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BY DAVID THILL

Common Threads

In some ways, horses may not be that different from dogs and cats from a healthcare perspective



If a lifelong dog owner decided, on a whim, to get a horse, they might be most concerned about how to provide the proper healthcare for this new beast. After all, that horse won't be small enough to live in [most] houses, and she won't spend her time burying rubber bones in the backyard. And although animal-lovers might enjoy the thought of retirement in the company of an Irish Setter or toy poodle, they would most likely be considering their newfound freedom in a different light with a 2,000-pound Clydesdale instead of a 9-pound toy poodle.

But while the differences in size and environment make the horse seem almost alien, those differences do not run as deep as they might appear, says Megan Green, DVM, manager of large animal veterinary services at Merial Animal Health. In fact, horses are often similar to companion animals such as dogs or cats when it comes to personality, many health issues, and veterinary needs.

> The horse's considerable size may lead one to expect that the animal faces greater health risks or significantly different challenges than those of smaller companion animals.

For that reason, sales reps who are used to calling on companion-animal veterinary practices might breathe a little easier when knocking on the equine veterinarian's door. The needs of both practices may not differ that much from each other.

Similarities

"Horses and dogs can be very similar in their personalities," says Green. Like

dogs, some horses are very friendly and share a close bond with their trainers or owners. Others are loners and prefer less attention from their owners. Still, "they are highly competitive animals that excel at their job."

The horse's considerable size may lead one to expect that the animal faces greater health risks or significantly different challenges than those of smaller companion animals. However, their larger size does not greatly affect health, she says. Both horses and companion animals are susceptible to various diseases, "some of which are preventable through routine vaccinations, while others depend on a risk assessment" for exposure of the animal to particular diseases.

One of the main differences in healthcare is simply the place in which the animal is treated. Because they are so big, horses are normally examined by veterinarians in the stable. The veterinarian is traveling, so they must be prepared for all different onsite circumstances, as each owner manages their horse uniquely. Contrast that with the companion animal, who typically visits the veterinarian at the veterinarian's office, where all the necessary supplies are on-hand.

As they age, horses also experience many of the same health issues that companion animals experience, such as osteoarthritis and weakened immune systems, which make it more difficult to recover from ailments. Dental disease is also prevalent. That is particularly problematic for horses, who must be able to properly chew their food. "It is essential to provide proper and routine dental care for older horses," says Green.

What sets them apart

While the similarities between horses and companion animals are many, the fact is, horses do experience some unique healthcare challenges. For example, horses are susceptible to tendon and ligament injuries, says Green. These injuries can range in severity, from a fairly common bowed tendon, to a more complicated suspensory ligament injury or a lacerated tendon from an accident. They are also prone to lameness as a result of hoof abscesses. "Routine foot care is essential" to prevent these debilitating injuries.

Another disease that horse owners must watch for is Cushing's Disease, formally known as Pituitary Pars Intermedia Dysfunction, or PPID. More common in older horses – between 18 and 23 years old – this pituitary gland disease often results in a shaggy coat, fat deposits along the neck and tail, lethargy, and hoof problems such as laminitis.

When it comes to finances, Green says that the cost of care depends on what the horse's job is. For example, for horses that spend their time predominantly on the farm, the cost of care typically ranges from $500 to $1,500 per year. In contrast, care for a high performance competition horse can range from $5,000 to $25,000 or more per year.

How's that retirement looking now? ■

Parasite control

Megan Green, DVM, manager of large animal veterinary services at Merial Health, lists some of the most common parasites that horse owners should be aware of.

According to Green, the primary and most common equine parasites include:

- Roundworms – *Parascaris equorum*
- Strongyles
    - Large Strongyles
    - Small Strongyles – Cyathostomes
- Tapeworms – *Anoplocephala perfoliata*

The secondary equine parasites include:

- Lungworms
- Pinworms
- Bots
- Threadworms
    - *Onchocerca spp.*
    - *Habronema spp.*

Green explains that horses require deworming to assist with parasite control, as well as annual and semi-annual vaccinations, and annual or semi-annual routine dental care. Some owners also seek joint therapy and alternative medicine – including acupuncture, chiropractics, and massage therapy – for their horses.

David Thill is a contributing editor for *Veterinary Advantage*.

The Economics of the In-House Lab

BY LAURA THILL

In-house lab services are a cornerstone of progressive medicine and profitability in successful equine practices, says Kent Adams, DVM, Appalachian Veterinary Services, Christianburg, Va.

