

HorseReport

CENTER FOR EQUINE HEALTH
SCHOOL OF VETERINARY MEDICINE • UNIVERSITY OF CALIFORNIA, DAVIS
SPRING 2018



**A Deadly Strain of
Equine Herpes Virus**

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UC DAVIS

VETERINARY MEDICINE

Center for Equine Health

Director's Message



The Center for Equine Health (CEH) is an exciting hub of activity fostering innovative studies, engaging student learning and serving our equine community through the center's lay-up services and the Contagious Equine Metritis (CEM) quarantine program. Our dedicated team enjoys working with our partners and friends in the daily pursuit of these activities.

In this issue of the *Horse Report*, we highlight the importance of biosecurity measures related to equine herpes virus 1 (EHV-1) as an example of the important steps horse owners need to be aware of when transporting their horses to and from events. Prevention, surveillance, treatment and outbreak containment are all part of an effective strategy to maintain equine health and support the horse-related activities in which we all engage.

Recently, the center honored Dr. Greg Ferraro, our former director, who has been instrumental in the success of CEH and the significant research advancements of our faculty. Dr. Ferraro guided many of the health initiatives, bringing together multidisciplinary teams to collaborate on these complex problems and work toward new treatments and solutions. He guided many veterinarians through the years and has been a very important mentor for me as well. Dr. Ferraro initially supported me during my Ph.D. and early career training and continues to provide advice as I "take over the reins" at CEH. With his support and mentorship, and the partnership and philanthropic support of our CEH community, the center will continue to advance equine health for years to come.

Thank you for sharing our passion for horses.

Carrie J. Finno, DVM, Ph.D.
CEH Director

Creating a Lasting Legacy of Helping Horses Heritage Society for Animals

The health of horses depends on continuous advancement in equine medicine. Dedicated to furthering knowledge, the CEH has improved the veterinary care of horses through important research studies and public education for more than 40 years.

Joining this mission are horse enthusiasts who include the CEH in their estate plans. These gifts ensure that the center's impact will continue for generations to come. Donors are remembered in perpetuity for making a difference in the health of horses. To recognize their enduring commitment, the school honors these donors as members through the prestigious Heritage Society for Animals.

Estate preparation does not need to begin late in life—foresight and generosity today can make a significant impact on the well-being of horses in the future. Estate planning options include charitable bequests made through wills, revocable living trusts, and life income agreements such as charitable remainder trusts and gift annuities.

For information about becoming a member of the Heritage Society for Animals and learning about the benefits of planning for an estate, please contact the [Office of Development](#) at 530-752-7024.



CEH Foals Join Animal Science Auction

Yearlings born at the CEH will join the 26th Annual Production Sale on June 23rd put on by the UC Davis Animal Science Horse Barn. Foals born at this facility are assigned to a student intern who works closely with them for six months, getting them accustomed to handling and advancing their ground manners. For the first time, the students are also visiting the CEH three times a week to work with the yearlings housed there.

“This partnership offers our students the benefit of working with horses of different personalities and breeds,” said Kelli Davis, manager at the [Horse Barn](#). “Most of the horses at the CEH are from American Quarter Horse stock, while we have other breeds as well. Having that exposure to various breeds and temperaments helps prepare the students for working in the equine industry.”



There are generally 10-14 yearlings available at auction. All are up-to-date on vaccinations, deworming, and hoof care. Foal managers who are familiar with their individual horses will be on hand before the auction during preview to answer any questions for potential bidders. Proceeds from the auction will benefit the CEH and the Horse Barn Teaching Program.

“This new collaboration is very exciting,” said CEH Director Carrie Finno.

“It’s a win-win by offering the students further experience with young stock, as well as providing our foals with additional training. This kind of interdepartmental partnership is a proud moment for UC Davis.”

For more information on the foal auction, call the Horse Barn at 530-754-4156 and check their [Facebook page](#) for updates beginning in May.

