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# Ontario Animal Health Network (OAHN)
# Equine Expert Network
# Quarterly Veterinary Report

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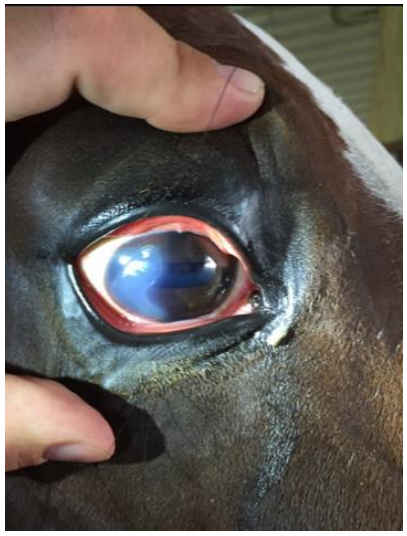
*One Health*

## Increase in corneal disease reported in Q3: Affect of weather and/or pollution?

In Q3, a perceived increase in corneal disease was reported by veterinarians on the clinical impression survey and network call. Corneal disease was noted as indolent (non-healing) ulcers, ulcers with bacterial and fungal organisms cultured and deep stromal abscesses. At first glance, this increase seemed unusual, however, a brief literature review revealed that weather and air pollution can be risk factors for corneal disease in both people and horses and could be one explanation for the reported rise.



The horse's eye is susceptible to trauma due to the amount of the globe exposed[1]. The horse also lives in a cantankerous environment full of mold, pollen, bacteria, fungi , particulate matter and exposure to the elements. The precorneal tear film plays a role in protecting the cornea so any disruption in the quantity and quality of the film may predispose the cornea to disease[1]. Disruption to the tear film may also alter the microflora present in the conjunctiva leading to opportunistic infection (e.g. fungal disease[1]. ) Environmental factors such as wind speed, humidity and exposure to airborne pollution have been shown to affect the tear film .

Airborne pollution is comprised of particles and gases that typically cause airway inflammation but are also absorbed across mucous membranes such as the conjunctiva[2]. The World Health Organization identifies key air pollutants as ozone, nitrogen dioxide (NO2), sulfur dioxide and particulate matter (PM 2.5 and 10)[2]. PM 2.5 are particles less than 2.5 microns in diameter and are produced from automobile combustion engines and agricultural, industrial and residential wood burning[2]. NO2 sources of air pollution include combustion emissions, power generation, domestic use (home heating), windblown soil and street dust. NO2 gas can travel up to 1500m from roadways[3].

In people, NO2 exposure has been shown to reduce the quality of the tear film by decreasing the thickness of the mucin layer. Windspeed can also cause tear film evaporation and mucin deterioration leading to higher osmolality of the tear film and potential degeneration of the corneal epithelium[4]. Pollen can then aggravate the corneal surface as well. In people, air quality and pollution are factors in dry eye disease (DED). In Asia, DED prevalence was associated with higher ozone and lower humidity levels. In India, the seasonal incidence of corneal ulceration is well known with a high incidence during

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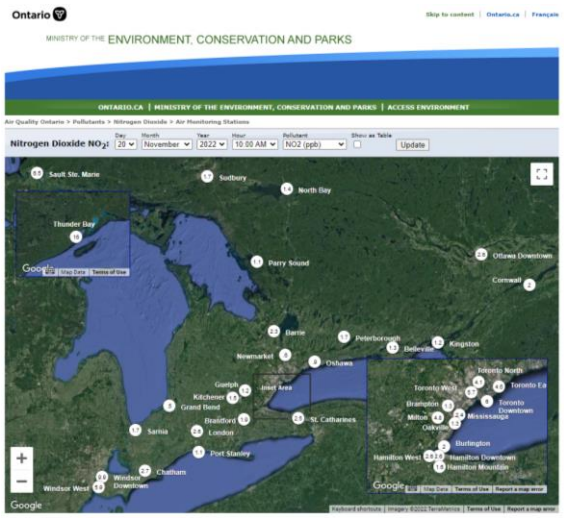
Practitioner input is invaluable to help detect regional trends, alert veterinarians to disease clusters and guide further investigation. The more vets participate, the more useful you will find the results!**

the harvesting season due to trauma by vegetative material[5]. In a social media evaluation of seasonal and geographic trends in corneal ulcers in the US, summer resulted in the highest number of posts and web searches and the southern states were the most represented across all social medial platforms[6].