Commercial labs make money by providing reliable results in a timeframe that was acceptable 15 years ago, he says. However, with the advent of reliable hematology, chemistry and specialty analyzers, doctors have been able to take an important revenue source back under their control. They have increased both gross and net revenues by offering dramatically shorter turnaround times at lower cost to the practice. Many practices are able to increase the average client charge, double or quadruple volumes and reduce cost per patient.



Most important, of course, they have improved equine healthcare. That's because the in-house lab provides the veterinarians with reliable results that can positively impact patient care in real time.

"Even in the most perfect of arrangements, with results available in 12 hours, important treatment decisions have already been made," says Adams, who is a member of Abaxis' scientific advisory board. "Send-out lab results offer only a retrospective view of a patient already under treatment."

In the case of the critical care patient that may be hospitalized or sent to a referral center, blood chemistry results, electrolytes, lactate and even hematocrit can be available stall-side in a few minutes. Preliminary diagnoses can be made and appropriate, patient-specific treatments initiated. "In our practice, the same blood samples can provide an even broader assessment within minutes with a Complete Blood Count at our office. The hematology analyzer is the only piece of the diagnostic puzzle that is not portable."

Self-fulfilling prophecy

Some doctors fail to understand the added value of in-house labs and the sources of that added value, says Adams. They may fail to grasp the enormous increase in value offered by fast, accurate results effectively communicated and shared with owners within minutes.

"We live in a world in which one in eight jobs is in human healthcare," he says. "More than ever, the public is keenly aware of cutting-edge healthcare from diagnostics to therapeutics. They spend considerable time educating themselves, often consulting Dr. Google before calling the veterinarian, or getting a do-it-yourself second opinion from the same illustrious sources and figures. Increasingly, veterinarians are expected to deliver sophisticated diagnostic and therapeutic plans in a clinical arena in which the standard of care is evolving quickly."

Twenty years ago, a 12- to 24-hour delay for results that might have an impact on treatment choices was acceptable, says Adams. But as point-of-care diagnostics become more common, it seems inevitable that in the not-too-distant future, misdiagnosing something and mistreating it for 24 hours – given the availability of equipment and technology that can deliver results much faster – will be an indefensible position.

An example would be point-of-care tests to determine a foal's absorption of colostrum, he points out. "If that test is negative, the foal, without a doubt, requires a plasma transfusion. But if the veterinarian sends that test out over the weekend, with a two- or three-day delay, he or she has missed the window of opportunity to save that foal's life."

Similarly, if the veterinarian can run a stall-side test, he or she can quickly make the decision whether a horse's diarrhea is parasitic or infectious, the treatments for the common causes of Salmonella, Potomac Horse Fever or parasites being very different and potentially life-saving.

Calculating the return

All too often, doctors may balk at investing 25K on lab equipment, when the send-out lab has no upfront costs, says Adams.

"They may justify this stance partly because their lab volumes are relatively modest, and they fail to see labs as a source of revenue. By doing so, they become their own worst enemies. After all, processing samples for pick-up is time consuming; cut-off times always loom large; and the low value of delayed results trains doctors to be less than enthusiastic about blood work.

"Increasingly, veterinarians are expected to deliver sophisticated diagnostic and therapeutic plans in a clinical arena in which the standard of care is evolving quickly."

"When labs are moved in-house, the turnaround time is reduced dramatically, the value results soar, and the added value increases client compliance. Many veterinarians report that their lab volumes double within three months and quadruple within a year of making the switch to an in-house lab."

When considering acquiring in-house lab equipment, doctors often miss the boat on applicability, says Adams. "They know that a new digital X-ray unit can be used on a very limited subset of patients – those presented for lameness or a pre-purchase exam. They may believe the same is true of the in-house lab, that is, tests can only be applied to sick horses, a pre-purchase exams or pre-surgical evaluations."



However, with the use of well-designed wellness plans, point-of-care diagnostics can potentially be applied to every patient in the practice, he says. "Offering routine labs as part of an annual exam, from fecal exams to CBC and blood chemistry, can boost lab volumes and reduce costs. It also trains clients to understand the value of labs. Some results will open the door to a work-up of a subclinical problem previously unknown to doctor and owner alike, generating new revenue."

