in donkeys is seasonal, so also adjust for warm-versus-cool weather, he recommended.

The medication management for these conditions is similar, according to Dr. Toribio, but be aware of the rate the drugs are metabolized in donkeys because it is quite different than horses. Donkeys have higher metabolic rates than horses, they are more efficient at water conservation and handle dehydration better than horses. Their urine output is lower, so drugs cleared by the kidneys will be slower in a donkey than in a horse. However, many drugs metabolized by the liver are cleared faster in donkeys.

Being aware of these differences will enable the management of donkeys to be more successful, he said. **MeV**

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1 Data on file.

2 Adequan® i.m. Package Insert, Rev 1/19.

3 Burba DJ, Collier MA, DeBault LE, Hanson-Painton O, Thompson HC, Holder CL: In vivo kinetic study on uptake and distribution of intramuscular tritium-labeled polysulfated glycosaminoglycan in equine body fluid compartments and articular cartilage in an osteochondral defect model. *J Equine Vet Sci* 1993; 13: 696-703.

4 Kim DY, Taylor HW, Moore RM, Paulsen DB, Cho DY. Articular chondrocyte apoptosis in equine osteoarthritis. The Veterinary Journal 2003; 166: 52-57.

5 McIlwraith CW, Frisbie DD, Kawcak CE, van Weeren PR. Joint Disease in the Horse.St. Louis, MO: Elsevier, 2016; 33-48.

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How Sperm Protect Their Membranes From Oxidation

A comparative analysis of the lipid profiles of sperm found major differences in the composition of lipids in sperm and seminal fluid, with more closely related species such as domestic cattle, domestic pig and domestic horse showing similarities in lipid profile.

This contrasts with the lipid composition of erythrocytes and blood plasma from different species, which is relatively uniform, according to the scientific team from the Leibniz Institute for Zoo and Wildlife Research and Leipzig University.

The results help to improve the understanding of the effect of oxidative stress on reproductive processes and could enhance assisted reproduction measures.

On their way to the oocytes, sperm are exposed to oxidative stress, which—among other things—can trigger the oxidation of membrane lipids and damage the cells in their structure or functioning. Using sperm and blood from animal species that differ in their reproductive system and type of nutrition (domestic cattle, domestic pig, domestic horse, African lion and humans), a team of specialists in reproductive biology and lipid biochemistry analyzed the sensitivity of sperm and erythrocytes to oxidation and the accumulation of harmful products of lipid oxidation.

In addition, the team also investigated the protective capacity of the seminal fluid.

"If lipid properties depend on cell function, we would expect differences in the lipid profile between sperm and erythrocytes. If it is nutrition which primarily determines the predominant lipids in the membranes, the lipid profile would be rather similar in both cell types of a species," said **Karin Müller,** PhD, a scientist at Leibniz-IZW.

"The results are important for estimating sperm properties in species that have not yet been studied and for adjusting prophylactic measures when sperm conservation and artificial insemination are used for species preservation—where the oxidative stress for gametes is increased by the freezing process."

The lipid composition of erythrocytes from different species is relatively uniform, but there are large differences in the composition of lipids in sperm and seminal fluid among different species.

These results suggest that the lipid composition is not determined by the functional requirements of the cell membranes.

On the one hand, the cell membrane of sperm must have a high degree of flexibility to enable the movement of the gametes and later their fusion with the oocyte. Therefore, sperm lipids contain a high proportion of polyunsaturated fatty acids, which are particularly susceptible to oxidative stress.

"In the sperm of all species studied, the accumulation of harmful lysolipids is largely avoided by the presence of less sensitive lipids from the outset, the timely elimination of radicals and the rapid degradation of oxidized lipids. Interestingly, samples with high lysolipid concentrations in sperm were particularly found in humans, although the lipid profile shows less oxidation-sensitive lipids and the protective mechanisms are very effectively developed," said **Kathrin M. Engel, PhD,** a scientist at Leipzig University. "Presumably, lifestyle factors cause high oxidative stress, which overtaxes the natural portfolio of protective mechanisms."

Further studies will help to understand individual imbalances between oxidative stress and protective factors in humans and animals, as well as to adjust measures of assisted reproduction. **MeV**

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For more information:

Jakop U, Müller K, Müller P, et al. Seminal lipid profiling and antioxidant capacity: a species comparison. *PLoS One.* 2022 Mar 8. https://doi.org/10.1371/journal.pone.0264675

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Open and direct conversations about cost are welcomed by clients. Yet, according to a 2021 survey, 75% of veterinarians have negative feelings about payment conversations.[1] If this sounds like you, it's a good idea to remind yourself that getting paid at the time of service is necessary to drive cash flow, reduce accounts receivable, and keep your practice running strong.