In horses, alterations in the concentration of airborne NO2 influenced the formation of deep stromal abscesses in some Florida horses. Wind speed was also associated with an increase in equine deep stromal abscesses, suggesting microtrauma to the ocular surface may play a role[1].

In Ontario, there have been no studies on the association of airborne pollution and/or weather with corneal disease prevalence, but there has been some research on air pollution and the risk for airway inflammation. Beeler-Marfisi et al. found that higher levels of PM 2.5 and NO2 in air pollution were associated with an increased proportion of lower airway granulocytes in bronchoalveolar lavages (BAL) from Standardbred racehorses presenting to the Ontario Veterinary College for poor performance. The change in the BAL composition peaked 3-4 weeks after a recorded NO2 increase measured at a weather station in Guelph, ON[7].




Map: Ontario's Air Monitoring Stations (airqualityontario.com)

Although air pollution and weather do not necessarily cause corneal ulcers or other pathology directly, they seem to have a role in altering the local eye environment that sets the stage for other triggers in the environment such as antigens and microbes to cause further pathologic processes (Figure 1). In people exposure to NO2 is known to be associated with prevalence of allergic conjunctivitis and asthma through an increase in allergic sensitization[8]. Knowledge of the effects of air pollution and weather may assist clients in managing their more susceptible horses differently (e.g. avoiding turnout during the time of day when pollen, mold or air pollution index is the greatest).

Here are some resources to assist owners with monitoring their local air status:

The Weather Network - Weather forecasts, maps, news and videos – go under "menu" top left and click on "forecast and reports", then choose under environment "air quality" or "pollen". Note neither pollen nor mold are reported during the early winter months. I believe they start reporting around February/March. Data is collected by Aerobiology Research Laboratories Aerobiology Research Laboratories. This information is also available on The Weather Network App.

Map: Ontario's Air Monitoring Stations (airqualityontario.com) This map shows values for air pollutants such as ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide and PM 2.5 by day/month/year.

