REPORT #31
APR. MAY. JUN
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Ontario Animal Health Network (OAHN)
Equine Expert Network
Quarterly Veterinary Report

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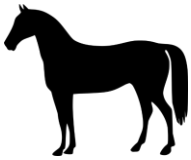
Don't Forget the Sample Site When Requesting Bacterial Culture !

Last quarter we asked for you to provide the sample site associated with bacterial culture submissions. Thanks to those who have listened but we really haven't made any overall progress (78% of samples with no site listed vs 77% last quarter).. To the vets who put "horse" as their sample site….Funny !..but not overly helpful!

78% of bacterial culture submissions had NO sample site listed

This information helps pathologists, who receive tissue as well, correlate the bacterial growth findings with the histopathology



Habronemiasis ("Summer Sores") – do we have it in Ontario?

Dr. Emily Ratsep presented the following case during our Q2 network meeting.

A biopsy of a lower eyelid mass was received from a 19 year-old gelding, from the Manitoulin District. The nature of the histologic lesions is consistent with ***cutaneous habronemiasis*** *and the eyelid is a common site for this to occur as larvae tend to be attracted to the moisture of tears. Although small refractile fragments suspicious for nematode cuticle were seen in the centers of the inflammatory nodules, a good cross section of a larva was not found. Nodular collagenolytic granulomas can also look like this. The underlying etiology of collagenolytic granulomas is unknown but a hypersensitivity reaction to arthropod injury has been proposed. Unlike habronemiasis, however, there is a lack of ulceration of the overlying epidermis. Although a definitive cause for the granulomatous and eosinophilic eyelid inflammation cannot be declared, the mass is decidedly non neoplastic and complete excision should be curative.*

Look for the Q3 survey in October 2022!
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!

Habronema life cycle:

- *Habronema microstoma*, *H. muscae* and *Drashcia megastoma* are the only habronema sp. detected in domestic or wild equids**.** Habronemiasis is found in temperate to tropic regions, peaking in the summer months. The infection is not age dependent and an recur yearly in susceptible individuals.
- The adults live in the stomach (wall of the fundus or pyloric region) or can be found on the mucosa of the margo plicatus. The females release eggs which can hatch during intestinal transit or after being passed in manure. L1 stage larvae can live for 7 days in a suitable environment
- Eggs and/or larvae are ingested by fly (muscarid) larvae that live in the manure.
- Musca domestica (housefly) and Stomxys calcitrans (stable fly) are the main vectors of *H. muscae and H. microstoma* respectively. *M. domestica* feeds on eye, nose and mouth secretions. *S. calcitrans* feeds on blood from the legs and flanks.
- Within the fly, the Habronema larvae develop from L1 to L3 over the course of 7 days. During warm weather, the L3 are deposited by the flies, around the horse's lips and then swallowed. The larvae develop to adults in the horse's stomach. L3 larvae can also be deposited at other sites; eyes and nostrils (cutaneous form) or genital mucosa (muco-cutaneous form). They may rarely reach the lungs, liver and brain. At these sites, larvae do not reach sexual maturity**.**

Clinical signs

- Gastric habronemiasis –mechanical irritation, ulcers, impede pyloric opening causing a range of clinical signs from none to anorexia, diarrhea, weight loss and/or colic.
- Cutaneous form – summer sores, most severe form – lesions disappear in the cold months but can reappear in warm weather.
- L3 are deposited on wounds by flies and the spine of the larvae induce proliferative granulation tissue caused by local injury and hypersensitivity reaction to dead or dying larvae.
- The chest, fetlocks and inner side of legs are most affected. The lesions are single or multiple, proliferative, granulomatous and often itchy, ulcerated with necrotic, caseous or calcified granules.
- They can be dry or wet (discharge) lesions. The dry lesion is usually circular with no hair and with grayish scales. Wounds can attract more flies and develop a super-infection
- Habronemiasis has also been diagnosed histologically on skin biopsies from swellings on the face and limbs with normal, intact overlying skin. The parasite has also been diagnosed associated with cellulitis.
- Mucocutaneous form – conjunctiva, medial canthus, nasolacrimal ducts or commissure of the lips or urethral process, glans, prepuce, vaginal fornix may be affected.
- Larvae are typically released in the medial canthus – conjunctivitis , blepharitis, dermatitis with photophobia and lacrimation. It can present as a flat ulcerated wound under the eye that fails to heal.