To justify a capital expense of $25,000 or $30,000, the practice needs to make sure that the equipment is working steadily. One hundred samples a year might not be an adequate return on the investment. But if the practice can double that volume, such as through wellness testing, the expense is more easily justified.

"The fact is, we veterinarians often reduce the demand for lab work by our own behavior," says Adams. Among themselves, veterinarians will admit that at 2:30 or 3 p.m. on a Friday afternoon, they might avoid a test rather than rush back to the office, get the sample spun down and smear made, then send it to the lab. Dealing with send-out labs can be so cumbersome, they don't want to do deal with it. "The veterinarian may be thinking – wrongly – that they are doing the client a favor by saving them money, but really, the doctor has shortchanged them by failing to give the full capability of what he or she can offer, including timely interpretation of appropriate lab values."

> "Even in the most perfect of arrangements, with results available in 12 hours, important treatment decisions have already been made."

Veterinarians who resist investing in in-house lab equipment may also be stuck in the past, when such equipment was more expensive, less accurate and unreliable. Older equipment called for much routine maintenance and standardization, at a sizable cost. That's not true today.

Getting clients used to testing

Clients are willing to pay – and pay well – for results delivered in a timeframe that impacts the diagnostic and treatment

choices made for their horse, says Adams. When they get results quickly, they gain peace of mind and confidence that their horse is in competent hands and receiving excellent care.

"Our doctors at Appalachian Veterinary Services are trained to pull blood at the beginning of any exam of a horse presented for sickness of any kind," he says. "This simple action, not unlike listening to the heart, begins a dialogue with the client that establishes lab work as a potential extension of the field exam being done."

At the conclusion of the exam, clients will invariably ask three questions of the doctor, he says: "Do you think you need to run the blood work? How soon will the results be available?" and less predictably, "How much will it cost?"

"When they ask, 'Do you think you need to run the blood work?' they have already decided that if the doctor thinks it would be of value to do so, they will accept the charge," he says. "It takes the veterinarian out of the uncomfortable spot of selling – something which veterinarians typically stumble through."

Beyond 'Normal'

At some point during the sales cycle, the sales rep will often hear, "So many times, when I run a CBC and chemistry, the results are normal. I have decided that with my 15 years experience, just by examining the horse, I can get a good idea whether the results will be normal or not – and whether a test is necessary."

Such veterinarians may fear pushback from their clients, who in the past may have paid $100 for testing, just to be told, "Everything's normal."

But simply hearing "Everything's normal" and then "good-bye," can make a client wonder where the money went. That's why the veterinarian should take three to four minutes to describe the lab results as a narrative, says Adams. Instead of simply saying "Everything's normal," the veterinarian should give the client a summary of what the tests show, e.g., "Liver enzymes are correct, there's a good balance of albumin and globulin, etc." Then follow up with, "And that makes me comfortable with the treatments we have chosen thus far," or "I would like to modify his treatment a little bit based on the results."

That narrative solidifies the bond between client and veterinarian, and instills the client with confidence that he or she can trust the doctor's competence, and that their horse is in good hands.

What's more, when owners are exposed to the availability and value of labs in a wellness setting, they are far more likely to choose those services when their horse is sick.

Developing a strong in-house lab program can help veterinary practices ride through lean years, such as the recession of 2008-2009, when breeding effectively stopped, notes Adams. The results will show up in increased revenues as well as improved equine health. ■

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BY JENNIFER RYAN

Caring for the Traveling Horse

Travel to competitions can increase the risk for a number of diseases



Horses are exposed to additional disease challenges the minute they leave the barn for a competition or even a fun trail ride. What's more, the additional stress of training for such an event can add to their risk of illness. Protecting horses prior to travel can help owners prevent downtime from disease – and keep their entry fees.

What's the risk?

The Association of Equine Practitioners (AAEP) recommends considering additional vaccinations for horses traveling, and comingled with, other horses. These vaccinations include: equine herpesvirus (EHV), equine influenza and strangles. This is an addition to a set of "core" vaccination recommendations.

"Core vaccines are for diseases that horses cannot stay away – like rabies or encephalitis," says Rob Keene, DVM, equine technical manager for Boehringer Ingelheim Vetmedica, Inc. "Then there are diseases that horses are potentially at risk for when they travel. Those additional vaccinations should be based on risk. For instance, in some areas they have more Potomac Horse Fever than others, but we don't have much of that disease in Montana."

Additional vaccinations are especially worth the cost for competitive horses, Keene says. It can take months for horses to fully recover from a respiratory infection. During which time, they aren't training or competing at their best.

