



## **Focus article: Surveillance of viral, bacterial and other causes of equine abortion in the United Kingdom: 2006-2011**

Catherine Butler, DVM, MRCVS, Animal Health Trust; in collaboration with Arno Werners, DVM, PhD, DipECVPT, Department of Veterinary Medicine, University of Cambridge and Richard Newton, BVSc, MSc, PhD, DLSHTM, DipECVPH, FRCVS, Animal Health Trust.

### **Introduction**

Following the focus articles published in the first quarter and last quarter in 2009 in which Equine Viral Arteritis (EVA) and Contagious Equine Metritis (CEM) were assessed respectively, 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 2006 to 2011 (including this quarter) for infectious and non-infectious causes of equine abortion.

### **Overview**

Abortion and stillbirth are major causes of equine mortality and have the potential to cause severe economic loss to the equine industry. There are many causes of abortion including infections with *Equine Herpes Virus* (EHV-1, and much less commonly EHV-4), *Equine Arteritis Virus* (EAV), *Streptococcus zooepidemicus*, *Leptospira spp.*, *Escherichia coli*, and *Aspergillus spp.*. Non-infectious causes of abortion include twinning and stillbirths associated with dystocia, congenital-, placental-, and umbilical cord abnormalities.

This report provides the most recent findings on several of the more prevalent infectious and non-infectious causes of equine abortion and stillbirth in the UK.

### **History of equine abortions**

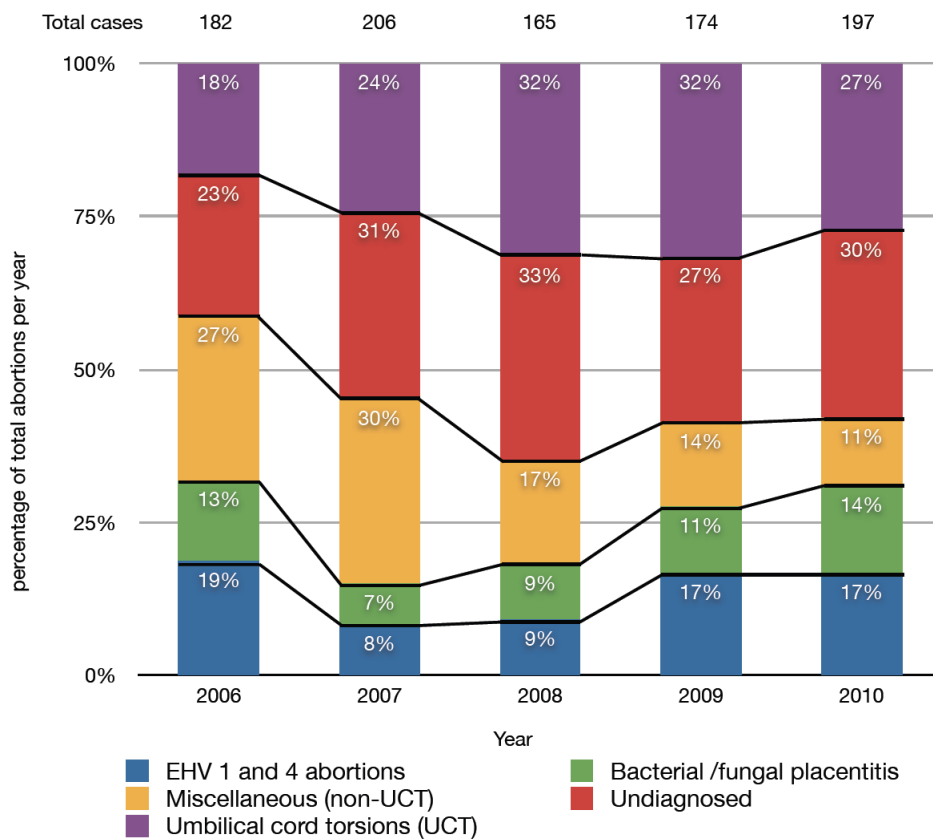
In the mare, as in other species, many pregnancies fail for reasons which, at present, are not clear. However, a definitive diagnosis of the cause of equine abortion is possible in the majority of cases where the whole fetus and placenta are submitted for *post mortem* examination. In a survey of equine abortion, stillbirth and neonatal death (n=1150) occurring in the UK from 1988-1997, conducted by Ken Smith and colleagues at the Animal Health Trust, problems associated with the umbilical cord were the most common diagnosis, followed by miscellaneous causes, intra partum stillbirth, placentitis, EHV infection and twinning. In a minority of the cases (n=81; 7%) in this survey no diagnosis could be reached. Continuous surveillance of equine abortion is fundamental in establishing current disease trends and identifying disorders requiring immediate and specific attention, as evidenced by the emergence of Mare Reproductive Loss Syndrome (MRLS) in the USA in 2001.