Ferraro Endowed Directorship

Dr. Gregory Ferraro was honored for his lasting impact on equine health and research with the announcement of a new endowed directorship in his name. Nearly 100 people—a veritable who’s who in equine medicine at UC Davis—gathered as Dean Michael Lairmore appointed Dr. Carrie Finno as the inaugural holder of the Dr. Gregory L. Ferraro Endowed Directorship.

Lairmore described a number of partnerships and generous donors to the CEH that made this endowed directorship possible, including the Bill and Inez Mabie Foundation that helped spearhead the initiative.

Dr. Claudia Sonder, former director of the CEH, was also honored for her leadership and skill as a liaison between the school and equine industry. Dr. Joie Watson, colleague and equine specialist, recalled a number of stories that illuminated



Dr. Carrie Finno (left) and Dr. Claudia Sonder with Dr. Gregory Ferraro.

Ferraro as a person of vision who helped build and create several successful programs that continue to grow today.

“That vision required patience and commitment to building relationships on mutual trust and respect,” Watson said.

Ferraro highlighted the importance of fostering the talent of people to make significant progress in the welfare of horses—from students and residents to staff and faculty members. A number of people reminisced about the lasting impression Ferraro made over the years, including delivering a foal while still

dressed in one of his trademark suits.

Finno spoke of the value of mentors and Ferraro’s instrumental support of her Ph.D. training in equine genetics and her recruitment to UC Davis as faculty.

“I have some very big Italian loafers to fill,” she said.

A Deadly Strain of Equine Herpes Virus

Any time a large group of horses gather in one place, there is a chance for a viral outbreak. Even seemingly healthy horses can become stressed by the situation and shed whatever virus they may be harboring. One in particular that has affected a multitude of shows and facilities in the past decade is a neurological strain of equine herpesvirus-1 (EHV-1) known as equine herpes myeloencephalopathy (EHM).

While the most common form of EHV-1 can cause respiratory illness as well as abortion, it is rarely fatal. The EHM strain, however, has a high mortality rate – generally 30-50 percent of infected horses will die.

Prior to 2011, EHM was only a monitored condition by the state of California, meaning the California Department of Food & Agriculture (CDFA) had limited authority to impose quarantine and movement restrictions. Due to an increase in cases, EHM has become a regulatory condition, giving CDFA and other state entities a more prominent role in preventing the spread of the virus.

Importance of Biosecurity

When outbreaks happen, there is always a focus on implementing the correct biosecurity measures to contain the virus at shows, in communities where the horses have returned, and at hospitals where infected horses are treated.

“The impact we can have as veterinarians is not in the prevention, it’s in the outcome,” said Dr. Nicola Pusterla, an internal medicine specialist at the UC Davis [veterinary hospital](#). “Can we get to these horses before the spread is too extensive? And at the clinic, can we recognize, isolate, and treat infected horses before the virus spreads?”

Pusterla also emphasizes the importance of every hospital or equine facility to have a dedicated biosecurity officer who is continually looking to stay on top of the situation and maintain strict biosecurity measures.

“At UC Davis, we focus on biosecurity every day, with every horse, no matter the circumstance,” Pusterla said.

Horse owners are advised to follow these basic CDFA and CEH biosecurity guidelines to decrease the potential



Avoiding the use of communal water sources is just one biosecurity measure all equine facilities should enact.

EHV-1/EHM spread at equine facilities and events:

- Limit horse-to-horse contact
- Limit horse-to-human-to-horse contact
- Avoid use of communal water sources
- Avoid sharing of equipment unless thoroughly cleaned and disinfected between uses
- Monitor horses for clinical signs of EHM including fever of 101.5°F or greater, nasal discharge, cough, reddish mucous membranes, puffy and red eyes, swollen legs and acute onset of neurologic signs (ataxia, recumbency, urinary incontinence)

In 2011, an EHV-1/EHM outbreak at the Western National Cutting Horse Event in Ogden, Utah potentially exposed the virus to at least 2,106 horses at 242 equine

facilities in 19 states (including California) and one Canadian province, and forced the cancellation of horse shows from coast to coast. By the time the outbreak eased, 90 horses were infected with EHV-1 (57) or EHM (33), with another 72 suspected cases (EHV-1: 62, EHM: 10). Thirteen of the 33 EHM-infected horses died.

