



FOCUS ARTICLE: SURVEILLANCE OF CONTAGIOUS EQUINE METRITIS (CEM), *KLEBSIELLA PNEUMONIAE* AND *PSEUDOMONAS AERUGINOSA* IN THE UNITED KINGDOM: 2005-2009

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Introduction

Following the focus article published for the first quarter in 2009 in which Equine Viral Arteritis (EVA) was assessed, and in order to gain insights into the UK equine surveillance trends over time, here we review the data collated and reported by Defra, AHT and BEVA over the period from 2005 to 2009 (including this quarter) for *Taylorella equigenitalis* (the contagious equine metritis organism – CEMO), and data collated and reported over the period from 2008 to 2009 (including this quarter) for *K. pneumoniae* and *P. aeruginosa*.

Overview

CEM is an infectious disease of equidae caused by *T. equigenitalis* (CEMO). *K. pneumoniae* capsule types 1, 2 or 5 and *P. aeruginosa* can also cause venereal disease. Clinical signs vary between mares and stallions; in mares there are two states of infection, the active state in which the main clinical sign would be vulval discharge, and the carrier state in which there are no outward signs of infection but the mare remains capable of shedding. Stallions do not generally show clinical signs of infection but can become carriers and therefore will be able to transmit the infection. Occasionally the bacteria can colonize the stallion's sex glands, causing pus and bacteria to contaminate the semen.

Transmission of the disease can occur directly or indirectly during mating or teasing by genital or naso-genital contact, but also by means of contaminated semen used for artificial insemination (AI) or indirect, iatrogenic transmission via the hands and equipment of staff or veterinary surgeons having handled the tail or genitalia of an infected horse.

CEM, caused by *T. equigenitalis*, occurs in the non-Thoroughbred population, and only to a limited extent in Thoroughbreds. Both *K. pneumoniae* and *P. aeruginosa* occur sporadically within Europe. Recent CEM outbreaks in France, Germany, United Arab Emirates, USA and lately in the UK in October 2009 highlight the potential importance of this disease.

The UK situation

CEM was first reported in 1977 on studs in England and was found in 1978 in horses imported from Europe into the state of Kentucky in the USA. The emergence of this new disease triggered the development of the first HBLB (Horseshoe Betting Levy Board) Code of Practice for control of this infection in conjunction with the other bacterial venereal pathogens such as *K. pneumoniae* and *P. aeruginosa* ([click here](#)). In the UK, isolation of the CEMO is notifiable by law under the Infectious Diseases of Horses Order 1987 ([click here](#)) and



any positive samples must be reported by the testing laboratory to a Divisional Veterinary Manager (DVM) or equivalent such as the Duty Veterinary Officer at the local Animal Health office of the Department for Environment, Food and Rural Affairs (Defra). The main preventive measures for this disease are based on establishing freedom from infection before and during breeding activities, and exercising strict hygiene measures during breeding activities. Whilst Thoroughbred breeders have adopted a zero-tolerance to CEMO globally, many non-Thoroughbred breeds remain endemically affected and there are no measures adopted to screen and clear breeding animals. Consequently, the effective absence of restrictions on trade in horses within the EU places the UK at risk of importation of CEMO infected horses from mainland Europe.

CEM testing data

CEM is diagnosed by means of microaerophilic culture from clitoral or endometrial swabs in mares and swabs taken from the urethra, urethral fossa and penile sheath, plus pre-ejaculatory fluid when possible in stallions. Currently CEM can now be diagnosed by quantitative/real time PCR (qPCR) in some laboratories; this technique increases sensitivity and speed of diagnosis. Every swab taken for official export health certification, and also every swab with a positive result from a HBLB certified laboratory must be sent to the designated laboratory within the Veterinary Laboratories Agency (VLA).

Graphical presentation of CEMO data: 2005-2009.

Figure 1 represents a summary by quarter for 2005-2009 of the total number of CEMO cultures conducted by a network of UK-based diagnostic labs and vet practices certified by the HBLB (together referred to as “CEMO HBLB”) and by the VLA (referred to as “CEMO VLA”). The lines represent the number of positives from both the HBLB labs and the VLA. The numbers on top of the CEMO HBLB bars correspond to the number of HBLB certified laboratories submitting data in each quarter.