> *"The reality is horse owners value the services provided by veterinarians. If we're not making them pay because we feel uncomfortable talking about money—uncomfortable about setting expectations that we deserve to be paid—then they're going to spend their money somewhere else."*
>
> *— **Amy Grice,** VMD, MBA*

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[1]Equine Veterinarian Practice Passion & Practice Study Presentation, conducted by ASQ360° on behalf of CareCredit, December 2020.

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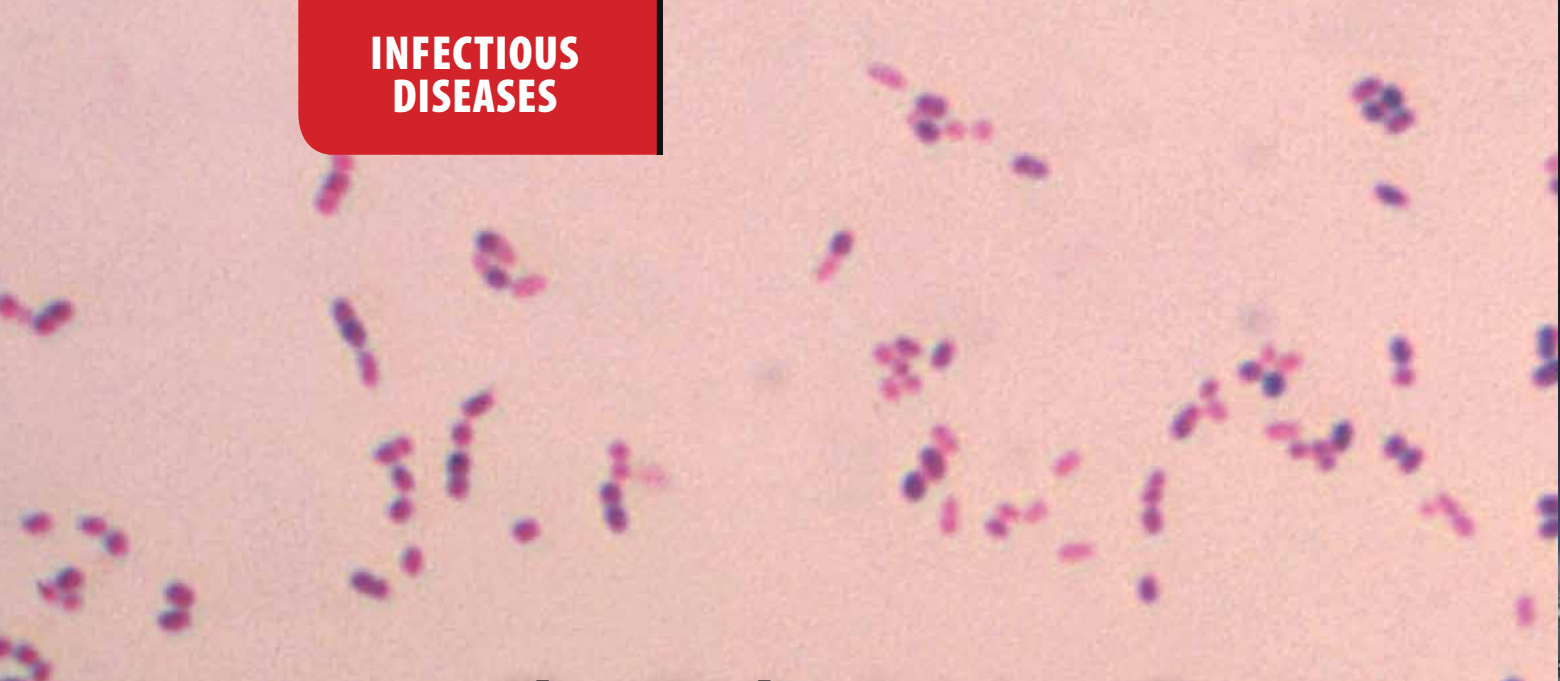

The Fight Against Resistant *Rhodococcus Equi*

Antimicrobial resistance is a growing global threat that crosses geographic and species barriers. While resistant *Staphylococcus* and *Enterococcus* strains tend to dominate the headlines, an increasing number of researchers are paying closer attention to *Rhodococcus equi*.

R. equi is a gram-positive, pleomorphic, aerobic rod that primarily affects foals less than 6 months of age. Many foals recover, but mortality rates can vary from farm to farm. The bacteria does not typically replicate or propagate in older horses, but shedding does increase with age.