**Graphical presentation of equine abortion data: 2006-2011.**

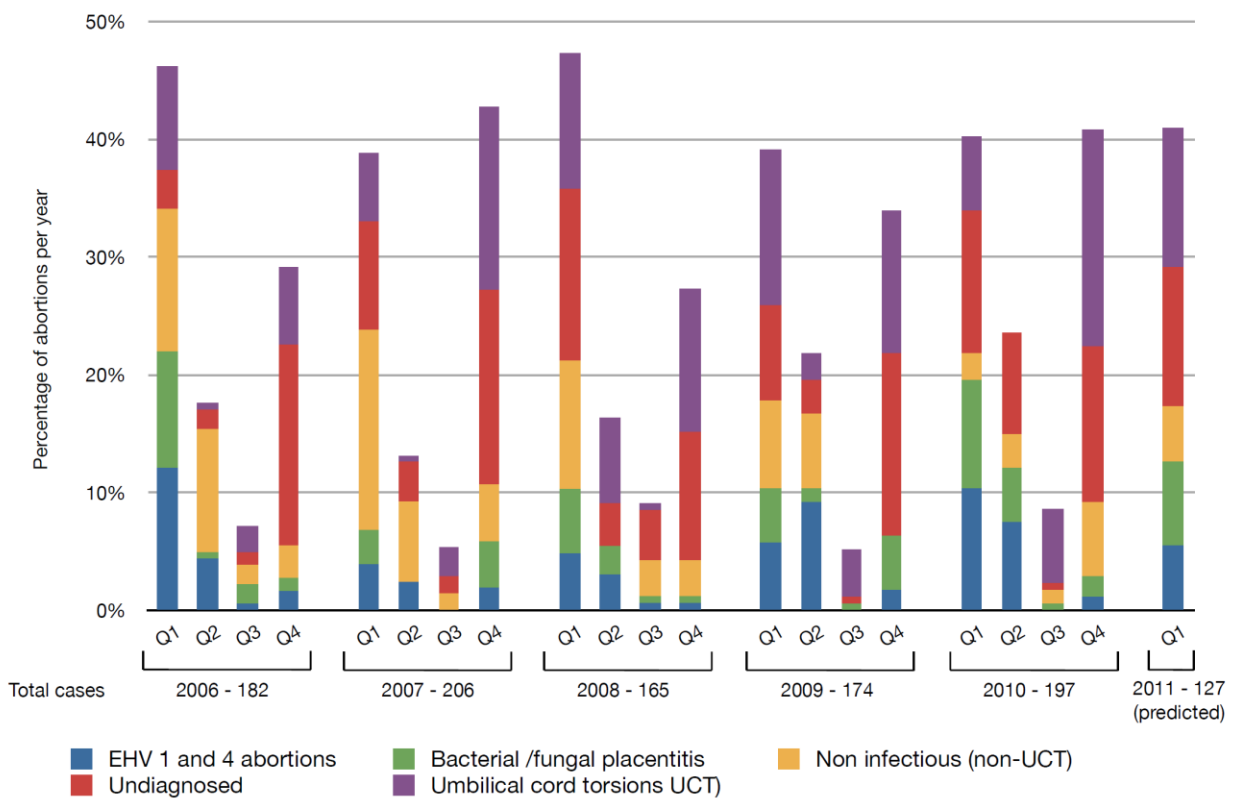
Figure 1 and 2 represent a summary by year and quarter for 2006-2011 of the different causes of equine abortion confirmed at post mortem examination conducted by a network of UK-based diagnostic labs and vet practices participating in the Defra/BEVA/AHT surveillance scheme. The data for the first quarter of 2011 is preliminary and has been adjusted to the average percentage of cases occurring in the first quarters of year 2006-2010.