**Look for the Q4 survey in January 2023!**
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## Figure 1

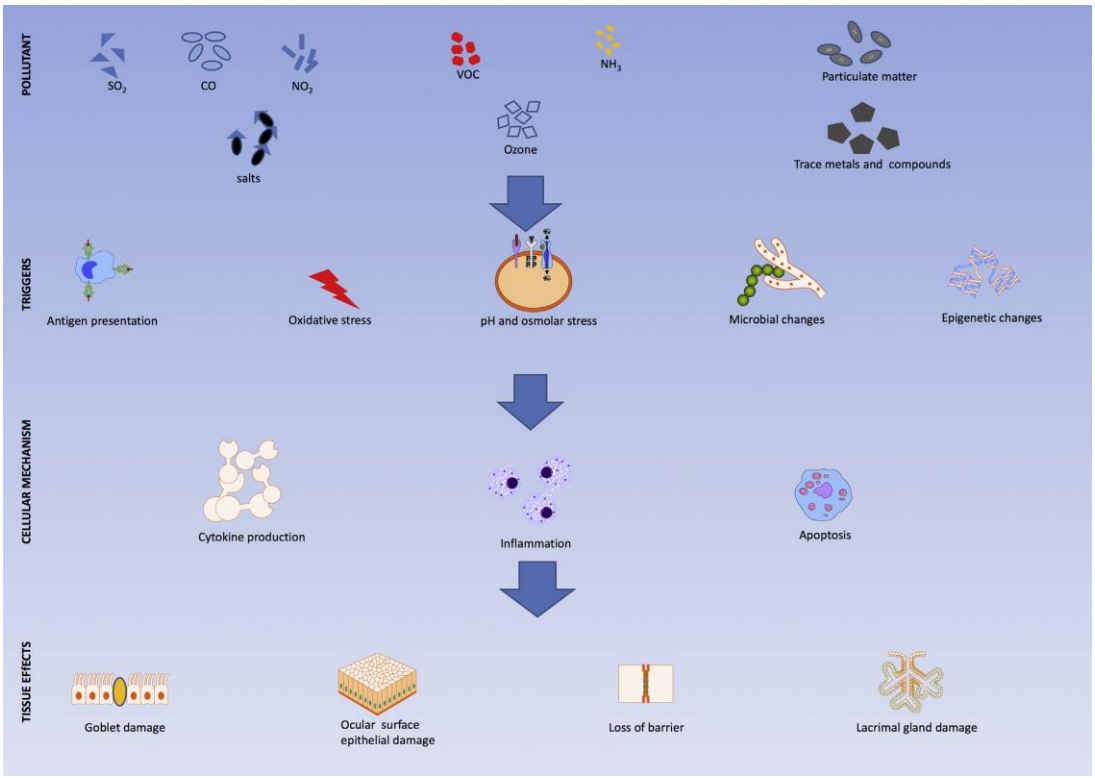


Fig. 1. Schematic showing the mechanism of pollutants (gases and particulate matter) inducing pathology in the ocular surface. Any one stimulant upstream can be combined with another trigger to lead to the downstream processes (for simplicity, cross-crossing arrows are not shown). SO2: Sulfur dioxide, CO: carbon monoxide, NO2: nitrogen dioxide, VOC: aromatic volatile organic compounds and NH3: ammonia (from **Jung, S.J. et al, Effects of environment pollution on the ocular surface, The Ocular Surface 16 (2018) 198-205.)**

# References:


1. A retrospective analysis of environmental risk factors for the diagnosis of **deep stromal abscess** in 390 **horses** in North Central Florida from 1991 to 2013.Proietto LR, Plummer CE, Maxwell KM, Lamb KE, Brooks DE.Vet Ophthalmol. 2016 Jul;19(4):291-6.

2. **Climatic** and Environmental Correlates of **Dry Eye** Disease Severity: A Report From the **Dry Eye** Assessment and Management (DREAM) Study.Berg EJ, Ying GS, Maguire MG, Sheffield PE, Szczotka-Flynn LB, Asbell PA, Shen JF; DREAM Study Research Group.Transl Vis Sci Technol. 2020 Apr 29;9(5):25

3. WHO Regional Office for Europe. Review of evidence on health aspects of air pollution – REVIHAAP Project: Technical Report [Internet]. Copenhagen: WHO Regional Office for Europe; 2013. C, Proximity to roads, NO2, other air pollutants and their mixtures. Available from: https://www.ncbi.nlm.nih.gov/books/NBK361807/

4. **Evaporation**-driven instability of the **precorneal** tear film.Peng CC, Cerretani C, Braun RJ, Radke CJ.Adv Colloid Interface Sci. 2014 Apr;206:250-64.

5. **Profile** of Corneal Ulcer in a Month of harvesting Season in a Tertiary Level Eye Hospital of Eastern **Nepal**.Gautam V, Chaudhary A, Singh SK, Rai PG.Nepal J Ophthalmol. 2018 Jan;10(19):32-38.

6. **Social Media** Evaluation of Seasonal and Geographic Trends of **Corneal** Ulcers in the United States.Choi JH, Ong ES, Munir WM.Eye Contact Lens. 2022 Oct 6.

7. Increased Weekly Mean $PM_{2.5}$ and $NO_2$ Are Associated With Increased Proportions of Lower Airway Granulocytes in Ontario Horses.Brankston G, Greer AL, Marshall Q, Lang B, Moore K, Hodgins D, Hennessey JTG, **Beeler-Marfisi J.**Front Vet Sci. 2020 May 5;7:185.