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Diagnosis

- Diagnosis is made on the basis of clinical history and clinical signs and skin biopsy.
- Differential diagnoses include proud flesh, sarcoids, squamous cell carcinoma and other neoplasias, other hypersensitivity reactions and pythiosis.
- Histopathology of a skin biopsy will show that wounds are infiltrated with eosinophils, macrophages, lymphocytes and a few plasma cells, Peripherally there may be a lot of fibrous tissue with masses of eosinophils. Sections of nematodes can sometimes be detected.
- Gross lesions are ulcerative and granulomatous with so-called sulfur-like granules.
- The larvae live for <1 month in cutaneous tissues and larval death may cause more necrosis and calcification than a living parasite.
- A PCR (only available in Europe) has been developed to identify *H. microstoma* and *H muscae* DNA.

Treatment and prevention

- Reducing the inflammation and preventing reinfestation are keys to treatment.
- Macrocyclic lactones (ivermectin, moxidectin) have high efficacy against larvae and adults in stomach.
- For cutaneous lesions; there is a questionable response to ivermectin as lesions are thought to be due to a local hypersensitivity reaction to dead or dying larvae and ivermectin may worsen the signs of pruritus. Corticosteroids may reduce hypersensitivity reactions and surgical debulking may be needed when medical treatment of summer sores is refractory. That said, several veterinarians in heavily afflicted areas of the US recommend topical treatments containing ivermectin as well as a corticosteroid (Facebook Equine Vet-2-Vet group).
- Regular cleaning of barn and paddocks, removal/disposal of manure, integrated fly control program, fly repellants, fly blankets , masks are all helpful.

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Complications of equine **wound** management and dermatologic **surgery** .**Hanson RR.**Vet Clin North Am Equine Pract. 2008 Dec;24(3):663-96, ix. doi: 10.1016/j.cveq.2008.10.005.

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Network Member Reports

Northern Region (Drew Hunnisett)	Normal and representative caseload for this time of year.
Southwestern Region (Melissa McKee)	Up until quite recently, it's been a dry, early summer so we've seen **fewer** dermatitis/mud fever cases as well as fewer cellulitis cases in general, although we've had a few chronic cases. There has been **less diarrhea** but, just in this month, we've started to see **oxytetracycline-responsive diarrheas**. We've had some horses struggling with **asthma** (often due to round bale feeding) and an on-going **strangles** situation at a high traffic lesson barn. We've had a typical summer with "**hivey", allergic** conditions which seem to be increasing year over year. We've seen an unusual increase in proximal limb (mainly **tibia) stress fractures** (7 in last few weeks), all two-year olds. No commonality in breeding, trainer, farm of origin or training centres etc.
Thoroughbred Industry (Jessica Peatling)	This information was based on feedback from Woodbine backstretch veterinarians. Everything has been stable . There has been a **reduction** in respiratory signs in the 2-year-olds possibly due to mandatory vaccination. There has been an **increase in soft tissue injuries** over this time last year with **front-end suspensory branch injuries** overrepresented. The overall breakdown rate seemed to be stable with increased diagnostics overall to work up soft tissue injuries. The recent **high humidity and hot weather** seemed to cause some horses to act up in post parade and at the gate, as well a EIPH and mild to moderate signs of heat stroke in some horses leading, in one instance, to the cancellation of a race card at Woodbine. The labour shortage is not as big an issue as there are fewer horses overall.
Eastern Ontario (John Donovan)	We saw a fairly representative caseload for the time of year. We are starting to see about 3 horses with suspected or confirmed **PHF** per week. We've also had a few horses with **Lyme disease** and **anaplasmosis** and a horse confirmed with **leptospirosis** (second case on the farm).