It's Everywhere

"It's an intracellular bacteria, and it must be associated with a Virulent Associated Protein Antigen, or VapA," said **Nathan M. Slovis, DVM, DACVIM, CHT,** Director of the McGee Center at the Hagyard Equine Medical Institute in Lexington, Ky. "This needs to be present to [cause] disease. There's plenty of *R. equi* out there in the environment, and they may have resistant genes, but they are not going to cause disease in the animal if [the bacteria] do not have this *VapA* gene."

Past studies have attempted to eliminate the seeming randomness of which foal develops disease due to *R. equi*.

"We tried to take fecal samples from mares that shed more *R. equi* in their feces to see if their foals were more at risk of becoming ill so that we could use that as a screening tool," Dr. Slovis said during a presentation at the 67th Annual AAEP Convention in Nashville.

The idea was to set quantifiable benchmarks for shedding bacteria to nail down a simple way to identify at-risk horses. If a mare shed a certain amount of *R. equi* in their feces, then their foals would hopefully have a specific percentage of increased risk of developing disease.

"Well, it didn't matter," he explained. "There were mares that were shedding a lot of *R. equi* and their foals never looked back. There were other mares that shed a low number, and their foals became severely ill. There's more to it than just looking at the passage of *R. equi* in the manure."

Getting the Upper Hand

Despite multiple attempts, a miracle cure for *R. equi* was elusive.

"There were farms that wanted to decrease mortality by 100%," Dr. Slovis said. "They told us they were losing millions of dollars on foals each year. But what can we do for that?"

In 2000, thoracic ultrasonographic screening of foals started to show promise. All that was needed was an ultrasound machine and a little alcohol on

By Paul Basilio

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References:
[1] Nogradi N, Couetil LL, Messick J, Stochelski MA, Burgess JA. Evaluation of an Omega-3 Fatty Acid Containing Feed Supplement in the Management of Horses with Chronic Lower Airway Inflammatory Diseases. J Vet Intern Med 2015; 29:299-306.
[2] Couetil LL, Cardwell J.M, Gerber V, Lavoie J.-P, Leguillette R, Richard E.A. Inflammatory Airway Disease of Horses. ACVIM Consensus Statement J of Vet Intern Med 2016; 30:503-515 p. 508-510.

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the foal's chest. No clipping was required. If an *R. equi* lesion was identified, it was graded, and treatment was initiated as needed.

All told, it took about 5 minutes per foal, and *R. equi* pneumonia was practically eliminated.

"We were giving each other high-fives," Dr. Slovis said. "We knew how to stop *R. equi* mortality."

Here We Go Again

In 2008, farms began to see dramatic increases in *R. equi* that was resistant to macrolide antibiotics and rifampin.

"We started to wonder whether the screening was causing problems," Dr. Slovis said. "Then we started to look at the emergence of resistance to macrolides and rifampin in clinical isolates of *R. equi* in central Kentucky."

From 1995 to 2006, the percentage resistant *R. equi* was quite low: Less than 5% of isolates showed resistance. Beginning in 2007, however, the percentage of resistant isolates jumped to 15%–20%. There has been a slight decrease since 2017, possibly the result of researchers sounding the alarm.

In 2018, a joint study conducted by Hagyard and the University of Georgia found that 76% of the more than 100 enrolled farms had resistant isolates of *R. equi*. In soil samples with resistant bacteria, 97.7% of the soil samples were resistant to both rifampin and macrolides, and 43% of those samples were virulent.

Additional investigation of the environment of 10 of the 100 study farms found resistant isolates in the soil, flooring, and stall air. More than half (55%) of the soil isolates and 34% of the air isolates were virulent.

Around that time, another group of researchers were investigating which gene was causing the resistance. The culprit turned out to be *erm(51)*.

"It's a clone," Dr. Slovis said. "If you had a resistant *R. equi* in California, it was a clone of the one in Kentucky. They were almost identical, at least back then."

The Fight Continues

Dr. Slovis and his colleagues conducted a randomized study in which some farms received no *R. equi* treatment, some received macrolides and rifampin, and others received gallium, which essentially starves the bacteria of the iron it needs to grow and propagate.

More than 76% of 100 farms had resistant *R. equi*; 97% of soil samples were resistant to both rifampin and macrolides, and 43% were virulent.

They found that treatment with macrolides and rifampin altered the microbiota and increased the resistomes—genes that are responsible for drug resistance. Treatment with the drugs also increased resistance in fecal bacteria when compared with controls.