"To get back to where they were, the costs associated with training can be many times what the entry fees are for a show," he says. "The biggest cost is loss of use. You can be out of training and competition for two to three months, which is a big deal."

In addition, the cost of illness isn't isolated. Each horse that has interacted with the infected animal – or even common areas and objects like grazing areas – can be at risk. Even horses left at home could need these additional vaccinations, Keene says.

"Even if you're only taking a couple horses in a barn on the road – unless you have good quarantine protocol in place – horses at home may be at risk, as well," he says. "As an example, sometimes horses may be infected with a disease, like Strep equi, the causative agent for Strangles, but may not be displaying outward signs of clinical disease. These types of horses can act as a 'Typhoid Mary' among the rest of the horses. The same can also hold true for equine influenza."

"It's very hard to not use common water sources," he says. "We know that with strep, they don't need to touch noses to transmit the disease. Using the same lead ropes, halters and common water sources can be hard to manage as are common grazing areas. Just like humans, horses that are very young and very old are more susceptible to disease than healthy, fit, adult horses."


Megan Green

"We like to give a booster dose prior to travel," he notes. "Travel is always a stress. How horses respond to vaccines can vary so we like to provide that booster in advance of that travel stress. The vaccine needs to be given well before travel to get the most bang for the buck."

At times, it may take between 10 to 14 days for horses to see the peak benefit of booster vaccinations. Oftentimes, owners can be busy with training and travel preparations and miss this window.

"Core vaccines are for diseases that horses cannot stay away from – like rabies or encephalitis. Then there are diseases that horses are potentially at risk for when they travel. Those additional vaccinations should be based on risk. For instance, in some areas they have more Potomac Horse Fever than others, but we don't have much of that disease in Montana."

– Rob Keene, DVM, equine technical manager for Boehringer Ingelheim Vetmedica, Inc

Preventing downtime

Timing vaccinations right is key to preventing disease, Keene says.

In fact, this is the reason why the United States Equestrian Federation (USEF) now requires all horses entering the grounds of a USEF-licensed competition to be accompanied by documentation of equine influenza virus and EHV vaccinations within six months prior to entering the stables.

Horses may need more time depending on their individual vaccination history, notes Megan Green, DVM, manager, equine and large animal veterinary services, Merial. Unvaccinated, or naïve, horses may require an initial vaccination as well as a booster dose.

"If we are vaccinating a naïve horse – or if we don't have a vaccination history – then that puts us at a disadvantage," Green says. "We'll have to take the time to get the history from the previous veterinarian and have a discussion about diseases, timing of vaccines and make sure that the horses are protected and vaccinated appropriately."

Simply knowing a horse is traveling is the first step, but Green also recommends understanding the geographic region the horse is traveling to and how many horses are expected to attend the event.

Training risks

Before the trailer pulls out of the driveway, the stress of training for a competition can set horses up for disease. Increases in training – both time and intensity – can set a horse up for developing equine gastric ulcer syndrome (EGUS).

"Two out of three horses can be suffering from equine gastric ulcer syndrome – and that's a significant amount. You want to be proactively staying ahead of the curve and thinking about your horse and what you're asking your horse to do."

For example, a horse may be given grass and hay in the morning and fed again in the evening. Meanwhile, acid is produced by the horse's stomach 24 hours a day, seven days a week. In fact, adult horses can produce up to 16 gallons of stomach acid in a day. Without hay or other feedstuffs to absorb the acid, it can accumulate in the stomach and lead to erosion of the lining of the stomach, which leads to EGUS.

"When we look at signs a horse owner might notice, poor performance is really the most common complaint," Green says. "A change of attitude and behavior or a change in eating pattern like eating a small amount and going over to their water bucket and drinking excessive amounts of water, as well as, intermittent colic episodes are all clinical signs that can be associated with EGUS"

Preventing EGUS can help equine competitors stay in top condition – and prevent treating more serious cases later on.

"It's much easier on the pocketbook of the owner and better for the horse's overall health and performance to prevent ulcers," she says. "If you have trained, planned and paid your entry fees, then you want your horse to compete to the best of their ability." ■

AAEP Risk-Based Vaccinations

Horse owners and veterinarians can determine a complete vaccination program that may include the following based on the horse's individual risk.