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Ontario Veterinary College (Memo Arroyo)	We have been seeing several cases of **colic** cases and a decent number of horses with **Potomac Horse Fever**. The number of respiratory cases has been **reduced** although we've seen some **hard-to-control asthmatics** where environmental management recommendations have not/could not be followed. Foal season is over! We saw a lot of foals this year, namely septic foals which were fortunately referred early so we had fewer septic joints and umbilical resections. One mare recently was euthanized due to laminitis from PHF infection, and we have had a couple of yearlings with **ascarids** found on treating post-deworming colic (ascarids were in the nasogastric tube). Some foals arrived from KY with respiratory lesions but not big abscesses etc. We have not seen the eosinophilic keratitis lesions we have seen in previous years.
AHL Pathology (Emily Ratsep)	• 9 year old Hanoverian mare -**hyperammonemic encephalopathy** (colonopathy with severe colonic necrosis). Type II Alzheimer's astrocytosis is typical of hyperammonemic encephalopathy, which is typically observed secondary to hepatic disease. In the absence of hepatopathy and presence of severe colonic necrosis, this case is consistent with colonopathy associated encephalopathy, where there is altered intestinal barrier or an increase in ammonia producing gut bacteria leading to hyperammonemia. • Mature female donkey (Jenny) **Pulmonary interstitial fibrosis** (Suspect AsNV4/5) **with adenocarcinoma**. Lung lesions in this donkey are compatible with fibrosing interstitial pneumonia associated with infection with asinine herpesvirus 4 and 5 (AsNV4 and AsNV5). These are gammaherpesviruses and differ from alphaherpesviruses such as equid herpesvirus 1. Diagnostic testing for presence of these viruses is not currently available. In addition the donkey also has a malignant neoplasm (adenocarcinoma) located int he cranial abdomen and invading the caudal vena cava. Either pancreatic or biliary (cholangiocarcinoma) origin is possible for this malignant tumour and opinions of the other AHL pathologists varied regarding these two differential diagnoses with an approximately equal split. Regardless of the anatomic site of origin, the neoplasm has invaded vena cava, infiltrated liver and metastasized to lung. The history of recent respiratory signs may be the result of tumour emboli. however this is speculative as no intravascular emboli were identified on gross or histologic exam. • 6 yo Dutch harness horse mare -**Laminar necrosis**. Laminar cortical necrosis is caused by hypoxic or ischemic damage to neurons, glial cells and the surrounding neuropil. It is associated with hypoxic/ischemic/metabolic/causes. Toxicities in different species include lead poisoning, thiamine deficiency in ruminants, salt toxicity in pigs. In this case it is likely hypoxia related.

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AHL Pathology (Emily Ratsep)	• 11 day old mixed breed colt - **enterotoxin producing enteropathy** with hemorrhage and venous thrombosis in the brain. The clinical course as well as the gross and histologic findings of hemorrhage, congestion and venous changes in the intestinal tract are highly suggestive of enterotoxin associated vascular damage as is seen with clostridial infection. The subtle histologic brain lesions could explain the clinical signs of encephalopathy and are suspected to be a consequence of enterotoxin associated vascular damage. • 11yo QH mare **- mediastinal T cell lymphoma**. The histologic assessment of the thoracic mass revealed two cell populations within the mass. One population of small lymphocytes and another population of polygonal to spindyloid cells. This second population is suspected to be the neoplastic population. A tentative diagnosis of lymphocyte rich thymoma will be further investigated by immunohistochemistry with pancytokeratin to confirm epithelial origin of this cell population. An addendum with these results will be posted. The remaining histologic finings are considered unrelated to the neoplastic process and rapid clinical decline of this patient. • 17 yo mare – **mammary carcinoma**. chronic inflammation, edema and progressive enlargement of the udder in this mare can be attributed to a mammary neoplasm. Areas of necrosis and secondary neutrophilic inflammation within the neoplasm would likely have been difficult to differentiate from an abscess clinically. Mammary neoplasms are rare in horses and criteria of malignancy are not established. However, the high degree of cellular pleiomorphism, high mitotic index, presence of areas of necrosis and peritumoral invasion seen in this neoplasm strongly suggest it is malignant. • 27 yo warmblood mare – **Hemangiosarcoma** -The gross diagnosis of hemangiosarcoma is confirmed on histology despite the markedly poor preservation of the tissue examined, making cellular details difficult to discern. As such, an accurate mitotic count was not possible however overall the neoplastic cells had minimal anisokaryosis and anisocytosis as is generally appreciated in hemangiosarcoma of small animals. Hemangiosarcoma in horses is uncommon and the disseminated form even less common, as these tumours are generally diagnosed as external skin or subcutaneous masses rather than visceral forms. Please see the body of the report for additional comments. • 9 day old colt. **Intestinal cryptosporidiosis**. The clinical signs and histologic lesions within the duodenum are consistent with Cryptosporidium parvum infection. A request has been submitted for a modified Ziehl Nielsen stain has been submitted for completeness. The multifocal necrosis within the liver likely result from hematogenous spread of intestinal bacteria that entered the blood stream when the epithelial layer was compromised due to the Cryptosporidium parvum infection.