Since the bioavailability of macrolides and rifampin is around 50%, there was plenty of drug in the manure that mixed in with the soil.

"Over time, soil treated with macrolides and rifampin selects for macrolide and resistant bacteria in the soil," Dr. Slovis said.

They also found that the presence of erythromycin-resistant *Enterococcus* increased with the use of macrolides.

"This is a bug that we're not even trying to kill, but we're still getting resistance," he added. "It also showed resistance to doxycycline. We're not even treating with doxycycline, but *Enterococcus* is becoming dual resistant to doxycycline and rifampin [as a result]."

With the combination of the altered microbiome in the foal and the deleterious effect of the antibiotics killing some beneficial organisms in the soil, a vicious cycle of increasing antimicrobial resistance occurs.

"The good news is that once you stop the selective pressures on the soil with the use of antimicrobials, the more susceptible *R. equi* will overpopulate compared with the resistant strain," he explained. "There's a fitness burden that becomes altered when you have the resistant genes in those animals. [The bacteria] can't survive as well in the real-world environment."

While the discontinuation of macrolides and rifampin does eventually return balance to the soil, Dr. Slovis acknowledges that farm owners may require some persuasion.

"The farm doesn't want any deaths, so we get nervous and overtreat," he said. "If we see a small lesion in the lung, we treat it, even though 99% of foals will get better on their own. We don't want to have the client come to us at a party and say, 'Remember that foal you looked at last week? Well, he's dead now.'"

While treatment can be tempting, Dr. Slovis concluded that the overarching goal should be prevention and proper antimicrobial stewardship. **MeV**

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Vertebral Abscess Presentation in Foals

By Emily Brooks

One hallmark of foaling season is the influx of lame foal emergencies that we see from February to June.

Although major breeding farms in Lexington, Ky., often have resident veterinarians that attend foalings, plasma banks, and access to several referral hospitals in case of dystocia or for preventative foal watch, the incidents of foals presenting with sepsis in this area of the country are very high.

It's vital that the cause of foal lameness be diagnosed quickly with certainty, as the likelihood of osteomyelitis or other complications increases rapidly with time. As foals grow, we lose the ability to use advanced diagnostic imaging modalities such as high field magnetic resonance imaging (MRI) and computed tomography (CT) because of limitations of bore size.

A 12-week-old Thoroughbred colt from a farm in central Kentucky presented to Rood and Riddle Equine Hospital on July 11, 2016, with acute right hind lameness and occasional dragging of the limb. A physical exam was performed. The foal had a temperature of 103.3° F, pulse of 80 beats per minute (bpm), and a respiration rate (RR) of 32. The foal weighed 350 lbs. and appeared systemically healthy, as was the accompanying mare.

Before this episode of lameness, the foal had been

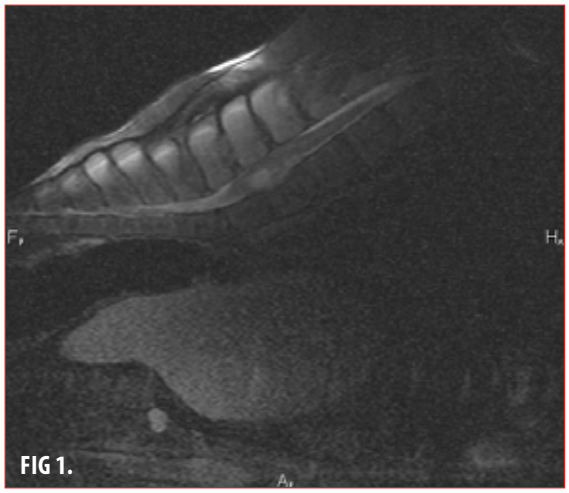
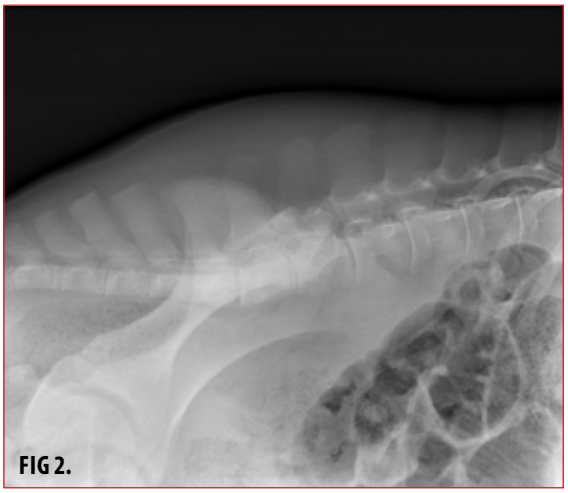


FIG 1.