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# Network Member Reports

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| Northern Region (Drew Hunnisett) | Normal and representative caseload for this time of year. |
| Southwestern Region (Melissa McKee) | We saw several colics that were referred to the OVC as they were not straight forward on presentation. Many were painful in spite of normal exam findings, had multiple loops of small intestine palpable or had reflux etc. We saw very few diarrhea cases this quarter, and of those, most resolved with very conservative therapy (e.g. Biosponge). We saw numerous eye cases; uncooperative, stubborn challenging ulcers not healing and some with poor owner compliance . We saw many asthma cases likely due to the prolonged warm summer and some cellulitis cases. On the SB racehorse side of things, several horses were diagnosed with career ending issues or issues that required prolonged time off from work. We had an interesting temporomandibular joint arthropathy case. A mare had ongoing issues following a dental. The TMJ joint was injected with a corticosteroid and the mare improved. At the next dentistry she was better with the speculum but had some issues under saddle. She did not respond to TMJ injection as positively the second time. At our clinic we noticed the mare was only moving the jaw to one side when she chewed. Radiographs and CT were equivocal. Carbocaine anesthesia of the joint led to her chewing normally for the remainder of the block. Dr. Carmalt ( University of Saskatoon, Western College of Veterinary Medicine) then performed a needle arthroscopy of the TMJ at the OVC and found significant cartilage and disc degeneration. The joint was treated with Prostride (and will be followed with Noltrex).<br>A number of owners have watched and are aware of Dr. Sue Dyson's equine ethogram for ridden horses. **The 24 Behaviors of the Ridden Horse in Pain: Shifting the Paradigm of How We See Lameness** |
| Thoroughbred Industry (Jessica Peatling) | This information was based on feedback from Woodbine backstretch veterinarians. No issues were reported regarding infectious disease. One veterinarian thought the number of fractures had increased over Q3. The labour supply challenges continue on the backstretch and notably with veterinary technical staff. |
| Eastern Ontario (John Donovan) | We treated a suspected anaplasmosis case based on clinical signs. It responded well to treatment. We diagnosed a number of spasmodic colics due to changing weather / fall grass. There was also an increase in laminitis cases due to the fall grass. We have not had any Potomac Horse Fever cases since the last meeting. One of my associates managed a horse with a thoracic anaerobic infection with secondary pericarditis. There were also a few stromal abscess referred to the ophthalmologist. Overall it was fairly quiet. |

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| Ontario Veterinary College (Memo Arroyo) | We admitted mainly colics this quarter along with horses with ocular conditions. We had very few colitis cases this year. Of interest, we diagnosed PHF colitis in two 4 month old foals this quarter; one with *Neorickettsia risticii* and one with *N. finlayensis*. We had some unusual cases including a horse with guttural pouch empyema with necrosis of the entire septum creating a communication between the two pouches.. A S. zooepidemicus biofilm was present. There was some fungal hyphae on cytology but no fungus was cultured. We also had quite a few cellulitis cases this year, some of which took a long time to recover with extensive skin loss (overrepresented). We have also had horses with fevers of unknown origin as well that have been challenging to work up. We haven't seen a lot of late summer neurologic cases. |
| AHL Pathology (Emily Ratsep) | • A 4 mo TB foal with bacterial enterocolitis, cyathostominosis and bacterial pancreatitis (*A. equuli subsp. equuli*). The histologic changes in the intestines confirm a severe enterocolitis with numerous bacteria and nematode larvae most consistent with cyathostomins. Though more commonly observed in late winter to early spring, presence of numerous cyathostomin larvae in the mucosa of the colon and cecum indicates that these parasites were maturing in the mucosa. This could have played an important role in development of edema and possibly a protein-losing enteropathy. Most bacteria present are extracellular, and there are only rare argyrophilic intracellular bacteria which would be consistent with *Lawsonia intracellularis*. However, in the immunostaining against Lawsonia intracellularis there is no staining. The positive control contains numerous curved rods in the apical portion of most enterocytes with marked, diffuse, positive immunostaining. This suggests that the argyrophilic intracellular rods are most likely an enterobacteria other than *L. intracelullaris* or related species.<br><br>Samples of liver and lymph node yielded growth of *Enterococcus faecium* (1+), and *E. coli* (1+) and *Klebsiella pneumonia* (1+), respectively. No *Salmonella spp* or *Rhodococcus spp*. were isolated from these tissues. These bacteria could have disseminated systemically from the intestines. The epithelial barrier of the intestines was likely compromised by the marked and extensive edema and damage to the mucosa. Gram stain confirms presence of numerous extra and intracellular gram-positive and gram-negative rods in the mucosa of the small and large intestines. Additionally, emergence of larval stages of cyathostomins from the large intestine can result in necroulcerative lesions which would further facilitate invasion of bacteria present in the intestinal lumen.<br><br>The necrotizing and suppurative pancreatitis is markedly extensive and severe, and there was no pancreatic tissue left in the examined histologic sections. Lack of fibrosis and presence of mostly neutrophils and macrophages indicates this is an acute process. Bacterial culture of the pancreas yielded large (4+) pure growth of Actinobacillus equuli subsp equuli. This is a normal inhabitant of the equine oral cavity and intestine, and it is also the causative agent in vasculitis and embolic nephritis in foals. In the present case an ascending infection of the pancreas via the main pancreatic duct in the duodenum is likely, as bacterial culture of the liver and lymph node did not result in growth of the same agent, which would indicate a systemic spread. The presence of colonies of gram-negative rods in the Gram stain is consistent with Actinobacillosis.<br><br>• 2.5 mo Friesian foal with severe, chronic osteochondrosis of the elbow and tibiotarsal joints. There is osteochondrosis manifesta and dissecans in the front limbs (latens is only evident histologically). Acute fracture of the compromised cartilage likely led to the marked hemarthrosis and swelling noted clinically. Given the weakness in the retained cartilage, normal activity such as lying down on a hard surface could have been sufficient to induce the cartilage clefts. Causes for osteochondrosis are multifactorial and include genetic predisposition, trauma, nutrition and growth rate. This horse was large for its age, heavily muscled and well nourished, which is supportive of rapid growth rate. These lesions result from loss of vascular supply to the articular cartilage, resulting in necrosis or clefting of the cartilage. Instability and rubbing of the articular surfaces of the joint is responsible for bone fragmentation, and necrotic cartilage is incapable of healing. |

