

Situation Report
2022 Canon City Equine Influenza Outbreak

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Situation Reports will be issued every Friday.
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Outbreak of respiratory disease characterized by high mortality attributed to pneumonia (pulmonary edema and hemorrhage) primarily among West Douglas horses (435) and more typical mild signs of a respiratory illness (fever, nasal discharge, coughing) in the balance of the facility (2550 total)

Summary:

On April 23, 2022 9 horses were found dead in 4 pens containing horses gathered from the West Douglas Herd Area in July/August of 2021. Several horses were gravely ill showing signs initially thought to be neurologic but later attributed to hypoxia from severe pneumonia. Over the next 3 days about two dozen horses died or were euthanized for severe debilitating respiratory distress in the West Douglas group of horses. Post mortem examinations consistently found pneumonia characterized by severe pulmonary edema and hemorrhage. Morbidity characterized by respiratory signs including fever, nasal discharge and coughing were also noted in 40-60% of the West Douglas horses with growing morbidity to about 20% noted in other pens throughout the facility. Over the course of the next 5 days PCR testing of blood, swabs and tissues for EHV-1 and -4 were consistently negative, however several nasal swabs and lung tissue specimens tested positive for equine influenza, confirmed to be H3N8 by PCR testing.

Contributing factors include a history of gather and removal of West Douglas horses after a severe wildfire in their herd area, severe winds and dust storms in the area in the days before the outbreak. The West Douglas horses had been in the facility for about 9 months but are still unsettled, flighty as a group and easily disturbed in the pens. Most of the facility population is current (within 6 months) for flu/rhino vaccination, however the West Douglas horses in pens 40-43 are either unvaccinated, have only received one shot, or only recently received their booster shots about 10 days before the outbreak.

Timeline:

4/18 A foal that had died following observation of a stillborn foal and another foal death is submitted for necropsy with concerns for equine herpesvirus (EHV1). Initial laboratory results are unremarkable, viral testing pending. Gross observations from this case do not suggest a respiratory condition. The preponderance of the results from this case to date (5/10/22) suggest this death was unrelated to the respiratory disease outbreak and hereafter is not considered likely to be an index case.

4/23 9 dead horses were found in pens 40-43, mostly among the studs that had just recently been vaccinated with their 6-way vaccine, several horses were taken to the diagnostic laboratory for necropsy.

4/23 Voluntary quarantine was established with no movement of animals allowed off the premises, biosecurity measures are increased throughout the facility

4/24-25 46 horses die or are euthanized among the West Douglas horses, additional horses are taken to the diagnostic laboratory for necropsy or necropsied on site with samples submitted for polymerase chain reaction (PCR) analysis

4/25 First press release goes out from BLM acknowledging the outbreak

4/25 First increases of respiratory morbidity are noted in other pens in the facility

4/25 The first samples tested are negative for EHV-1

4/26 Veterinarians with the United States Department of Agriculture (USDA) and Colorado Department of Agriculture (CDA) visit the facility to review biosecurity and consult on the outbreak investigation

4/26 Several nasal swab and lung tissue samples are PCR positive for equine influenza virus (EIV or flu) at two diagnostic laboratories.

4/27 Additional PCR testing from two laboratories confirms the EIV as equine H3N8 type flu virus

4/27 CDA issues first press statement

4/28 BLM issues second press release identifying H3N8 as the cause of the outbreak

4/28 Additional necropsy and laboratory test results confirm pneumonia caused by H3 equine influenza virus complicated by bacterial coinfection as the cause of death in more animals. EHV-1 and EHV-4 are NOT detected.

5/02 Further testing of the samples positive for the equine influenza virus has determined the virus to be the Florida Clade 1 sublineage. This is currently the endemic strain of equine influenza in North America.

5/05 Culture and microscopic examination of samples obtained at necropsy have identified the bacteria streptococcus equi subspecies zooepidemicus (commonly called strep zoo) and actinobacillus species of bacteria in lung tissues as well as evidence of these infections consistent with severe suppurative bronchopneumonia. Although in some cases strep zoo is considered a primary pathogen, these bacteria are generally considered to be ubiquitous bacteria (meaning common and widespread in animals and the environment) and commensal organisms that occur in most if not all horse populations. Commensal means these bacteria are usually thought to be opportunistic pathogens rather than principle causes of

disease. While it is possible for these bacteria to be spread from horses to humans, this is a rare occurrence.

These findings support the initial clinical assessment that the respiratory disease and mortality seen at the facility is likely a multifactorial respiratory disease complex that includes the equine influenza virus, bacterial pathogens that are common in the environment and among all types of horses as well as environmental and host specific cofactors and comorbidities. On site clinical evaluations and sampling as well as laboratory testing including DNA analysis and work to identify specific types and strains of the virus and bacteria involved are ongoing.