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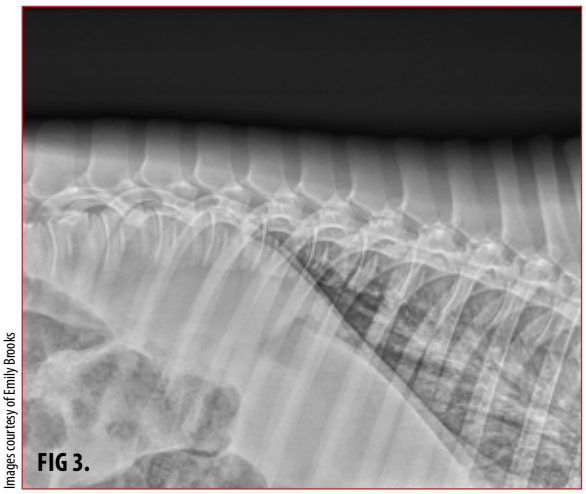

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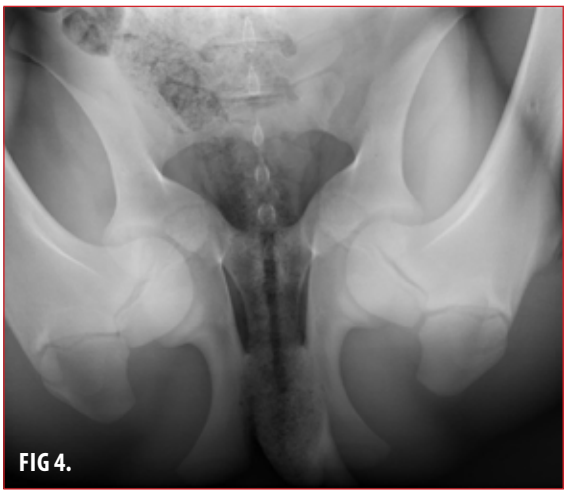

FIG 4.

Images courtesy of Emily Brooks

FIG 1. STIR sagittal sequence of lumbar spine showing abscess in spinal cord. FIG 2. Lateral radiograph of lumbar spine (standing). FIG 3. Lateral radiograph of thoracic spine (recumbent). FIG 4. DV radiograph of pelvis (recumbent).

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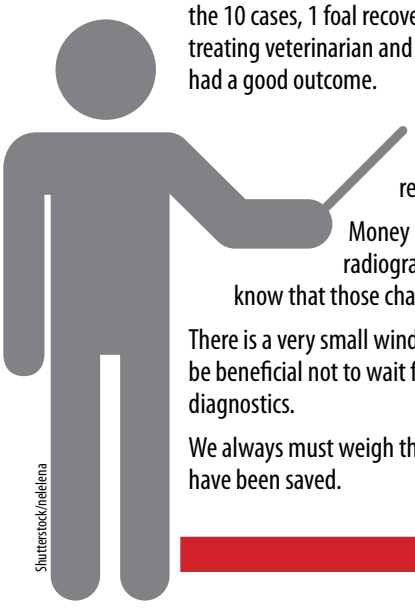
Teaching Points

This case highlights the importance of advanced diagnostic imaging as a tool when determining the cause and severity of lameness in all horses, but specifically foals.

Over 4 years, there have been multiple cases that had similar presentations and findings at Rood and Riddle. All these foals presented with a lameness that could not be localized, and their conditions quickly deteriorated.

MRI found vertebral body abscesses in 10 of these cases between 2015–16, and most were confirmed with necropsy. Of the 10 cases, 1 foal recovered and returned 2 months later for a transphyseal screw. It's likely that the quick decision by the treating veterinarian and the farm to perform an MRI as opposed to recumbent pelvic radiographs is the reason that foal had a good outcome.



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Often farms elect to try and manage cases conservatively or on the farm, and although these cases can resolve, occasionally the time trying treatments will decrease the odds of a full recovery.

Money is almost always an issue when determining what treatment plans to use. Often, we rely upon radiographs as a non-invasive and affordable tool to follow changes in bone such as osteomyelitis. We know that those changes can lag behind lameness and actual damage being done.

There is a very small window of time in which a foal's abdomen and pelvis can fit into the bore of the MRI, so it could be beneficial not to wait for prolonged lameness or consistently bad bloodwork to make the decision for advanced diagnostics.