- Anthrax
- Botulism
- Equine herpesvirus (rhinopneumonitis)
- Equine influenza
- Equine Viral Arteritis
- Leptospirosis
- Potomac Horse Fever
- Rotaviral Diarrhea
- Snake bite
- Strangles

Information provided by AAEP. For more details, visit www.aaep.org.

Potential Signs of Equine Stomach Ulcers

The diagnosis of equine gastric ulcer syndrome (EGUS) is based on the presence of clinical signs and confirmation with endoscopic examination. Clinical signs in adult horses can include:

- Poor appetite
- Attitude changes
- Decreased performance
- Reluctance to train
- Poor body condition
- Rough hair coat
- Weight loss
- Low-grade colic

Information provided by AAEP. For more details, visit www.aaep.org.

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Equine vaccine program distributes 3,200 free vaccines

According to horsetalk.co.nz, a program in the U.S. providing core vaccines to horses in need has given out more than 21,000 doses since 2008. So far this year the AAEP-Merck Animal Health initiative sent 3,200 free vaccines to more than 180 non-profit equine rescue and retirement facilities in the United States, through the Unwanted Horse Veterinary Relief Campaign (UHVRC). The UHVRC provides qualifying equine facilities with vaccines to protect against eastern equine encephalitis, western equine encephalitis, equine rhinopneumonitis (EHV-1 and EHV-4), West Nile Virus, equine influenza, tetanus and rabies. To qualify for donated vaccines, facilities must have 501(c)(3) tax-exempt status, follow the AAEP Care Guidelines for Equine Rescue and Retirement Facilities, and work with an AAEP-member veterinarian to submit an application. "The complimentary vaccines from the UHVRC enable us to serve our community and meet the standard of healthcare that our horses deserve," said Cara Zehnder, co-founder of Rescued Dreams Ranch in North Canton, Ohio.

Jaguar equine drug product candidate for the treatment of gastric ulcers in accordance with standard testing guidelines for horse racing

Jaguar Animal Health, Inc. announced that standard drug testing in race horses having received SB-300 did not detect any substances commonly disallowed by horse racing authorities, according to a release. The testing was conducted by an accredited US testing facility. SB-300, a pharmaceutical formulation of a standardized botanical extract, is Jaguar's prescription drug product candidate for the treatment of Equine Gastric Ulcer Syndrome (EGUS). Jaguar believes the results of this exploratory study are an important step towards development of a product that treats EGUS without interfering with the animals' competition schedules. In addition, the Company believes confirmation of no withdrawal time prior to competition should give SB-300 a remarkable advantage over other products that address EGUS that are currently on the market. Future work is being planned to confirm these results. The study also provided visual evidence that feed does not appear to interfere with the product candidate's local availability in the gut.

Three cases of EHM confirmed in Nebraska

According to the *High Plains/Midwest Ag Journal*, three cases of the Equine Herpes Myeloencephalopathy were confirmed in May at Fonner Park in Grand Island, Nebraska, resulting in State Veterinarian Dr. Dennis Hughes calling for horse owners to use best biosecurity practices. Samples were collected and sent to the National Veterinary Services Laboratory in Ames, Iowa, where the disease was confirmed. One of the affected horses was euthanized onsite while the other two have been isolated on the premises. The Nebraska Department of Agriculture in cooperation with Fonner Park management has quarantined the horses located at Fonner Park. Horses located in the Red Barn (where the affected horses were stabled) will not be allowed to race at present time. Racing was to continue at Fonner Park with the horses located in the other barns on the premises.

Equine internal medicine experts update statement on inflammatory airway disease

According to TheHorse.com, for the first time since 2007, a group of equine internal medicine experts collaborated and updated the consensus statement on inflammatory airway disease to help facilitate the industry's understanding of this common, performance-limiting, and potentially debilitating respiratory condition in horses. "Recurrent airway obstruction, or heaves, seen in older horses and inflammatory airway disease noted in younger horses both resemble asthma in humans," explained Laurent Couëtil, DVM, PhD, section head of Large Animal Internal Medicine at Purdue University in West Lafayette, Indiana, and lead author of the 2016 American College of Veterinary Internal Medicine Inflammatory Airway Disease Consensus Statement. "Specifically, they are characterized by airway inflammation and accumulation of mucus in the airways. "Other key points in the consensus statement relate to diagnosis and treatment of IAD, including the following recommendations: Rule out other causes of poor performance, such as upper airway obstruction and musculoskeletal disease; Use the mucus scoring system (Grade 0-5, with 5 being most severe) to grade the amount of mucus in the airway via endoscopy. The study, "Inflammatory airway disease of horses – revised consensus statement," was published in the *Journal of Veterinary Internal Medicine.*