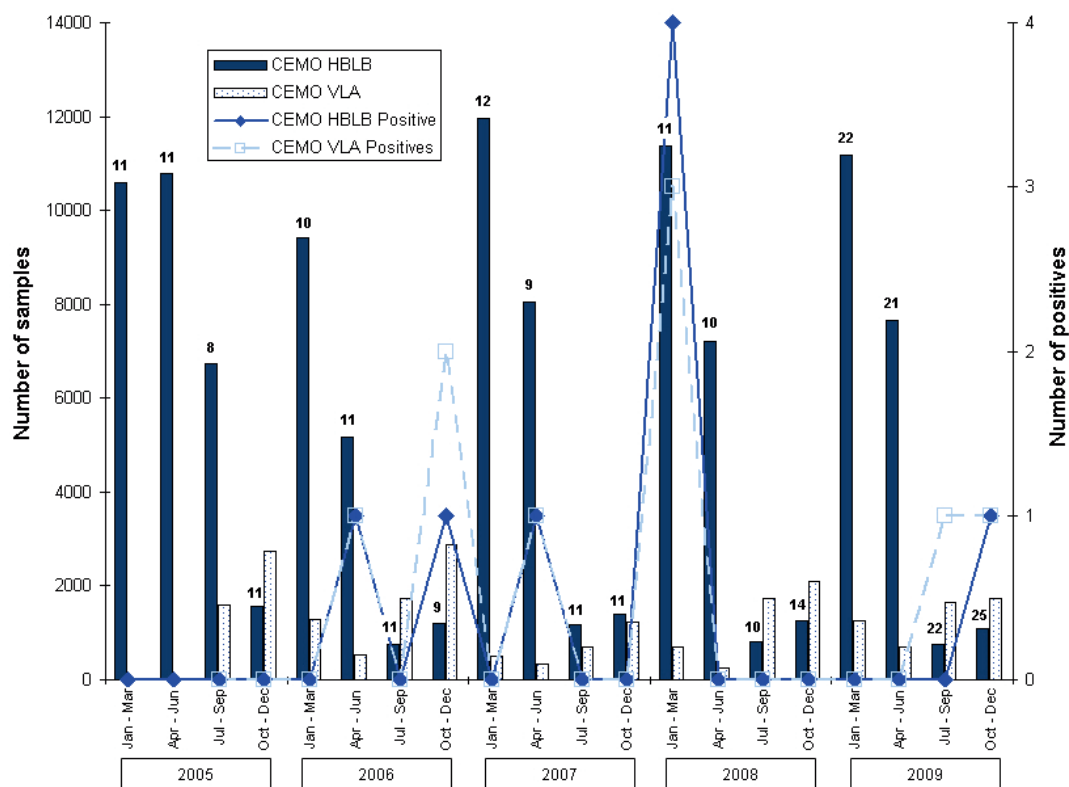


Figure 1: CEMO culture data by quarter for 2005-2009 for VLA and HBLB certified laboratories.



The results of note in this summary for CEMO culture data from 2005 to 2009 are:

- The consistent seasonal trend in the number of cultures conducted within each year, mostly from 2006 on, which was different between VLA and HBLB certified laboratories. The pattern in HBLB certified laboratories demonstrated a peak in the 1st quarter, declining to 3rd quarter and with a small increase in numbers in the 4th quarter. This pattern would be consistent with pre-breeding testing in the first two quarters, with a predominance of Thoroughbred samples tested in the 1st quarter and some cultures conducted after December 1st in the 4th quarter. The VLA pattern would be different since VLA cultures are principally in relation to international trade (most of which is done between October and December) and outbreak investigations, showing lower numbers of cultures overall and a less pronounced peak in the final quarter, consistent with international trade testing requirements.
- For the period between the 2nd quarter 2005 (when the VLA started submitting data) and the 4th quarter of 2009, the proportion of positive results for both the VLA and HBLB certified laboratories were reasonably closely matched. This could be due to the fact that every positive result from a HBLB laboratory must be repeated and confirmed by the VLA. Overall there was a very low level of positivity for CEMO among the screened population in the UK, and most of the positive cases were horses from mainland Europe and staying in the UK for international transfer.
- Regarding the number of HBLB certified contributing laboratories, there was a peak in the 1st and 2nd quarters and a decrease in the 3rd quarter since many of the laboratories won't submit data if they haven't conducted any CEMO culture. Interestingly, even when in 2009 there was a rise in the number of contributing labs reaching nearly the 100% of contributions (due to the efforts of HBLB), the addition of laboratories to the reporting scheme has actually made little difference to the coverage of samples – probably because the scheme already covered the major contributors by means of numbers of cultures conducted; in addition, there was a small decrease on the numbers of cultures conducted by these major contributors in 2009 (which could reflect the impact of the prevailing adverse economic climate on the number of breeding animals being tested) and the new laboratories filled this gap. Such a good coverage since 2005 permitted the analysis of the graph as a whole despite the increase on the number of laboratories reporting in 2009.