While there hasn’t been another incident as large as Ogden since, scores of smaller outbreaks continue to occur across the country. In the first two months of 2018, confirmed cases have been reported at large equine facilities in 11 states, including California. A 10-year-old pony at Los Alamitos Race Course in Southern California displaying severe neurologic signs was euthanized. A necropsy at UC Davis’ [California Animal Health & Food Safety Laboratory System](#) confirmed EHM. CDFA and the California Horse Racing Board staff were quickly onsite to ensure the implementation of biosecurity measures and monitor the situation. CDFA immediately issued a quarantine for 11 other exposed horses at the facility.

“This is a great example of the importance of our regulatory condition of EHM, and of our collaboration with other state entities, like the [UC Davis School of Veterinary Medicine](#),” said Dr. Katie Flynn, CDFA equine staff veterinarian.

In light of these events, CDFA published “EHM Incident Guidelines for State Animal Health Officials” and a “Biosecurity Toolkit for Equine Events,” as well as an

EHV-1/EHM informational website. The Equine Disease Communication Center established a national database website with timely information on every EHM outbreak.

Understanding EHM

While it is important to prevent and properly treat EHM, it is equally important to study it. More research on the virus may yield better ways to prevent and treat it.

A retrospective study of the Ogden outbreak showed that horses were 3.3 times more likely to contract EHM if they were vaccinated against EHV-1 within five weeks of the event. (While there is a vaccination for EHV-1 to be used as an aid in disease prevention when it comes to respiratory issues and abortion, no commercial vaccine has a claim for the prevention of EHM; no consensus has been reached on the efficacy of EHV-1 vaccines.) The odds grew by 1.9 times with each vaccination in the year before. The research also showed that female horses were 2.8 times more likely than males to contract EHM.

[CEH](#) has contributed significantly to additional research projects into EHM, many performed by Pusterla and other faculty. An improved understanding of EHM has emerged from data collected during outbreaks at riding schools, racetracks and veterinary hospitals throughout North America and Europe.

Advanced laboratory testing at the school to confirm EHM not only assists with the treatment of hospitalized horses, but it also plays a significant role in a national biosurveillance research. An ongoing project between Pusterla and Merck Animal Health is studying the prevalence and epidemiology of relevant viral and bacterial respiratory pathogens. Since 2008, the school's PCR Laboratory has tested more than 6,300 samples from a wide variety of febrile horses showing signs of respiratory illness and/or neurological disease. The data mined from this research helps veterinarians and horse owners determine best biosecurity practices in clinics and equine events.

Managing EHM Cases

In 2011, BSR Cat, an 8-year-old American Quarter Horse gelding, became infected with EHV-1 and developed EHM during the Ogden outbreak. Shortly after leaving the show, he experienced an acute onset of neurological deficits

While healthy, BRS Cat still has not returned to competition seven years after his bout with EHM. ►



BSR Cat was hospitalized at UC Davis for 46 days after contracting equine herpes myeloencephalopathy.

and was transported to the UC Davis veterinary hospital. Upon admission, a test of his nasal swab and blood confirmed the diagnosis of EHM. BSR Cat was immediately placed in the hospital's Isolation Unit, a facility on the hospital grounds separated from the barns.

"Any horse that we suspect has EHM immediately goes to isolation – we don't take any chances," said Pusterla.

Every stall in the facility is an independent unit with its own air circulation to avoid cross contamination between the isolated horses.

"Putting the horses in isolation isn't enough," continued Pusterla. "Further precautions must be taken to ensure the virus isn't spread by the caretakers or because of the environment. If you swab a person who just treated an EHM horse, the virus is on their attire. So we take extreme precaution in making sure that anyone who comes in contact with an EHM horse has completely changed out of their clothes and cleaned thoroughly."

