Recommendations for Horses Exposed to Equine Herpes Virus (EHV-1) or Equine Herpes Virus Myeloencephalopathy (EHM)

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Background

Cases of Equine Herpes Virus (EHV-1) and Equine Herpes Virus Myeloencephalopathy (EHM) have been identified in horses that recently attended a cutting horse event in Ogden, Utah held from April 29 to May 8, 2011. The National Cutting Horse Association has notified State Veterinarians of horses from their states that were entered in the event and may have been exposed to the virus. Horses exposed at the event in Utah have since left the event and may now have exposed horses at their home farm or other equine facilities.

Case Definitions

Suspect EHV-1 case: An exposed horse that becomes febrile (rectal temperature greater than 101.5 degrees Fahrenheit) during the monitoring period.

Confirmed EHV-1 case: A suspect EHV-1 case whose infection is laboratory confirmed by virus isolation and/or PCR detection of the virus, or a 4-fold change in titer on the serum neutralization test using paired sera.

Suspect EHM case: An exposed horse exhibiting signs of central nervous system (CNS) dysfunction, including most commonly posterior incoordination, weakness, recumbency with inability to rise, or bladder atony.

Confirmed EHM case: A suspect EHM case testing positive for EHV-1 by virus isolation and/or PCR assay on nasal swab or blood (buffy coat). In cases of sudden death or where the horse dies as a result of neurological complications, the postmortem lesions are consistent with those of myeloencephalopathy and EHV-1 has been isolated, detected by PCR, or demonstrated by immunohistochemical examination of the CNS.

Non-clinical EHV-1 case: (It is not recommended to test exposed non-clinical horses). An exposed horse with no clinical signs (afebrile, non-neurologic) testing positive for EHV-1 by virus isolation and/or PCR assay on nasal swab or blood (buffy coat).

Monitoring of Exposed Horses

Key Points:

- *Isolation and monitoring are recommended for all premises with exposed horses*
- *Exposed horses should be initially be monitored for fever and/or neurologic signs for at least 7 days*

- *Owners should confirm with their practicing veterinarian or State animal health officials whether any requirements exist for notification to the State Veterinarian.*

- *Once suspect or confirmed cases are identified on a premises, then all horses on the premises should be managed as described in the "Management of Suspect and Confirmed EHV-1 or EHM Cases" section below*

Horses that attended the event in Ogden, Utah and other horses currently on the same premises as the horse exposed at the event should be isolated and monitored. Horses that left the premises after being exposed to the horse that attended the event should also be located and held for monitoring. Horses that attended the event and horses that have since contacted the horse that attended the event are considered exposed horses.

Monitoring of all exposed horses should initially occur for at least 7 days after the notification of the owner by the State Veterinarian. During the isolation period, it is recommended to discontinue or reduce any strenuous training or exercise for exposed horses. Also, biosecurity practices, such as those recommended on the American Association of Equine Practitioners (AAEP) website, should be implemented on the exposed premises. http://www.aaep.org/pdfs/control_guidelines/Biosecurity_instructions%201.pdf

All exposed horses should have rectal temperatures taken twice daily (8-12 hours apart) and recorded in a log for at least 7 days after notification of the owner by the State Veterinarian. Horses whose rectal temperature registers higher than 101.5 degrees Fahrenheit are considered to be febrile. All horses on the premises should also be monitored for neurologic signs (ataxia, posterior incoordination, weakness, recumbency with inability to rise, circling, head pressing, head tilt, bladder atony) during the home quarantine period. Central nervous system signs, such as posterior incoordination, weakness, recumbency with inability to rise, and bladder atony are most common in EHM affected horses. If any horse on the premises becomes febrile or begins to show neurologic signs, all horses on the premises should be managed as described in the "Management of Suspect and Confirmed EHV-1 or EHM Cases" section below. In addition, if required by the State Veterinarian, the owner or practitioner should report the clinical signs to the State Veterinarian's office. If none of the exposed horses becomes febrile or presents with neurologic signs during the isolation monitoring period, then the isolation may be discontinued.