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CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian. For client-friendly information on navicular syndrome and lameness exams please refer to www.equinelameness.com. As with all drugs, side effects may occur. In field studies, the most common side effects reported were signs of discomfort or nervousness, cramping, pawing, and/or colic within 2 hours post-treatment. Osphos should not be used in pregnant or lactating mares, or mares intended for breeding. Use of Osphos in patients with conditions affecting renal function or mineral or electrolyte homeostasis is not recommended. Refer to the prescribing information for complete details or visit www.dechra-us.com.

OSPHOS®
(clodronate injection)

Bisphosphonate
For use in horses only.

Brief Summary (For Full Prescribing Information, see package insert)

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

DESCRIPTION: Clodronate disodium is a non-amino, chloro-containing bisphosphonate. Chemically, clodronate disodium is (dichloromethylene) diphosphonic acid disodium salt and is manufactured from the tetrahydrate form.

INDICATION: For the control of clinical signs associated with navicular syndrome in horses.

CONTRAINDICATIONS: Horses with hypersensitivity to clodronate disodium should not receive OSPHOS.

WARNINGS: Do not use in horses intended for human consumption.

HUMAN WARNINGS: Not for human use. Keep this and all drugs out of the reach of children. Consult a physician in case of accidental human exposure.

PRECAUTIONS: As a class, bisphosphonates may be associated with gastrointestinal and renal toxicity. Sensitivity to drug associated adverse reactions varies with the individual patient. Renal and gastrointestinal adverse reactions may be associated with plasma concentrations of the drug. Bisphosphonates are excreted by the kidney; therefore, conditions causing renal impairment may increase plasma bisphosphonate concentrations resulting in an increased risk for adverse reactions. Concurrent administration of other potentially nephrotoxic drugs should be approached with caution and renal function should be monitored. Use of bisphosphonates in patients with conditions or diseases affecting renal function is not recommended. Administration of bisphosphonates has been associated with abdominal pain (colic), discomfort, and agitation in horses. Clinical signs usually occur shortly after drug administration and may be associated with alterations in intestinal motility. In horses treated with OSPHOS these clinical signs usually began within 2 hours of treatment. Horses should be monitored for at least 2 hours following administration of OSPHOS.

Bisphosphonates affect plasma concentrations of some minerals and electrolytes such as calcium, magnesium and potassium, immediately post-treatment, with effects lasting up to several hours. Caution should be used when administering bisphosphonates to horses with conditions affecting mineral or electrolyte homeostasis (e.g. hyperkalemic periodic paralysis, hypocalcemia, etc.).

The safe use of OSPHOS has not been evaluated in horses less than 4 years of age. The effect of bisphosphonates on the skeleton of growing horses has not been studied; however, bisphosphonates inhibit osteoclast activity which impacts bone turnover and may affect bone growth.

Bisphosphonates should not be used in pregnant or lactating mares, or mares intended for breeding. The safe use of OSPHOS has not been evaluated in breeding horses or pregnant or lactating mares. Bisphosphonates are incorporated into the bone matrix, from where they are gradually released over periods of months to years. The extent of bisphosphonate incorporation into adult bone, and hence, the amount available for release back into the systemic circulation, is directly related to the total dose and duration of bisphosphonate use. Bisphosphonates have been shown to cause fetal developmental abnormalities in laboratory animals. The uptake of bisphosphonates into fetal bone may be greater than into maternal bone creating a possible risk for skeletal or other abnormalities in the fetus. Many drugs, including bisphosphonates, may be excreted in milk and may be absorbed by nursing animals.

Increased bone fragility has been observed in animals treated with bisphosphonates at high doses or for long periods of time. Bisphosphonates inhibit bone resorption and decrease bone turnover which may lead to an inability to repair micro damage within the bone. In humans, atypical femur fractures have been reported in patients on long term bisphosphonate therapy; however, a causal relationship has not been established.

ADVERSE REACTIONS: The most common adverse reactions reported in the field study were clinical signs of discomfort or nervousness, colic and/or pawing. Other signs reported were lip licking, yawning, head shaking, injection site swelling, and hives/pruritus.

OSPHOS®
(clodronate injection)

Distributed by:
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