How big is the EHV1 viral plume over equestrian events?

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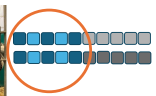
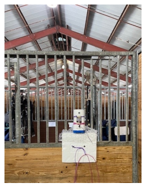
INTRODUCTION

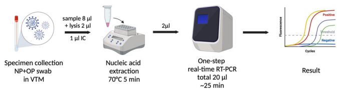
Equid alphaherpesvirus 1 (EHV-1) is a respiratory tract pathogen of horses, and infection can be associated with herd outbreaks of (equine herpesvirus) myeloencephalopathy (EHM) or abortions. EHM outbreaks have occurred at equestrian events, and there is a need for heightened surveillance at shows. Air space sampling during Covid-19 has shown efficacy as a surveillance tool.

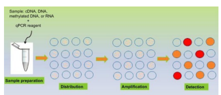
MATERIALS AND METHODS

- Observational study in 6 independent equestrian events
- Florida (Dec 2023), Spain 1–4 (March/April 2024), Kentucky (Sept 2024)
- An **air sampler** (Bertin™ Coriolis, France) placed in stable units with (minimum of) 5 occupied boxes out of 10. On each event day we collected an air volume of 18m^3 between 22:00 – 04:00. Next day (09:00) we collected **surface samples** from each occupied box.
- All samples were tested for EHV-1, EHV-2 and EHV-4 **using quantitative and digital PCR**, and specific primers and probes.
- Data reported as presence or absence in surfaces (S) or air (A) samples, as well as low (<1000), or medium (<10,000) abundance of target genome copies. During all Spain events we also sampled air between 16:00 and 22:00

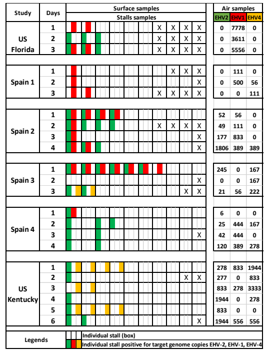








RESULTS



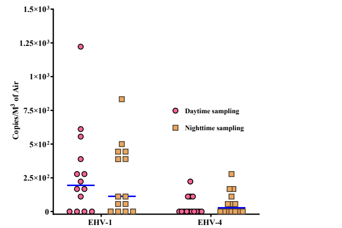


Figure 2 Day vs night air sampling comparison for EHV-1 & -4 genomic particle detection

Figure 1 Summary chart of qualitative/quantitative EHV-2, EHV-1 and EHV-4 detection results in Surface and air samples across study locations. Six study locations: Florida (December 2023), Spain 1–4 (March/April 2024), Kentucky (early September 2024) (Row numbers 1– 6: A sampled subunit of (max.) 10 stalls. Stall(s) (boxes) marked with 'X'—empty stall/alternative use. Colour coding for individual stall: green-EHV-2; red-EHV-1; yellow-EHV-4. Columns 'air samples': target gene copy numbers/m3 of air sampled in the corresponding aisle).

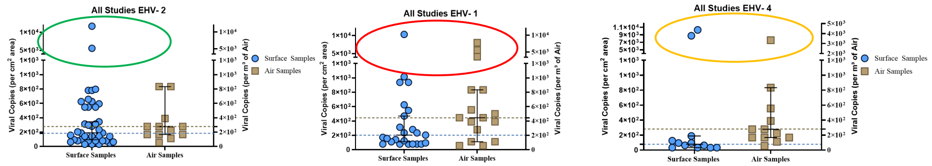


Figure 3 Absolute quantification and comparison of EHV-1, EHV-2 and EHV-4 across all studies expressed as gB gene copies/cm^2 area on the surface and per m^3 of air in air samples (6 h continuous sampling; 18 m^3 air)

DISCUSSION AND CONCLUSIONS

Ranked detection frequencies for EHV-2, EHV-1 and EHV-4 were: 5 events, A16/S40; 5 events, A16/S24, and 2 events, A13/ S12. Abundance was overall 'low' for air or surfaces samples.

At 2 events we detected 'medium' EHV-1 or EHV-4 abundance in air, which corresponded with 'medium' abundance on select surfaces. Detection frequency was similar between evening and night sampling during the Spain events. EHV-1 detection was restricted to winter/spring events. There were no reported clinical cases during these events.

We provide evidence for regular, albeit low-abundance presence of EHV1 &4 genome copies at equestrian events