Management of Suspect and Confirmed EHV-1 or EHM Cases

Key Points

- *Suspect and confirmed clinical cases need to be strictly isolated from non-clinical horses*

- *Suspect clinical cases should be sampled for laboratory confirmation of EHV-1*

- *Management Option 1: Cases and herd mates isolated for at least 21 days past resolution of clinical signs, then releasing test on all horses on the premises*

- *Management Option 2: Cases and herd mates isolated for at least 28 days past resolution of clinical signs with no releasing test*

Suspect EHV-1 or suspect EHM cases should be immediately isolated from other horses on the premises. The most effective method of isolation is removal of the suspect horse from the general horse housing area in which non-clinical horses are located. The isolation facilities of a local veterinary clinic or a separate barn/building on the affected premises are highly recommended. Some farms have used portable event tents and portable stalls to create an isolation unit on the premises. Febrile and neurologic EHV-1 cases shed large amounts of virus via the respiratory route and sharing airspace or fomites (equipment, buckets, human contact) within a barn may lead to further disease transmission. If physical separation of suspect cases in a different building is not possible, then relocation within the barn to a stall far removed from other horses with strict isolation biosecurity protocols implemented for handling the suspect horse may be an effective method of containment.

Suspect EHV-1 and suspect EHM cases should be sampled by a private practitioner for diagnostic testing as described in the "Diagnostic Testing" section below.

Management Option 1 (Best)

Confirmed and suspect EHV-1 and EHM cases should remain isolated with no movement of horses in or out of the affected premises for a period of at least 21 days from the resolution of clinical signs in all horses on the premises. Daily monitoring of rectal temperatures for all horses on the premises should continue through the 21 day period and horses should not be on any non-steroidal anti-inflammatory drugs (NSAIDs) during this time, as NSAIDs will mask a fever. If no new suspect or confirmed cases are identified during the 21 days, then sample all exposed horses on the premises using real-time or nested PCR testing of nasal swabs. If all negative results are obtained, the quarantine can be discontinued.

Management Option 2 (For premises with many horses where Option 1 may be economically impractical)

Confirmed and suspect EHV-1 and EHM cases should remain isolated with no movement of horses in or out of the affected premises for a period of at least 28 days from the resolution of clinical signs in all horses on the premises. Daily monitoring of rectal temperatures for all horses on the premises should continue through the 28 day period and horses should not be on any NSAIDs during this time. If no new suspect or confirmed cases are identified within this 28 day period, then the quarantine can be discontinued with no additional diagnostic testing.

Treatment and Vaccination

Horses with neurological signs will require intensive supportive care that should be administered by an equine private practitioner. Since vaccination and treatment strategies can be highly variable and depend on the specific farm situation, owners should work directly with the private practitioner to develop the appropriate treatment and/or vaccination strategy for premises with suspect or confirmed EHV-1 or EHM cases.

<u>Diagnostic Testing</u> (Note: Testing of non-clinical, exposed horses is not recommended)

1) Suspect EHV or EHM case (live horse with clinical disease).

a. Wear disposable gloves and change gloves between each horse
b. Collect whole blood into EDTA and label sample (preferably have an assistant label samples)
c. If a twitch is used to restrain the horse it must be washed and disinfected between horses
d. Nasal swab collected using Dacron tipped swab with plastic shaft. Swab should be in contact with nasal mucosa for at least several seconds.
e. Place swab in viral transport media or other transport solution recommended by laboratory performing the test and label sample. Use a small volume of transport fluid (less than 2 mL) to avoid over-dilution of the sample.
f. Perform hand hygiene between horses sampled and put on new pair of examination gloves
g. Keep samples cool but not frozen and ship by overnight delivery
h. Request real-time or nested PCR test and virus isolation
i. If sample reported as PCR positive, request typing of the virus based on DNA polymerase gene testing