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| AHL Pathology (Emily Ratsep) | **Cont'd.** The lesions in the hock are consistent with a Salter Harris type II fracture, involving the physis and extending down the metaphysis. This type of avulsion fracture is due to excess force applied to the calcaneus by the calcaneal tendon. However, the bilateral fractures in this case are slightly unusual in that they do not completely parallel the physis. The presence of a cartilage flap adjacent to the fracture in the right tarsus suggests that an underlying osteochondrosis lesion predisposed to avulsion, with the fractures beginning at the site of the necrotic articular cartilage lesion and progressing along the path of least resistance through the relatively weak bone along the physis. Similarly, instability and excessive force on this bone resulted in non-union and fragmentation of the bone in this area.<br><br>There is delayed sloughing of the umbilicus, but it is dry, contracted and not inflamed. Omphalitis is not suspected in this case, however a resolved infection cannot be ruled out.<br><br>There are histological correlates of all stages of osteochondrosis in the joints examined. The extensive fibrous tissue formation observed in the humeri suggest that the clefts had been gradually progressive for some time prior to death, with fibrosis reflecting unsuccessful attempts at healing these unstable lesions. As postulated in the gross report, relatively minor shear forces on the weakened cartilage could then have led to sudden worsening of the clefting and the gross hemarthrosis. The rest of the organs were unremarkable and there was no sign of systemic infection that may have contributed to ischemia of the growing cartilage. In light of the absence of other predisposing lesions, rapid growth rate is considered the most likely predisposing factor for these lesions in this foal.<br><br>• 19 yo QH mare with rectal eosinophilic granulomas. The definitive cause is undetermined for the unusual eosinophilic inflammatory lesions in rectum of this horse, although the lesions fall under the general category of hypersensitivity (potentially to nematodes) or immune dysregulation. Presence or absence of systemic illness or lesions involving other organ systems may help to rule out some specific disease syndromes, although the history provided suggests that there is no clinical evidence of systemic disease at this point in time. Similar rectal eosinophilic granulomas have been described in horses with multisystemic eosinophilic epitheliotrophic syndrome. Horses with this condition generally have a history of weight loss and / or diarrhea due to eosinophilic inflammation involving multiple organ systems, including intestine, skin, and pancreas. Skin lesions are typically prominent, and progressive.<br><br>Eosinophilic gastroenteritis is an additional differential diagnosis, although distinct granuloma formation is not typical. Compatible clinical signs and lesions at other levels of the gastrointestinal tract would be expected.<br><br>If lesions are limited to rectum and colon, larval nematode migration and associated hypersensitivity is a third differential diagnosis, although the inflammatory reaction is quite dramatic for this cause. |
| Alison Moore (OMAFRA) | This year was extremely quiet for infectious neurologic disease.<br>There was one EHM case in Wellington County. A mature gelding was euthanized after showing incoordination, which rapidly progressed. The gelding had not been off the property for several years. Other horses from the facility had recently competed at an eventing competition in Simcoe County. None of those horses showed signs of EHM.<br>A suspect case of West Nile virus was identified in Middlesex County but the horse had been vaccinated two weeks prior to the advent of neurologic signs and blood work could not confirm WNV at the time. The horse recovered.<br>There were no reported cases of EEE this year. |