BSR Cat remained hospitalized for 46 days. Due to his inability to control his hind limbs, he was placed in a sling to help him stand. During the stay, his condition improved significantly, and he was ultimately able to lie down and get back up without any difficulty. Now seven years later, BSR Cat is in good health, but has not returned to competition.

UC Davis treated five horses from the Ogden outbreak and two other EHM cases that year.

Two of those seven patients did not survive.



On the Road *to Recovery*

Helen McCloskey's filly, Amal, is a bit of a miracle baby. She came three weeks premature with a narrow chance of survival. McCloskey rushed Amal in her lap to the UC Davis veterinary hospital an hour from her farm in the Capay Valley and placed her in the care of the [Equine Medical Emergency and Critical Care Service](#) led by Dr. Gary Magdesian.

Despite the odds, that foal survived and is now thriving three years later. So, when McCloskey's Arabian stallion, Raj, colicked this February, she knew exactly where to go.

The veterinary team assessed Raj through ultrasound and physical exam to determine that part of his large intestine was displaced. He required emergency surgery to survive.

Raj made it through surgery, but unfortunately developed a common surgical complication—an antibiotic resistant infection. It became apparent he couldn't go back to the ranch anytime soon and needed close supervision and access to medical care.

Since McCloskey's home is up the valley from the stables where Raj and her other horses live, she was concerned about not being able to keep a close eye on him as he recovered. He also needed a smaller enclosed space to keep him quiet while his body healed.

Fortunately, the CEH offers [layup boarding](#) with

individualized care for horses recovering from illness, injury, surgery, or other procedures requiring time for healing and rehabilitation. Amal had lived there for three months after her stay in the [neonatal intensive care](#) unit of the veterinary hospital. McCloskey decided to keep Raj there as well.

"We believe that the care of a horse during this critical recovery period can have a significant impact on how well they heal from an injury or illness," said Dr. Carrie Finno, CEH director. "We can facilitate any necessary medical care and 24-hour monitoring by our highly-trained team."

Horses that are not patients of the veterinary hospital are also welcome at the [CEH](#). The service operates 24/7, year-round. Interested clients may request a private tour of the facilities.

Care includes the following:

- Housing in individual 12 x 12-foot stall with 12 x 22-foot run, located in one of the 17-stall barns
- Bedding (shavings or straw, based on medical requirements or client preference)
- Individualized feed
- Grooming kit to take home upon departure that includes: thermometer, brush, hoof pick, and curry comb
- Daily grooming
- Daily exercise (hand walking and turnout)

Raj was well enough to return home in mid-March where he continues to improve.

"There's no better place to go if you have a horse with a life-threatening condition," McCloskey said of the veterinary hospital. "A situation like that is always scary, but I knew he was in the best hands possible."



▶ Helen McCloskey gives Raj a little love as he recovers from colic surgery.



Welcome Petri!

The first UC Davis ICSI foal—dubbed Petri—was born at the CEH on the evening of February 23rd. Mom and filly are doing well after an assisted foaling by Drs. Daniella Orellana and Ghislaine Dujovne of the veterinary hospital's Equine Reproduction Service. This is the first foal produced with intracytoplasmic sperm injection (ICSI), a unique in-vitro fertilization process, done entirely at UC Davis. This advances the ability of UC Davis to provide total [reproductive health](#) care from embryo production to birth and beyond.

ICSI is an artificial insemination technology that specifically assists in situations of male infertility, such as low sperm count or poor motility. UC Davis is proud to offer this technique as a breeding tool for stallions with one or both of these conditions as a way to preserve important bloodlines that could otherwise be lost. Further, our research and development in equine ICSI has important implications for refining and improving human ICSI, currently the primary method of IVF for human male infertility cases.

Going the Distance

Julie Suhr is a legend in the sport of endurance riding. Starting in 1968, she began riding in the Tevis Cup—an annual one-day, 100-mile trail competition—and earned 22 silver buckles for completing the race, with three Haggin Cup wins for the horse in the best physical condition among the top 10 finishers.