2) Suspect EHV or EHM case (abortion or euthanatized suspect case)
    a. If mare aborts, while wearing disposable examination gloves, place fetus and placenta into a large plastic bag and avoid contamination of equipment or horse housing areas with the placental fluids
        i. Submit both the fetus and placenta to a veterinary diagnostic laboratory for testing
        ii. Request histopathology and testing of fetal tissues and placenta for EHV
    b. If horse is euthanatized, necropsy should be performed
        i. Request histopathology and testing of spinal cord and brain for EHV
3) Testing for release from quarantine (premises with suspect or confirmed cases)
    a. After resolution of clinical signs in all horses for the specified period
    b. Collect nasal swabs from all clinical cases and exposed cases
    c. Be certain to avoid any cross contamination by wearing a new pair of exam gloves to collect samples from each horse and perform hand hygiene between horses sampled
    d. Keep samples cool and ship by overnight delivery
    e. Request real-time or nested PCR test
4) PCR test interpretation (Per ACVIM Consensus statement on EHV)
    a. A positive EHV-1 test result on a blood sample indicates viremia most probably resulting from an active infection. It is unlikely that latent viral infection alone will give a positive result in this test.
    b. A negative EHV-1 test result on a blood sample indicates the absence of detectable EHV-1 viremia.

c. A positive EHV-1 test result on a nasal swab sample should be interpreted as indicative of the shedding of infectious virus. Quantitative PCR (ie, real-time PCR) could provide more information about the likely level of risk this shedding poses.
d. A negative EHV-1 test result on a nasal swab indicates the absence of detectable virus shedding.

Serological Testing

Owing to widespread EHV-1 exposure and vaccination in the general equine population, serologic testing on a single sample is uninformative. Serologic testing which demonstrates a 4-fold or greater increase in serum antibody titer between acute and convalescent samples collected 7–21 days apart provides presumptive evidence of EHV-1 infection, if there is no EHV vaccination in this time period. The serum neutralization (SN) test, also called the virus neutralization (VN) test is most commonly used. The acute sample should be collected as soon as horses are placed under observation, or at the earliest unset of clinical signs. In the midst of an outbreak, detection of rising virus-neutralizing antibodies in paired serum samples can be used to screen for horses that were exposed to the virus. A proportion of both affected and unaffected in-contact horses may seroconvert, providing indirect evidence that EHV-1 is the etiologic agent. Neutralizing antibodies do not distinguish between EHV-1 and EHV-4 infections.

Laboratory Submission

The following state and university laboratories are currently available to conduct real-time or nested PCR testing for EHV-1:

California Animal Health & Food Safety Laboratory System (real-time PCR)
http://www.cahfs.ucdavis.edu/

Lucy Whittier Molecular and Diagnostic Core Facility(real-time PCR)
http://www.vetmed.ucdavis.edu/vme/taqmanservice/

Cornell University College of Veterinary Medicine Animal Health Diagnostic Center (real-time PCR)
http://ahdc.vet.cornell.edu/

The University of Kentucky Veterinary Diagnostic Laboratory (nested PCR)
http://www.lddc.uky.edu/testofferings.asp

Michigan State University Diagnostic Center for Population and Animal Health (real-time PCR)
http://www.animalhealth.msu.edu/Bin/Catalog.exe?Action=Test&Id=2035

New Jersey Department of Agriculture Division of Animal Health Animal Diagnostic Laboratory (real-time PCR)
http://www.nj.gov/agriculture/divisions/ah/prog/lab.html

Pennsylvania Veterinary Laboratory – Harrisburg (real-time PCR)
http://www.padls.org/

University of Georgia – Athens (real-time PCR)
www.http://vet.uga.edu/dlab

Louisiana Animal Disease Diagnostic Laboratory (real-time PCR)
http://laddl.lsu.edu/

University of Illinois (real-time PCR)
http://vetmed.illinois.edu/vdl/index.html

Washington State University Animal Disease Diagnostic Laboratory - Pullman (real-time PCR)
http://www.vetmed.wsu.edu/depts_waddl/