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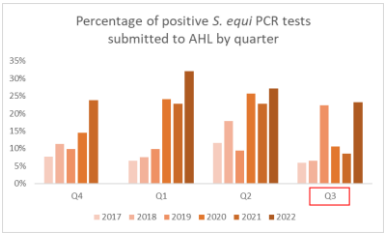
# Syndromic and AHL Laboratory Data Surveillance Dashboard

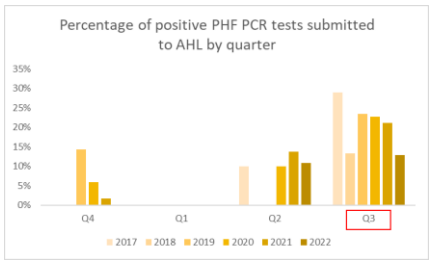
## Survey – Key points

- 19 Counties represented
- 59% equine, 27% equine and food animal clinics responded; the remainder were equine and small animal, mixed animal and ophthalmology
- Increase in (**foal**) *Lawsonia intracellularis*, limb deformities; (**adult**) equine asthma, Strangles, colic, non-healing corneal ulcers, colitis, Potomac Horse Fever, fecal water syndrome, allergic dermatitis, *E. coli* endometritis, gastric ulcers, PPID/EMS, equine protozoal myelitis, vaccine reactions; increased skeletal injuries, shoulder/scapular injuries, front sesamoid fractures +/- suspensory branch desmitis (equine athletes).
- While PHF was mentioned as increased, a number of respondents also listed it as decreased highlighting the regional nature of the disease.

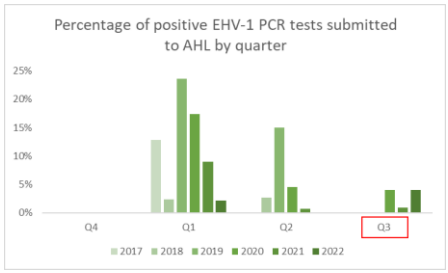
- New conditions or those without a diagnosis:
    - Chronic renal failure in a 5 yo Knabbstrupper with unknown cause
    - Fever of unknown origin with transient neurologic signs
    - Mare with TMJ arthropathy showing behavioural issues under saddle.
    - Painful colic signs without correlation with rectal findings (WNL) nor ultrasound findings.
    - Cellulitis, lymphangitis without an obvious explanation
    - Ocular lesion consistent with habronemiasis . No biopsy. Responded to oral deworming ad topical corticosteroids.

There is an increase in the percent of positive S. equi PCRs in Q3 2022 versus Q3 2021. Trend showing an overall increase in positive PCR tests suggestive of more testing in outbreak situations and to identify carrier horses.

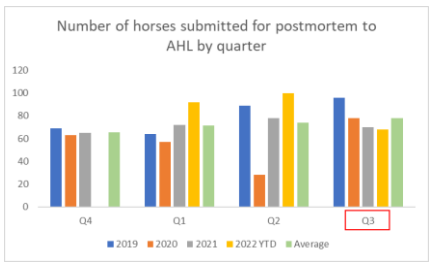


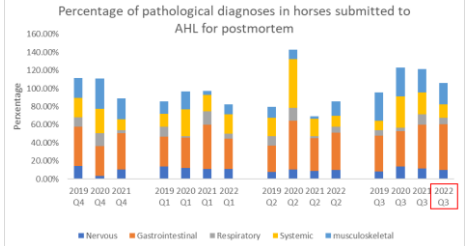

There was a decrease in the percentage of positive PHF PCR tests in Q3 2022 compared to 2021. The overall trend shows an earlier detection of PHF (in Q2). Q3 is the main season for PHF.