Maintaining her strong physical stamina, Suhr continued to blaze the trail until she was 80 years old. Today at 93, she continues to enjoy riding her horses and serves as an inspiration to others for the sport.

Deemed one of the most difficult endurance rides, the Tevis Cup trail passes through the rugged wilderness of the Sierra Nevada mountains, from east of Squaw Valley to Auburn. Held during mid-summer, this competition also challenges riders and horses with conditions of extreme heat.

Suhr attributes her longtime participation in the sport to good health and a supportive family. Her daughter Barbara White, receiving 31 Tevis Cup buckles herself, and her late husband, Bob, shared her passion and were often by her side during rides.

To honor Suhr, they wanted to find a special way to celebrate her love for and many contributions to endurance riding. After brainstorming some ideas, they secretly reached out to then CEH Director Gregory Ferraro, who was instrumental in helping them solidify their plans for a surprise gift.

Julie Suhr ►

“The fund established in my name means that through research at the [CEH](#), others may have the benefit of long and rewarding companionships with very special horses as I have had,” Suhr said. “I could not have wished for a nicer gift.”

The family created the Juliette Weston Suhr Endowed Fund—supporting research in exercise-related cardiopulmonary and metabolic disorders.

“We are very grateful to the Suhr family for the support of equine research. It has allowed us to perform endurance horse-based research with the goal of improving the health of the endurance horse,” said Dr. Gary Magdesian, chief of service and the holder of the Roberta A. and Carla Henry Endowed Chair in emergency medicine and critical care.

To make [a gift to the CEH](#), please contact the Office of Development at 530-752-7024.





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Mail ID 1415
Center for Equine Health
School of Veterinary Medicine
University of California
One Shields Avenue
Davis, CA 95616-8589

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Honor Someone Special

Are you looking for a special way to show that you care? The CEH offers a meaningful way to honor horses and the people who are devoted to them through **the Equine Tribute and Memorial Fund**. With a gift to this fund, you can:

- Remember a family member or friend
- Honor a dedicated veterinarian
- Celebrate the birth of a foal
- Express devotion for a loyal equine companion
- Commemorate winning a competition
- Memorialize a beloved patient

With your generosity, you are also supporting equine health studies and making a difference in the lives of horses. For information, visit give.ucdavis.edu/Go/EqTributeMemorial or call 530-752-7024.



Currently Funded CEH Projects

Temporal and spatial phylogeny of H3N8 equine influenza virus in the USA (2006-2016) – PI: Dr. Beatriz Martinex Lopez
Co-I: Dr. Nicola Pusterla, Dr. Kyuyoung Lee and Samantha Barnum

Equine influenza virus (EIV) is a highly contagious respiratory virus responsible for outbreaks worldwide. Because the virus continuously evolves and alters its form to escape the host's immune system, it is important to determine how the structure of the proteins responsible for the induction of immunity change over time. This information is relevant to evaluate vaccine effectiveness. The study aims to sequence strains of EIV from across the U.S., collected over a 10-year period (70 isolates), to determine how genetic changes relate to year and geographic location. This information will guide vaccination recommendations.

Using microbiota analyses to understand foal health: an examination of mare's milk and foal microbiota – PI: Dr. Michael Mienaltowski. Co-I: Dr. Elizabeth Maga, Dr. Gary Magdesian and Ubaldo De La Torre

Healthy gastrointestinal (GI) microbiota is necessary for a foal to grow into a healthy weanling. Disturbing the establishment of that microbiota can lead to diarrhea, which can affect the foal's morbidity and mortality. The changes could result from the mare's milk, the foal's overall health, diet modifications, or exposure to environmental bacteria. This study aims to determine: changes in the gut microbiota from birth to two weeks post-weaning, how healthy and sick foals' gut microbiota differ, and how the mare's milk affects the foal's gut microbiota. Microbiota composition will be determined using next-generation sequencing. Investigating the normal establishment of gut microbiota in nursing foals should lead to an improved understanding of the microbiota present in growing neonates and how mare's milk establishes the foal's microbiota.



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