5/6 With thanks to the many veterinarians and laboratory scientists that have been working on this outbreak investigation to date, the BLM is pleased to recognize that an ongoing collaborative effort to continue investigation of environmental, host and agent factors that contributed to the severity of the outbreak has been established. This includes the attending veterinarians on site and epidemiologists with the US and CO Departments of Agriculture as well as pathologists, clinicians and laboratory scientists from the Colorado State University Veterinary Diagnostic Laboratory, the Equine Infectious Disease Research Laboratory at the University of CA, Davis and the Gluck Equine Research Center, University of Kentucky. This Situation Report will continue to be the best source of updated information on the outbreak investigation. All questions should be directed to the BLM at (303) 239-3988.

5/11 Clinical observations from 5/9 through 5/11 suggest that the population of horses throughout the facility including those in the severely affected West Douglas subpopulation are returning to normal. The morbidity (proportion of animals showing mild respiratory signs including fever, dullness, coughing, nasal discharge) is greatly reduced from previous highs of >90% prevalence among West Douglas horses and about 50% prevalence in the remaining population to an estimated 10% prevalence among the West Douglas horses and about 5% prevalence in the remainder of the population. The estimated cumulative incidence of observed respiratory morbidity in the entire population is 90%. Mortality in the last few days is dramatically lower in the 4 West Douglas pens and remains zero in all others. The few animals that have died on 5/8, 5/9 and 5/10 were observed to have been ill with a guarded prognosis for recovery in the previous several days. Peer to peer, social interactions and other behaviors have largely returned to normal throughout the facility including in the severely affected pens.

These observations suggest that the outbreak is diminishing in intensity and beginning to resolve.

5/13 On 5/12 three horses unrelated to the incident were examined by the attending veterinarian and euthanized at the facility for the following reasons: Lameness with a poor prognosis for recovery, unable to maintain a Henneke body condition of 3 or greater with a poor prognosis for improvement, and acute severe injury of the spinal cord with a poor prognosis of recovery.

5/16 Updated the numbers from number of horses died to adult/foal horses died

Situation Report 5/24/22 – Histopathology results indicate the presence of severe diffuse necrosuppurative bronchitis and bronchiolitis with suppurative bronchopneumonia consistent with the equine influenza virus and streptococcus equi subspecies zooepidemicus infections previously identified. Laboratory testing of liver samples for Cu, Mg, Zn, Se and Mo, Vitamins A and E levels has been completed with no significant mineral deficiencies or toxicities found. Vitamin E levels were

normal, vitamin A levels were low. Recommend continued feeding of the protein, energy, vitamin and mineral supplement that was started at the beginning of the outbreak.

Mortality by Date:

	Pen Number	Group Name	# Adult Horses died	# Foals died	Comments
4/23	40-43	West Douglas	9	0	9 takes foal out of count from 4/18 initially thought to be linked to outbreak, but later found to be unrelated.
4/24	40-43	West Douglas	20	2	
4/25	40-43	West Douglas	21	3	
4/26	40-43	West Douglas	9	1	
4/27	40-43	West Douglas	18	0	
4/28	40-43	West Douglas	9	1	
4/29	40-43	West Douglas	7	1	
4/30	40-43	West Douglas	2	2	
5/01	40-43	West Douglas	10	1	
5/02	40-43	West Douglas	1	1	
5/03	40-43	West Douglas	3	1	
5/04	40-43	West Douglas	2	2	
5/05	40-43	West Douglas	1	1	
5/06	40-43	West Douglas	1	1	
5/07	40-43	West Douglas	1	4	
5/08	40-43	West Douglas	2	0	
5/09	40-43	West Douglas	2	0	
5/10	40-43	West Douglas	0	0	cumulative mortality to date 5% overall (32%, among WD horses, 0% among non-WD horses)
5/11	40-43	West Douglas	2	0	
5/12	40-43	West Douglas	0	0	
5/13	40-43	West Douglas	1	0	
5/14	40-43	West Douglas	0	0	
5/15	40-43	West Douglas	0	1	
5/16	40-43	West Douglas	0	0	
5/17	40-43	West Douglas	0	0	
5/18	40-43	West Douglas	0	0	
5/19	40-43	West Douglas	0	0	
5/20	40-43	West Douglas	0	0	