**Figure 1: Equine abortion data by year for 2006-2010 for several laboratories.**





**Figure 2: Equine abortion data by quarter for 2006-2011 for several laboratories.**



The results of note in this summary for equine abortion from 2006 to 2011 are:

- 976 fetuses/mixed fetal membranes were examined in the period 2006-2011, with the cause of abortion being established in 71.1% of cases (n=694).
- Umbilical cord abnormalities comprising umbilical cord torsion and over-long cord/cervical pole ischaemia, were the most common diagnoses, representing 26.4% (n=258) of the total cases examined.
- Miscellaneous causes, comprising lethal congenital anomalies, premature placental separation, dystocia associated stillbirths, and twins represented 19.6% (n=191) of the cases
- An infectious cause was confirmed in 25.0% (n=244) of the total cases, with EHV infection related abortions representing 13.8% (n=135) and bacterial/fungal placentitis representing 11.2% (n=109). The majority of herpesvirus abortions (n=135) were caused by EHV-1 (92.6%: n=125) with some occurring as outbreaks involving multiple cases, with only occasional, always individual cases being attributed to EHV-4 infection (7.4%: n=10) during the period.
- Considerable variation in causes of abortion has been detected in the different quarters. Umbilical cord torsions have been predominantly diagnosed in the first and last quarter of the year. EHV abortions predominantly in the first two quarters of the year and bacterial placentitis in the first quarter, in late stage pregnancy. Umbilical cord abnormalities showed a yearly variation in prevalence of 17.8% to 31.6%, undiagnosed cases varied between 23.1% and 33.3%, miscellaneous cases varied between 11.1% and 30.1% yearly, bacterial/fungal placentitis varied between 6.7% and 14.2%, and EHV infection related abortions showed a yearly variation in prevalence of 9.0% to 18.6%.



In conclusion, the data in this overview indicate that umbilical cord torsion, detected in 26.4% of the examined cases, is still the most important cause of equine abortion in the UK. However, it should be noted that the overall prevalence of confirmed EHV abortions (13.8%) in this overview for 2006-2010 is higher than the figure of 6.5% found by Smith *et al.* (2003) in their study for the period 1988-1997. It might be argued that this difference might be explained by the 'recent' introduction of PCR as a routine diagnostic method in EHV abortion testing, however, positive test results from at least two different tests (e.g. positive PCR + characteristic histopathology or positive immunohistochemistry + characteristic histopathology) have conventionally been required to confirm a diagnosis of fetal EHV infection. In 282 cases (28.9%) no diagnosis could be reached in this series, which is a much higher proportion than the figure of 7% reported by Smith *et al.* (2003). We speculate that this might be due an increase in selective sampling performed for EHV-1 clearance testing of an aborted fetus but which makes establishment of final diagnoses in case of a negative EHV-1 result very much more difficult in the absence of the whole fetus and placenta.

#### Further reading

Platt H. Etiological Aspects of Perinatal Mortality in the Thoroughbred. *Equine Vet J* 1973;5:116-120.

Smith KC, Blunden AS, Whitwell KE, Dunn KA, Wales AD. A Survey of Equine Abortion, Stillbirth and Neonatal Death in the UK from 1988 to 1997. *Equine Vet J* 2003;35:496-501.

Whitwell KE, Blunden AS, Miller J, Errington J. Two Cases of Equine Pregnancy Loss Associated with *Leptospira* Infection in England. *Vet Rec* 2009;165:377-378.

Whitwell KE. Morphology and Pathology of the Equine Umbilical Cord. *J Reprod Fertil Suppl* 1975;(23):599-603.

Sebastian M, Gantz M, Tobin T, Harkins J, Bosken J, Hughes C, Harrison L, Bernard WV, Richter D and Fitzgerald TD: The Mare Reproductive Loss Syndrome and the eastern tent caterpillar: A toxicokinetic/statistical analysis with clinical, epidemiologic, and mechanistic implications. *Vet Ther*, 4(4):324-339, 2003.