North Dakota State University Veterinary Diagnostic Laboratory (real-time PCR)
http://www.vdl.ndsu.edu/

Murray State Breathitt Veterinary Center (nested PCR)
http://breathitt.murraystate.edu

Iowa State University Veterinary Diagnostic Laboratory (nested PCR)
http://vetmed.iastate.edu/diagnostic-lab

National Veterinary Services Laboratories – Ames (nested PCR)
http://www.aphis.usda.gov/animal_health/lab_info_services/diagnos_tests.shtml

Mississippi State University Veterinary Research and Diagnostic Laboratory (nested PCR)
http://www.cvm.msstate.edu/diagnostic_labs/index.html

Ohio Animal Disease Diagnostic Laboratory – Reynoldsburg (real-time PCR)
http://www.agri.ohio.gov/addl/

Oregon State University Veterinary Diagnostic Laboratory (real-time PCR)
http://oregonstate.edu/vetmed/diagnostic

Texas Veterinary Medical Diagnostic Laboratory (real-time PCR)
http://tvmdl.tamu.edu/

Animal Health Laboratory, University of Guelph (real-time PCR)
http://www.guelphlabservices.com/AHL/

University of Nebraska Veterinary Diagnostic Laboratory (real-time PCR)
http://vbms.unl.edu/nvdls

Additional laboratories will be added to this list as their real-time or nested PCR capabilities for EHV-1 are determined.

Reporting of Suspect and Confirmed EHV-1 and EHM Cases

It has been requested by the AAEP, American Horse Council, and some affected States that USDA-APHIS-Veterinary Services compile and distribute information on suspect and confirmed cases of EHV-1 and EHM associated with this incident. To facilitate this request, State Veterinarians in affected states are asked to report information weekly on the exposed horses and cases being monitored in the State. A standardized weekly reporting worksheet is available to assist the States in reporting of suspect and confirmed cases as soon as they are identified. Weekly reporting worksheets should be sent through the AVIC to the designated Regional Epidemiologist for compilation into a national report. The national report will be made available to the State Veterinarians, AVICs, other pertinent APHIS-VS personnel, and equine industry groups.

Cleaning and Disinfection (C&D) of Confirmed EHV-1 and EHM Case Premises

EHV-1 virus can stay viable in the environment for several weeks or longer. Thorough cleaning and disinfection of all horse trailers and equipment that returned from the event in Ogden, Utah is highly recommended. Cleaning and disinfection of barns, individual stalls, feeders, waterers, buckets, and other equipment should be performed on all confirmed EHV-1 and EHM case premises at the end of the quarantine period and before quarantine is discontinued. See the AAEP biosecurity protocols for detailed guidance on effective C&D procedures:

http://www.aaep.org/pdfs/control_guidelines/Biosecurity_instructions%201.pdf

EHV-1 and EHM Education and Outreach Materials

USDA-APHIS website

EHV information sheets, color brochures, historical information, and a review of disease mitigation strategies are available on the USDA-APHIS website:

http://www.aphis.usda.gov/vs/nahss/equine/ehv/

AAEP website:

General EHV resources through the American Association of Equine Practitioners:
http://www.aaep.org/ehv_resources.htm

Neurologic Disease Guidelines:
http://www.aaep.org/pdfs/control_guidelines/Neurologic%20Disease%20Guidelines.pdf

Equine Herpes Virus:
http://www.aaep.org/images/files/EquineHerpesvirusGuidelines051711.pdf

Biosecurity Guidelines:
http://www.aaep.org/pdfs/control_guidelines/Biosecurity_instructions%201.pdf

Biosecurity Instructions for Caretakers - English & Spanish:
http://www.aaep.org/pdfs/control_guidelines/Instructions%20to%20grooms.pdf

National Cutting Horse Association (NCHA) website:

For history of the current outbreak and additional outreach materials:

http://www.nchacutting.com/

ACVIM Consensus Statement on EHV-1:

http://onlinelibrary.wiley.com/doi/10.1111/j.1939-1676.2009.0304.x/pdf