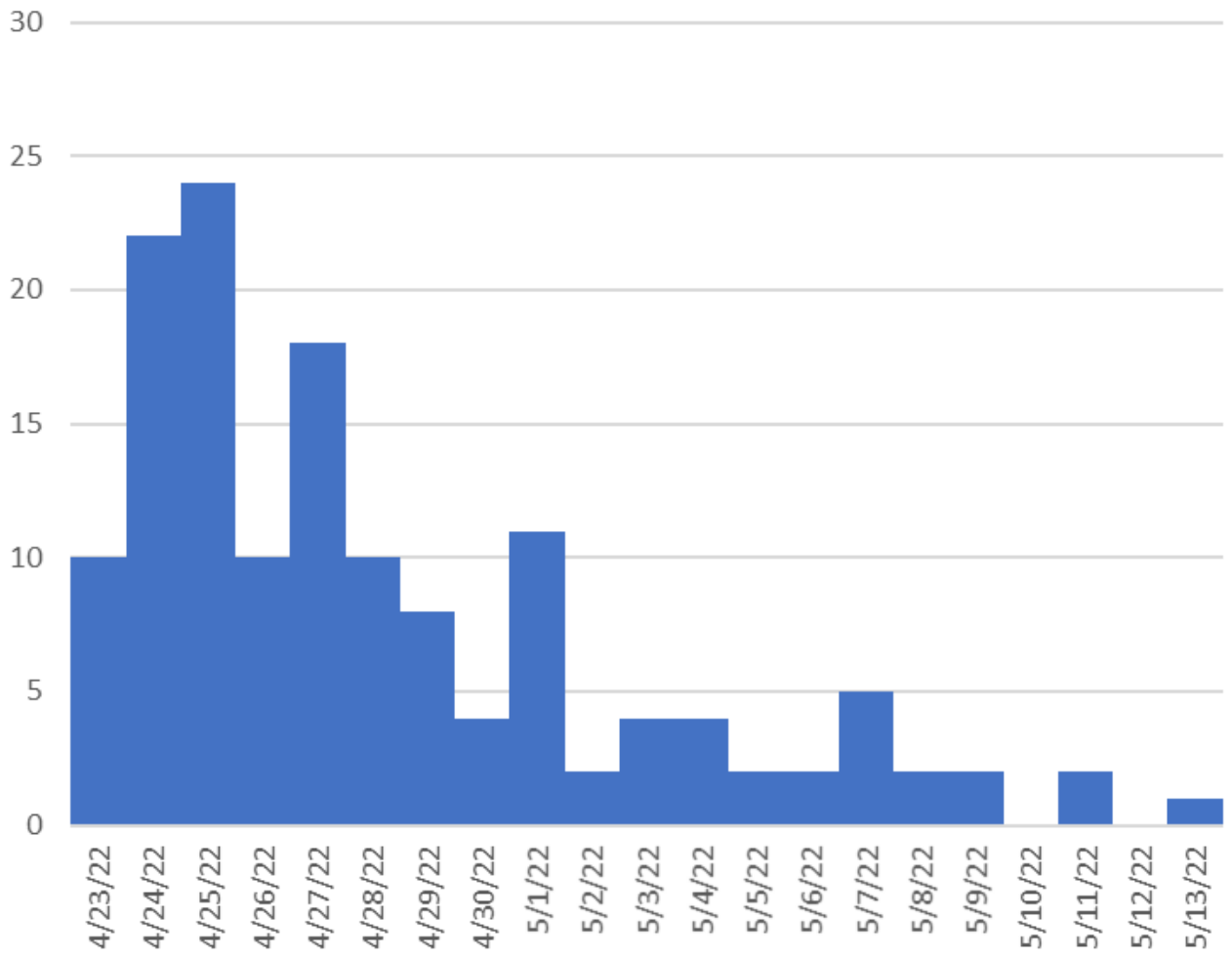
5/21	40-43	West Douglas	0	1	
5/22	40-43	West Douglas	0	0	
5/23	40-43	West Douglas	0	0	
5/24	40-43	West Douglas	0	0	
5/25-5/27	40-43	West Douglas		1	5/26
5/28- 6/3	40-43	West Douglas			

Diagnostic Plans and Investigation:

Several carcasses were transported daily along with samples (nasal swabs, whole blood, lung tissues and others) sent overnight to diagnostic laboratories. Testing requested included PCR for respiratory wildtype and neuropathic EHV as well as pan herpes viruses, other EHV types, influenza, rhinitis and S. equi. Samples of feed, water and stomach contents were collected and stored for future analysis. A site visit and outbreak investigation were conducted in collaboration with the US Dept of Agriculture and the CO State Veterinarian’s Office on 4/26/22 (report available at <https://www.blm.gov/programs/wild-horse-and-burro/herd-management/herd-management-areas/colorado>). Specimens from more than 15 horses had been prepared for testing s of 4/26/22. At this time the transport of carcasses for necropsy was suspended to allow time for sample processing and analysis to catch-up. Onsite necropsies and sample submission will continue as indicated based on the attending veterinarians’ clinical observations. Additional site visits will be scheduled and the outbreak investigation revisited as indicated based on results of the initial testing and progression of the outbreak.

With the determination that this event has been a multifactorial respiratory disease complex outbreak involving the H3N8 equine influenza virus and the bacteria streptococcus equi subspecies zooepidemicus as components of the problem, the ongoing laboratory focus will be on DNA sequencing these agents as well as further evaluation of host and environmental factors that may have contributed to the severity of the outbreak.

Canon City Mortality Curve (updated 5/13/22)





Treatment and Mitigation:

In addition to the voluntary quarantine of the entire facility, supportive care for affected animals and biosecurity measures have been put in place. Animals that could be handled without being moved outside the most affected pens were provided with anti-inflammatories and/or antibiotics at the direction of the attending veterinarian. Most of the affected animals are wild and ungentled and cannot be treated without use of the hydraulic squeeze chute systems. This risks further spreading the illness throughout the facility, stressing the animals that could exacerbate any current underlying issues and risk further injury to adults and young foals in the affected pens. For these reasons, individual animal treatment will be limited. The preventive medication of water with antibiotics is considered, but not implemented at this time. Dust mitigation efforts including wetting down adjacent roads and gravel areas is being done on an ongoing basis.