We always must weigh the possible complications of invasive procedures versus the benefit, but in the case, the foal might have been saved.

healthy, and foaling was unremarkable. Palpation of the foal found swelling over the right femorotibial joint with all other joints palpating within normal limits. Digital radiographs of the right stifle (lateral and craniocaudal views) were obtained standing, as was one lateral view of the pelvis. All radiographs were read as within normal limits. A 16-gauge catheter was placed in the right jugular vein and a complete blood count (CBC), and master panel were submitted. The foal was put on systemic antibiotics of potassium penicillin and gentamicin and was given flunixin meglumine for pain and fever reduction as well as dexamethasone and Gastrogard.

The bloodwork showed a white blood count (WBC) of 18,700, fibrinogen 800, glucose of 159 mg/dL, LDH: 484.7u/L (high values). Throughout a 5-day stay in the hospital the foal's fevers waxed and waned, and the right hind lameness gradually improved, although was still present at the time of discharge. The mare and foal were released on July 15, 2016, with the diagnosis of right femoral nerve trauma.

Discharge instructions were to continue Gastrogard (350# dose SID for 2 weeks), Banamine (400# dose PO BID for 3 days, then SID for 4 days), and dexamethazone powder (5 mg PO SID for 2 days). The foal was to be confined to the stall or small pen until lameness was significantly improved, and could then slowly increase to larger fields as he continued to progress.

The foal was readmitted to the hospital on July 22, 2016, with no function of the left or right hind limbs. Upon admittance, the foal was in left lateral recumbency on the trailer and was unable to stand even with as-

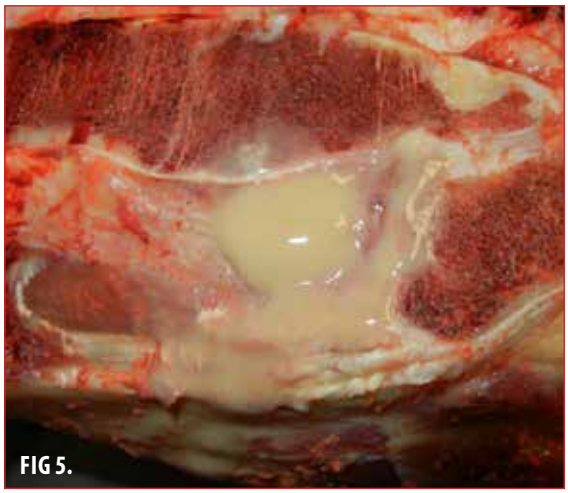

FIG 5.

FIG 5. Abscess in vertebral body.

sistance. The physical exam showed the temperature was 101.1° F, the pulse was 72 bpm, and RR was 40. A CBC/Pre op was pulled, and results were packed cell volume (PCV) 33.7, total protein (TP): 6.2, WBC count 23,100, and fibrinogen: 700.

A team used a large animal glide to take the foal to radiology where he was placed on a myelogram table and put under general anesthesia using guaifenasen-ketamine-xylazine solution. Recumbent pelvic radiographs (DV and lateral views) were taken. Radiographs were still inconclusive so MRI was indicated. A lumbosacral tap was attempted but unsuccessful, and the patient was prepared for the MRI.

It's not common to MRI an area of anatomy without first localizing a lameness. The decision to focus on this foal's pelvis as opposed to possible spinal cord impingement in the cervical or thoracic spine was made due to the original presentation of right hind lameness and swelling in the region of the femorotibial joint from 11 days before. At 13 weeks and 450 lbs., this foal presented quite a challenge to MRI because placing the pelvis in isocenter of the magnet and reducing image artifact would be difficult. The bore of the MRI is 60 cm and the foal's pelvis was approximately the same. The foal was given a fluid bolus of lactate Ringers (1 L) with dimethylsufoxide (100 mL), then placed on maintenance fluids at the rate of 400 mL/hour with potassium chloride (20 mEq). Preoperative medications of flunixin meglumine, dexamethasone and clarithromycin/rifampin were given. MRI sequences in the transverse, dorsal and sagittal planes were obtained.

Before this episode of lameness, the foal had been healthy, and foaling was unremarkable.

Though there were multiple artifacts due to complications with positioning and image acquisition, the MRI (STIR sagittal) showed an extra dural mass with vertebral body and dorsal process involvement and edema in the spinal cord.