There was 1 case of EHM this quarter.




The number of horses submitted to AHL for postmortem in Q3 are similar to those of Q3 2021.




Trend towards an overall decrease in all areas of pathologic diagnoses except gastrointestinal when compared to Q3 2021..

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# Equine Research from Ontario and Around the World

## Researchers in Ontario

Fecal microbiota of **horses** with colitis and its association with laminitis and survival during hospitalization. Ayoub C, Arroyo LG, MacNicol JL, Renaud D, Weese JS, Gomez DE.J Vet Intern Med. 2022 Oct 21. **Free article**

Acute diarrhea in **horses**: A multicenter Canadian retrospective study (2015 to 2019).Gomez DE, Leclere M, Arroyo LG, Li L, John E, Afonso T, Payette F, Darby S.Can Vet J. 2022 Oct;63(10):1033-1042

Infection of young foals with **Equine** Parvovirus-Hepatitis following a fatal non-biologic case of Theiler's disease.Meister TL, Arroyo LG, Shanahan R, Papapetrou MA, Reinecke B, Brüggemann Y, Todt D, Stang A, Hazlett M, Baird JD, Steinmann E.Vet Microbiol. 2022 Nov;274:109557.

Fecal Microbiota Comparison Between Healthy Teaching **Horses** and Client-Owned **Horses**.Ayoub C, Arroyo LG, Renaud D, Weese JS, Gomez DE.J Equine Vet Sci. 2022 Sep 1;118:104105.

Case report: Use of penicillin G potassium in poloxamer 407 gel to aid in healing of an **equine** sublingual abscess.Larsen EA, Lack AC, Wassack E.Front Vet Sci. 2022 Jul 29;9:783753. doi: 10.3389/fvets.2022.783753. **Free PMC article.**

Real-Time PCR Differential Detection of *Neorickettsia findlayensis* and *N. risticii* in Cases of Potomac Horse Fever.Budachetri K, Lin M, Yan Q, Chien RC, Hostnik LD, Haanen G, Leclère M, Waybright W, Baird JD, Arroyo LG, Rikihisa Y.J Clin Microbiol. 2022 Jul 20;60(7):e0025022. **Free PMC article.**

Network analysis of Standardbred horse movements between racetracks in Canada and the United States in 2019: Implications for disease spread and control.Brown J, Physick-Sheard P, Greer A, Poljak Z.Prev Vet Med. 2022 Jul;204:105643.

Shivering and Stringhalt in **horses**.Valberg SJ, Baird JD.Vet J. 2022 Apr;282:105829.

Bilateral thoracic radiographs increase lesion detection in **horses** with pneumonia or pulmonary neoplasia but do not bring any additional benefit for inflammatory or diffuse pulmonary disease.Malek G, Leclere M, Masseau I, Zur Linden A, Beauchamp G, Finck C.Vet Radiol Ultrasound. 2022 Sep;63(5):518-529

## Researchers around the world

A review of **horses** as a source of spreading livestock-associated methicillin-resistant *Staphylococcus aureus* to human health.Khairullah AR, Sudjarwo SA, Effendi MH, Ramandinianto SC, Widodo A, Riwu KHP.Vet World. 2022 Aug;15(8):1906-1915. **Free PMC article.**

Comparison of thoracic ultrasonography and thoracic radiography between healthy adult **horses** and **horses** with bacterial pneumonia using a novel, objective ultrasonographic scoring system.Hepworth-Warren KL, Nelson N, Dembek KA, Young KAS.Front Vet Sci. 2022 Oct 13;9:991634 **Free PMC article.**