Figures 2 and 3 represent a summary by quarter for 2008 and 2009 of the total number of *K. pneumoniae* and *P. aeruginosa* cultures conducted by a network of UK-based diagnostic labs and vet practices (dark blue bars). It should be noted that data provided here for *K. pneumoniae* only relates to the pathogenic capsule types (1, 2 and 5). The lines represent the percentage of positive cultures. The numbers on top of the bars correspond to the number of laboratories submitting data in each quarter.

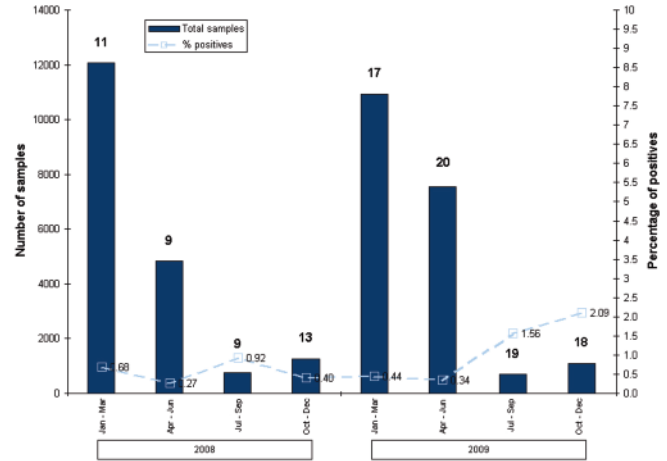
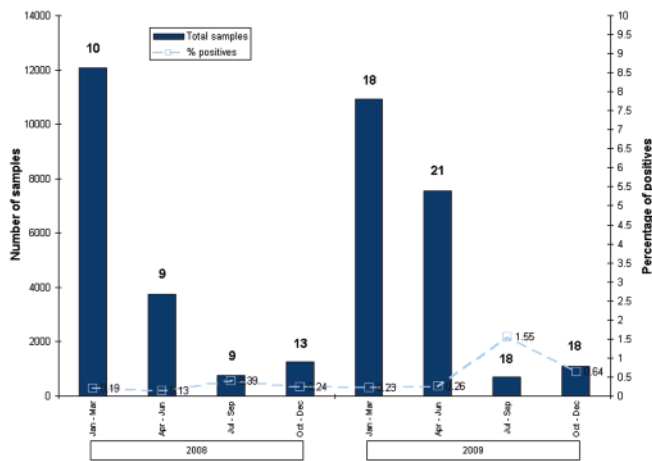


Figure 2: *K. pneumoniae* culture data by quarter for 2008-2009 Figure 3: *P. aeruginosa* culture data by quarter for 2008-2009

The results of note in this summary for *K. pneumoniae* and *P. aeruginosa* culture data from 2008 to 2009 are:

- As in Figure 1, the consistent seasonal trend in the number of cultures conducted within each year. This similarity would be explained by the fact that the pre-breeding testing is the same as for CEMO.
- The percentage of positive results for both *K. pneumoniae* and *P. aeruginosa* were reasonably closely matched with the exception of the 4th quarter 2009. There was a peak in the percentage of positives in the 3rd quarter 2008 and 2009 for *K. pneumoniae* and the 3rd quarter 2008, 3rd and 4th quarter 2009 for *P. aeruginosa*, but the high percentages of positives could be due to the low numbers of samples being tested in these quarters.
- With regards to the number of contributing laboratories, there are differences with respect to CEMO since even when the major contributors report for CEMO, *K. pneumoniae* and *P. aeruginosa*, some HBLB certified laboratories only report for CEMO. Furthermore, there are other non-HBLB laboratories which report only cultures conducted for *Klebsiella* and *Pseudomonas*. As for CEMO, there was an increase in the number of contributing laboratories in 2009 which has not affected the coverage in terms of number of cultures conducted.

In conclusion, the data presented in this article confirms the on-going application of pre-breeding recommendations resumed in the HBLB Codes of Practice. These recommendations have led to a **zero level of positivity in the Thoroughbred population in the UK**, where zero-tolerance to CEMO has been adopted. Overall the positive cases were **sporadic** and were detected in **non-Thoroughbred horses**, especially in those **from mainland Europe and transiting UK for international transfer**.

The efforts of the HBLB as the operator of the laboratory approval scheme have led to reporting almost 100% coverage in 2009; therefore the data presented here is representative of the UK situation and should be encouraging for stakeholders and international trade partners for breeds undertaking pre-breeding CEM screening.