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AHL Pathology (Emily Ratsep)	• 14 year old TB mare. **Necrohemorrhagic typhlocolitis** (Paeniclostridium sordellii)The gross and histologic lesions are consistent to the lesions described in Paeniclostridium associated enterocolitis in horses. This was also isolated from bacterial culture of the colonic tissue in this case. In this horse, it appeared to infect the cecum and colon, sparing the small intestines. There was marked autolysis in the intestinal sections that made it difficult to distinguish the necrosis vs autolysis, however in a few sections examined there was convincing fibrin and viable mucosa. Consistent with previous findings by Nyaoke et al., inflammation was not a predominant feature, but rather necrosis and hemorrhage. • 3 day old TB filly. **Thyroid hyperplasia and musculoskeletal deformity syndrome.** The histological features of the thyroid gland are consistent with solid goiter. In animals, congenital hypothyroidism is usually associated with hyperplastic goiter and results when inadequate maternal thyroid hormone crosses the placental barrier during development in utero. The fetal pituitary gland responds by secretion of TSH, resulting in fetal hyperplastic goiter. Dystocia, retained placenta and prolonged gestation have also been associated with congenital hypothyroidism in newborns. In horses, affected foals are usually born extremely weak and die within a few days of birth. The thyroid gland may be only slightly enlarged in these cases, consistent with the absence of gross enlargement in this foal. Thyroid hyperplasia and musculoskeletal deformity (TH-MSD) is a well recognized syndrome of neonatal foals in Canada. The musculoskeletal deformities observed include flexural deformities of the limbs, muscular weakness and delayed endochondral ossification. The histological changes in this case were those of an incomplete ossification of the cuboidal bones in both the front and hind limbs.
Alison Moore (OMAFRA)	**EHV-1 abortions in Q2** April – a mare aborted due to EHV-1 in Bruce County. May – a mare aborted due to EHV-1 in Bruce County **Influenza outbreaks in Q2** April – influenza outbreak in Simcoe County involving draft breeding horses. May – influenza outbreak in a boarding facility in the Regional Municipality of Waterloo June – influenza outbreak at a standardbred facility in Wellington County. June – a Quarter horse was diagnosed with influenza in Bruce County

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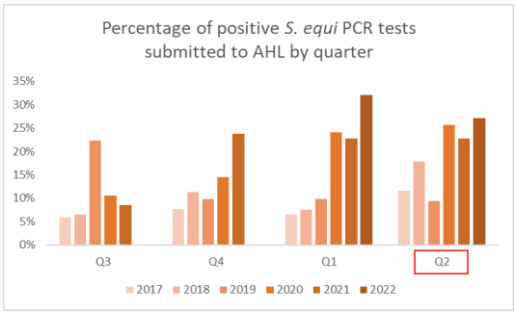
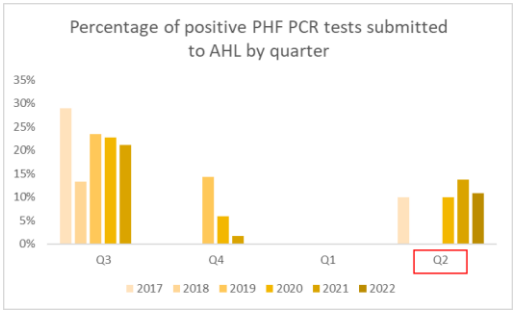
Syndromic and AHL Laboratory Data Surveillance Dashboard

Survey – Key points

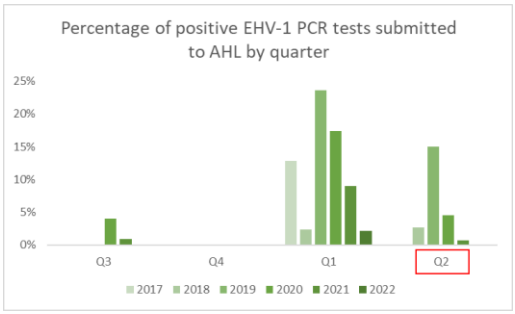
- 22 Counties represented
- 38% equine and small animal, 30.7% equine and 23% equine and food animal clinics responded
- Increase in equine asthma, lice and hypersensitivity reactions reported for Q2
- New conditions or those without a diagnosis:
  - Acute behavior change, poll reactivity, and inability to accept saddle in recently imported mare, NSF on radiograph, ultrasound, scintigraphy, GI scoping. Only improves on gabapentin. Suspect some type of neuropathic pain.
  - Cellulitis that erupted out the side of cannon leaving an opening about six inches across that continued to grow in size and on euthanasia was discovered had eaten away proximally behind carpus and across tendon sheath medically- despite very aggressive treatment.

