



DEFRA / AHT / BEVA
EQUINE QUARTERLY DISEASE
SURVEILLANCE REPORT
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Highlights in this issue:

- [Equine Influenza has Jumped the Equine/ Canine Species Barrier](#)
- [Equine Infection with West Nile Virus](#)

Important note:

The data presented in this report must be interpreted with caution, as there is likely to be some bias in the way that samples are submitted for laboratory testing. For example they are influenced by factors such as owner attitude or financial constraints or are being conducted for routine screening as well as clinical investigation purposes. Consequently these data do not necessarily reflect true disease frequency within the equine population of the United Kingdom.



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Introduction

Welcome to the final quarterly equine disease surveillance report for 2005 produced by DEFRA, BEVA and the Animal Health Trust. Regular readers will be aware that this report collates equine disease data arising from multiple diagnostic laboratories and veterinary practices throughout the United Kingdom giving a unique insight into equine disease occurrence on a national scale.

In the last report we announced that in August DEFRA had launched a consultation into a national strategy for dealing with equine encephalitides (Specified Type Equine Exotic Diseases (STEED) including West Nile virus and that the deadline for receipt of responses was 21st November 2005. This can now be accessed via the closed consultations section of the DEFRA website (<http://www.defra.gov.uk/corporate/consult/steed-contingency/index.htm>). We can report that both the AHT and BEVA submitted detailed responses prior to the deadline and are awaiting feedback on these submissions. Please contact the AHT or BEVA directly if you are interested in these responses. Defra will collate and publish all responses to the consultation shortly.

In line with previous reports we continue to include focus articles kindly supplied by recognised contributors that provide novel insights into topics covered in the surveillance report. We reiterate that the views expressed in these focus articles are the authors' own and should not be interpreted as official statements of DEFRA, BEVA or the AHT. Focus articles in this issue have been contributed by Dr. Janet Daly and Dr. Javier Castillo-Olivares.

Complementary to the potential threat from new and re-emerging viral infections, **Dr. Janet Daly**, Head of the Influenza Research Group at the AHT, outlines how a well recognised infection of the horse can unexpectedly transfer to a novel host species. In this case, equine influenza virus infection was observed to jump the species barrier and cause fatal respiratory disease in some affected dogs in North America. Janet's article describes how retrospective investigation of a previously unexplained disease in Foxhounds in the UK demonstrated a similar cross-species transmission. In this case there was no apparent onward transmission between dogs.

Continuing the theme of equine neurological disease, **Dr. Javier Castillo-Olivares** is an internationally recognised authority on equine exotic infections including equine viral arteritis, African horse sickness and West Nile Fever, working in the Centre for Preventive Medicine at the AHT. Javier's article on West Nile virus infection of horses considers the potential risk of this infection in the UK setting, in the context of recent outbreaks in North America and mainland Europe.

Access to all of the equine disease surveillance reports can be made on a dedicated page on the Animal Health Trust website at http://www.aht.org.uk/equine_disease.html or via the BEVA and Defra websites:

<http://www.beva.org.uk/>

<http://www.defra.gov.uk/animalh/diseases/vetsurveillance/species/horses/index.htm>

We would remind readers and their colleagues that there is available on the AHT website a form for registration to receive reports regularly via e-mail as they are produced. The link for this registration form is available via http://www.aht.org.uk/equine_disease_registration.html.



Virology Disease Report for the Fourth Quarter of 2005

We are again pleased to include data relating to EVA serology from the Veterinary Laboratories Agency (VLA), Weybridge, in this quarterly report. The sample population for the VLA is different from that for the other contributing laboratories as the VLA tests are principally in relation to international trade. Of the 8 serology positives detected by the VLA, 4 were among export samples, 3 from imports and 1 from overseas (with the findings from import samples of relevance to the UK).

Table 1: Virology sample throughput and positive results for fourth quarter 2005

	Number of Samples Tested	Number Positive	% Positive	Number of Contributing Laboratories
<u>Serological Tests</u>				
EVA VN/ELISA	2229	21 [#]	0.9%	3
VLA EVA VN	2134	8 [#]	0.4%	1
EHV-1/-4 CF test	646	35*	5%	2
EHV-3 VN test	2	0	0%	1
ERV-1/-2 CF test	321	9*	3%	1
Influenza HI test	335	10*	3%	1
<u>Virus Detection</u>				
EHV-1/-4 PCR	11	1	9%	1
VLA EVA VI & PCR	11	0	0%	1
Influenza NP ELISA	10	5	50%	1
EHV VI	60	7	12%	1
Rotavirus	4	0	0%	2

EHV = equine herpes virus, EVA = equine viral arteritis, VN = virus neutralisation, ELISA = enzyme-linked immunosorbent assay, CF = complement fixation,

HI = haemagglutination inhibition, PCR = polymerase chain reaction, NP ELISA = nasopharyngeal swab VI = virus isolation, ERV = equine rhinovirus, # = Seropositives include vaccinated stallions

* = Diagnosed positive on basis of seroconversion between paired sera

Equine Herpes Virus (EHV)

EHV-1 Abortion

Five confirmed cases of EHV-1 abortion have been diagnosed during the quarter. Two of the affected mares were vaccinated against EHV and three of the cases occurred in Thoroughbreds. Diagnosis was based on characteristic histological findings in conjunction with positive EHV-1 PCR results and positive virus isolation from fetal tissue samples.