Rein tension in harness trotters during on-track exercise.Egenvall A, Byström A, Pökelmann M, Connysson M, Kienapfel-Henseleit K, Karlsteen M, McGreevy P, Hartmann E.Front Vet Sci. 2022 Oct 11;9:987852 **Free PMC article.**

Evaluation of feedback methods for improved detection of hindlimb lameness in **horses** among riding instructors and trainers.Leclercq A, Byström A, Söderlind M, Persson E, Rhodin M, Engell MT, Hernlund E.Front Vet Sci. 2022 Oct 10;9:992954. doi: 10.3389/fvets.2022.992954. eCollection 2022.PMID: 36299634 **Free PMC article.**

Radiographic prevalence of juvenile osteochondral conditions of the proximal interphalangeal joint of Australian Thoroughbred racehorse yearlings and associations with sales results and race performance.Faulkner J, Vanderperren K, Duchateau L, O'Sullivan C.Front Vet Sci. 2022 Oct 10;9:988826. **Free PMC article.**

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Frequency of Detection of Respiratory Pathogens in Clinically Healthy Show **Horses** Following a Multi-County Outbreak of **Equine** Herpesvirus-1 Myeloencephalopathy in California.Wilcox A, Barnum S, Wademan C, Corbin R, Escobar E, Hodzic E, Schumacher S, Pusterla N.Pathogens. 2022 Oct 8;11(10):1161. doi: 10.3390/pathogens11101161.PMID: 36297218 **Free PMC article.**

The Effect of Chiropractic Treatment on Limb Lameness and Concurrent Axial Skeleton Pain and Dysfunction in **Horses**.Maldonado MD, Parkinson SD, Story MR, Haussler KK.Animals (Basel). 2022 Oct 19;12(20):2845. **Free PMC article.**

Artificial Intelligence for Lameness Detection in **Horses**-A Preliminary Study.Feuser AK, Gesell-May S, Müller T, May A.Animals (Basel). 2022 Oct 17;12(20):2804. doi: 10.3390/ani12202804.PMID: 36290189 **Free PMC article.**

Prospective Case Series of Clinical Signs and Adrenocorticotrophin (ACTH) Concentrations in Seven **Horses** Transitioning to Pituitary Pars Intermedia Dysfunction (PPID).Kirkwood NC, Hughes KJ, Stewart AJ.Vet Sci. 2022 Oct 17;9(10):572. doi: 10.3390/vetsci9100572.PMID: 36288186 **Free PMC article.**

**Equine** Anthelmintic Resistance: Horse Owner and Yard Manager Perception of the Barriers Affecting Strategic Control Measures in England.McTigue FE, Mansbridge SC, Pyatt AZ.Vet Sci. 2022 Oct 11;9(10):560. doi: 10.3390/vetsci9100560.PMID: 36288173 **Free PMC article.**

Are Horse Owners Able to Estimate Their Animals' Body Condition Score and Cresty Neck Score?Busechian S, Turini L, Sgorbini M, Pieramati C, Pisello L, Orvieto S, Rueca F.Vet Sci. 2022 Oct 3;9(10):544. doi: 10.3390/vetsci9100544.PMID: 36288157 **Free PMC article.**

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## Do you have clients with pet pigs or small swine holdings?

The OVMA has developed an African Swine Fever (ASF) webpage with several ASF resources including an ASF whiteboard video. A free 4-part online pig course for veterinarians is available on-demand produced by the Canadian Animal Health Surveillance System (CAHSS).

## Interested in what's happening with avian influenza?

Visit the OMAFRA avian influenza webpage for information on the ongoing HPAI situation in Ontario. For information on HPAI in wild birds in Canada, visit the CFIA interactive HPAI dashboard.

Research Ontario Equine

## Your OAHN Equine Network Team

Northern Ontario
Dr. Drew Hunnisett
Southwestern Ontario
Dr. Melissa McKee
Eastern Ontario
Dr. John Donovan
Thoroughbred Industry
Dr. Jessica Peatling
Animal Health Lab
Dr. Emily Ratsep
Ontario Vet College
Dr. Memo Arroyo
OMAFRA
Dr. Alison Moore
Dr. Tim Pasma
OAHN Coordinator
Dr. Tanya Rossi