The foal recovered from anesthesia and was taken, still recumbent, back to the stall with the mare. He would attempt to dog sit and change recumbency but never stood after the scan. The foal was humanely euthanized on July 23 and sent for necropsy at the University of Kentucky Diagnostic Laboratory. The findings were a pathologic fracture on L6, purulent exudate extending into spinal cord, severe chronic, locally extensive pyogranulomatous osteomyelitis with necrosis, hemorrhage and moderate fibroplasia. A culture of the abscess grew *Rhodococcus equi*. **MeV**

About the Author

Emily Brooks has worked as an equine veterinary technician since 2007, starting her career at Rood and Riddle Equine Hospital. Her interest quickly focused on advanced diagnostic imaging modalities and there she ran a high-field MRI, CT and performed musculoskeletal ultrasound for lameness exams and surgery. Emily has traveled to the Equine Veterinary Medical Center in Doha, Qatar, to help set up their imaging center in 2018 and now works at Kentucky Equine Hospital as the head Imaging Technician in Simpsonville, Ky. She also runs a sport horse rehabilitation facility and trains and shows dressage horses and eventers.

FIG 6.

FIG 6. Abscess of T2 with pathologic fracture (*Staphylococcus aureus*).

FIG 7.

FIG 7. Pelvic radiographs taken on a recumbent foal.

Horses Also Suffering in Ukraine

Horses remain under serious threat within occupied areas of the Ukraine, with horrendous accounts of animal cruelty, while grooms and carers risk their own lives by refusing to abandon them, according to **David Rendle,** BVSc, MVM, CertEM(IntMed), DipECEIM, MRCVS, the president elect of the British Equine Veterinary Association (BEVA).

This horse arrived in Poland with impaction colic, and was treated successfully by administering fluids via a soft drinks bottle and a short piece of hose pipe.

The Foundation for the Horse, the charitable arm of the American Association of Equine Practitioners, donated $50,000 to help horses in Ukraine and neighboring countries. The foundation distributed the money through its partnership with BEVA and its charitable arm the BEVA Trust.

They are working with 2 additional organizations, British Vet Professionals for Ukraine and British Equestrians for Ukraine, to support the veterinary and equestrian communities who have boots on the ground. They are making an immediate impact for equids in Ukraine and neighboring countries to which the animals have been evacuated, including Poland, Slovakia Hungary, Romania and Moldova.

Dr. Rendle visited the Ukraine-Poland border to deliver essential veterinary supplies, including antibiotics and pain medication. He also worked with British Equestrian and World Horse Welfare to help treat and to relocate horses from Ukraine.

He heard about attacks being carried out by Russian forces on stables in Bucha, Irpin and other equestrian premises north of Kyiv. During one alleged incident, Russians set fire to a stable and shot any horses trying to escape.

"Some horses ran away, others were wounded, and some were burned down. After the building was burned, Russian soldiers went away and horses that escaped were wandering around the village and trying to find the feed. Step by step, people living in the village collected the horses and kept 1 or 2 horses in their yards," said Anatoly Levitsky, a local veterinarian.

Dr. Rendle called the cruelty unimaginable: "It is hard to understand what could motivate anyone to perform these deliberate acts of cruelty. Random shootings, stabbings and burnings are widely reported and pictured on social media. We have no idea how many horses are dead and how many injured, but it has to be a significant number.

"Some of the lorry drivers I have met coming out have been shot at, shelled and beaten up while evacuating surviving horses. They are taking risks that we would consider totally unacceptable to move animals out and supplies in; I have nothing but admiration for the bravery of the Ukrainian people."

There are dire shortages of medicines and materials in the areas where they are needed, and the collaboration is doing what it can to get veterinary and humanitarian supplies to the vets they are in contact with.

They are working to establish safe stables in the West of Ukraine to get horses and their owners away from likely areas of combat in the East.

"Our hearts go out to the animals, their owners, and veterinarians impacted by the devastation in Ukraine," said Dr. Emma Read, president of The Foundation for the Horse and the AAEP. "We are delighted to be partnering with BEVA, an organization of trusted equine veterinarians that we have a long history of working with for not only equine welfare and education, but now direct equine disaster relief." **MeV**

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References:
[1] Brendemuehl JP, Kopp K, Altman J. Uterine Inflammatory Response to Frozen Semen is attenuated by Oral Supplementation of a Blend of Omega-3 Fatty Acids (Algal DHA and Flax Seed) in Susceptible and Resistant Mares. Submitted to Theriogenology. [2] Brendemuehl JP, Altman J, Kopp K. Influence of dietary algal N-3 fatty acids on breeding induced inflammation and endometrial cytokine expression in mares bred with frozen semen. J Equine Vet Sci. 2014; 34(1): 123-124. [3] A.M. Adkin, A.V. Muniz, C.J. Mortensen, L.K. Warren. Maternal fatty acid supplementation influences memory and learning ability in yearling and 2-year-old horses. J Equine Vet Sci. 2015; 35: 418-436. [4] A.M. Adkin, L.K. Warren, C.J. Mortensen, J. Kivipelto. Maternal supplementation of docosahexaenoic acid and its effect on fatty acid transfer to the foal (longitudinal study). Equine Vet Sci. 2013; 33: 321-329. [5] A.M. Adkin, L.K. Warren, and C.A. McCall. Effect of maternal docosahexaenoic acid supplementation on behavior and cognitive development in nursing foals. J Equine Vet Sci. 2013; 33: 321-399.