Trend towards a slight increase in the percent of positive S. equi PCRs in Q2 2022 versus 2021. Trend showing an overall increase in positive PCR tests suggestive of more testing in outbreak situations and to identify carrier horses.

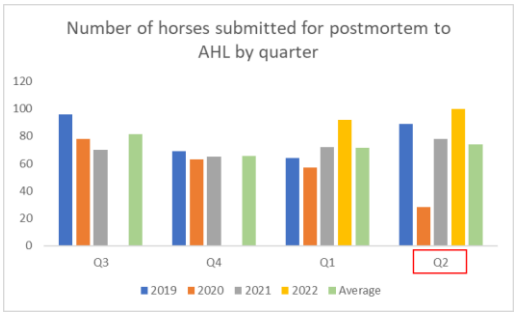




Trend towards a slight decrease in the number of PHF PCR positive tests in Q2 2022 compared to 2021. The overall trend shows an earlier detection of PHF (in Q2). Q3 is the main season for PHF.

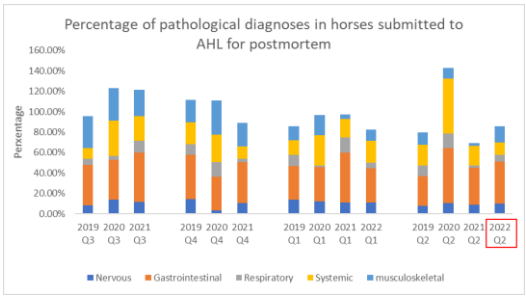


Fewer EHV-1 positive tests compared to the last three Q2's. No EHM outbreaks in Q1 or Q2 this year.



Trend towards a slight increase in postmortem cases in 2022 Q2 over previous years (and 2022 in general) Confounding factors include lack of previous submissions due to the pandemic and changes to the deadstock industry.

Trend towards a slight increase in musculoskeletal, respiratory and GI diagnoses over Q2 2021, however, confounding factors (inc in PM cases overall, pandemic, deadstock) may play a role.



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Equine Research from Ontario and Around the World

Researchers in Ontario

Real-Time PCR Differential Detection of *Neorickettsia findlayensis* and *N. risticii* in Cases of Potomac Horse Fever.Budachetri K et al. .J Clin Microbiol. 2022 Jul 20;60(7):e0025022. doi: 10.1128/jcm.00250-22. Epub 2022 Jun 13. **Free PMC article.**

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Researchers around the world

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Quantifying the effect of Warmblood Fragile Foal Syndrome on foaling rates in the German riding horse population. Wobbe M et al. .PLoS One. 2022 Jul 28;17(7):e0267975 **Free PMC article.**

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Correlation between Ocular and Rectal Temperature with Intra Ocular Pressure in Horse during Exercise. Aragona F et al. .Animals (Basel). 2022 Jul 21;12(14):1850 **Free PMC article.**

Mixed-Effects Modelling of the Risk Factors Associated with Multiple Pregnancies in Thoroughbred Mares. Salem SE et al. .Animals (Basel). 2022 Jul 20;12(14):1841. **Free PMC article.**

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Quality of Life within Horse Welfare Assessment Tools: Informing Decisions for Chronically Ill and Geriatric **Horses**.Long M, Dürnberger C, Jenner F, Kelemen Z, Auer U, Grimm H.Animals (Basel). 2022 Jul 17;12(14):1822. doi: 10.3390/ani12141822.PMID: 35883370 **Free PMC article.** Review.

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Is the Use of Bisphosphonates Putting **Horses** at Risk? An Osteoclast Perspective. Vergara-Hernandez FB et al. .Animals (Basel). 2022 Jul 3;12(13):1722 **Free PMC article.**

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Association between forage mycotoxins and liver disease in **horses**.Durham AE.J Vet Intern Med. 2022 Jul;36(4):1502-1507. **Free PMC article.**

Research Ontario Equine

ResearchONequine.ca is a website developed by the Ontario Animal Health Network equine network to help increase research awareness and to connect researchers from academia, industry and government with the ultimate goal of improving the lives of all equines. It was supported by OAHN and the Ontario Association of Equine Practitioners.

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