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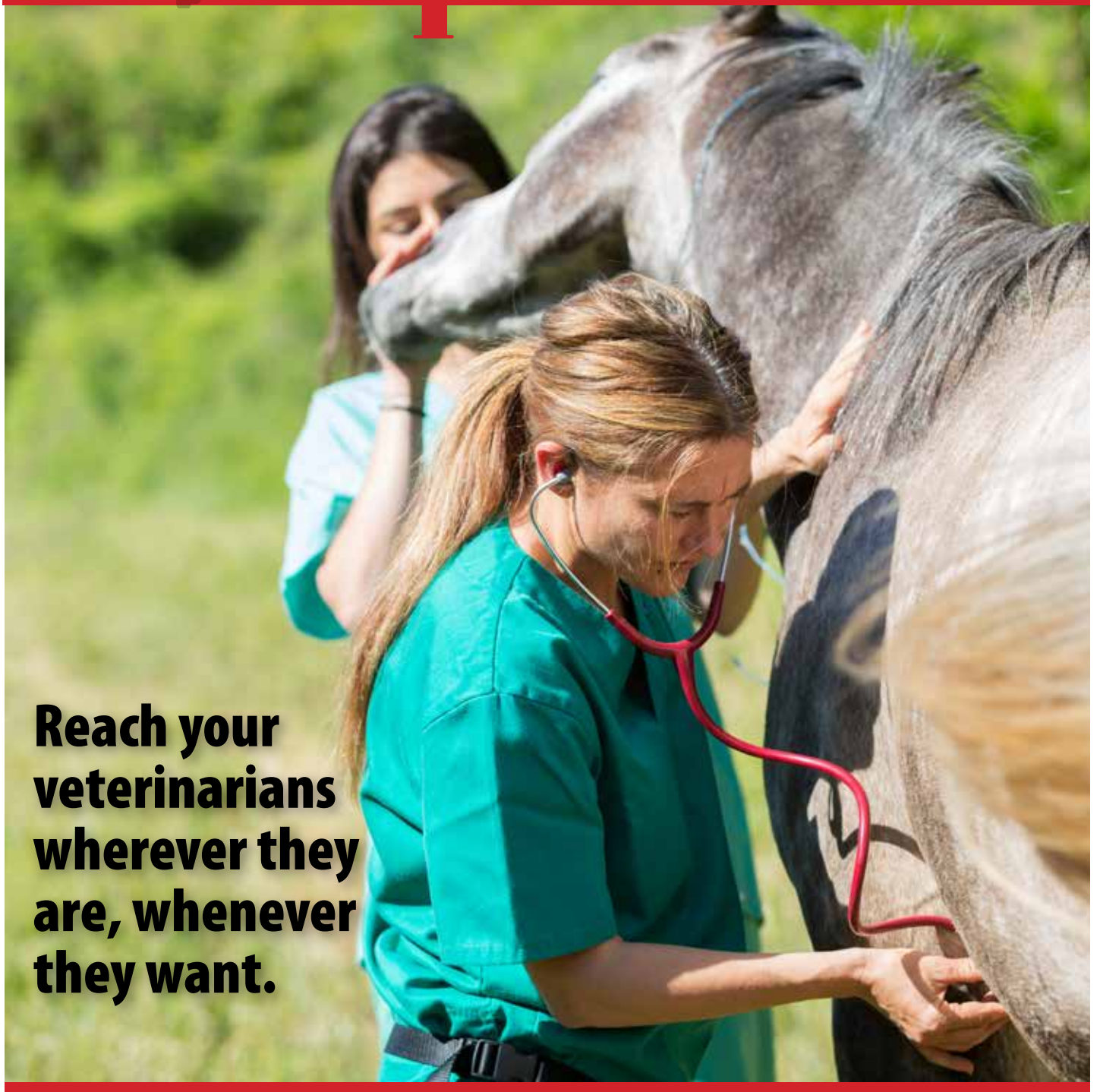

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