EHV-1 Respiratory Disease

EHV-1 was isolated from two nasopharyngeal swabs taken from horses on unrelated premises this quarter. The affected animals were a Thoroughbred foal and a seven-year-old crossbred mare. Both showed signs of clinical respiratory disease whilst in-contacts remained asymptomatic.



Equine Influenza (EIV)

Three outbreaks of influenza have been confirmed during the quarter.

- A six-month old crossbred foal was confirmed with influenza having been transported from Wales to Scotland. The diagnosis was based on a positive ELISA result from a nasopharyngeal swab. No other animals, including the dam, were affected. The virus was isolated from this outbreak and typing revealed it to be a European lineage virus similar to Benelux/03 and Buckinghamshire/02. The isolate was quite different from Wales/05, identified in September 2005, which appeared to be closely related to Newmarket/03.
- An outbreak occurred on a livery yard in Essex during which five of ten native-breed horses showed clinical signs of depression, pyrexia and a dry cough. Nasopharyngeal swabs from four of the affected animals were positive by ELISA. The vaccination history of the horses was uncertain.
- A single case was confirmed in Somerset on a private yard of twenty horses. The affected four-year-old Irish Draught cross was unvaccinated and had a history of close contact with two coughing horses recently arrived from a sale. Diagnosis was based on seroconversion between paired serum samples. No nasopharyngeal swab was submitted.

FOCUS ARTICLE - Equine influenza has jumped the equine/canine species barrier (Dr Janet Daly, Centre for Preventive Medicine, Animal Health Trust)

Influenza is very much in the news at the moment because of the fear that the avian influenza H5N1 strain ('bird flu') poses a significant threat to the avian industry and has the potential to cause a human influenza pandemic. Aquatic birds are the natural reservoir of influenza A viruses from which viruses are occasionally transmitted to other animals, including domestic chickens, horses, pigs and people, causing transitory infections and outbreaks. Through adaptation, some of these viruses may establish species-specific permanent lineages of influenza. Transmission of viruses and transitory infections may also occur among the new hosts (e.g. between humans and pigs or chickens and humans).

Interspecies transmission of equine influenza was a major topic at a Havemeyer Foundation equine influenza workshop held in Miami, Florida in November 2005. In March 2004, a press release from the University of Florida reported the first known natural transmission of equine influenza to another species after isolating an equine influenza virus from a greyhound affected during a respiratory disease outbreak in January 2004. The latest information available from the American Veterinary Medical Association (AVMA) is that canine influenza has been confirmed in 23 states in the US (Figure 1). In addition to outbreaks at greyhound racetracks, infection has also been confirmed in pet dogs in 13 states.

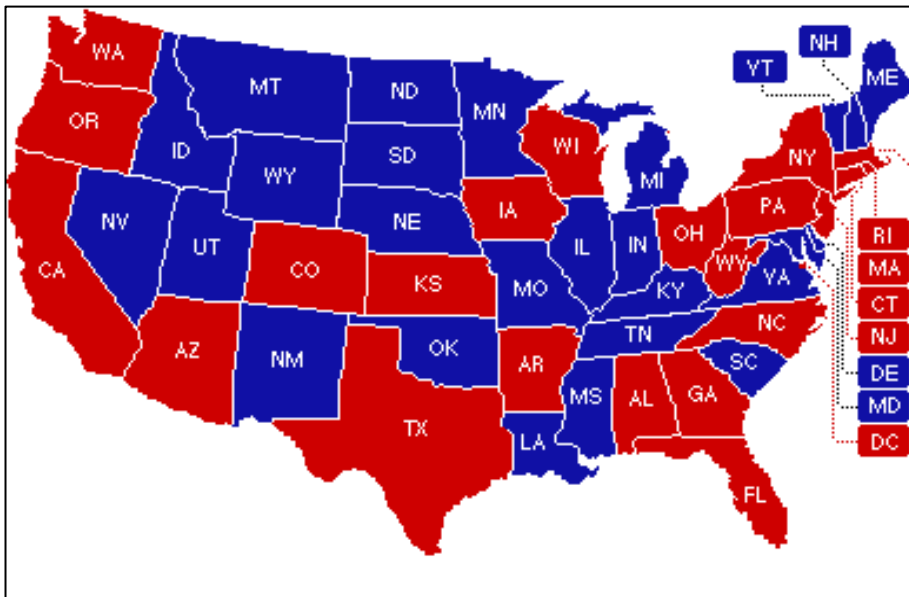


Figure 1. US States with confirmed canine influenza outbreaks (indicated in red) as of November 2005 (Based on AVMA data).

The reports of the Florida canine outbreak stimulated the Animal Health Trust to conduct a follow-up investigation of an outbreak of respiratory disease in which seven English foxhounds died or were euthanased after severe respiratory signs, depression and ataxia in 2002. It was subsequently confirmed by detection of virus in preserved lung tissue and the presence of specific antibodies in hounds that survived the outbreak that equine influenza virus had been the cause.

It has been suggested that, both in the US and the UK, the virus may have initially been transmitted through consumption of uncooked meat, including lungs, from an infected horse. It is likely that the probability of a horse being infected with equine influenza at the time of death is low, but it is possible that infection of dogs with equine influenza virus has only recently occurred because recent strains of equine influenza virus were particularly virulent. Fortunately, assessment of the situation in the UK, generously funded by Battersea Dogs and Cats Home, Dogs Trust and the Kennel Club, has suggested that the infection has not become endemic here as it seems to be the case in the US. We must, however, continue to be alert to the possibility for re-transmission between horses and dogs in the UK or the introduction of canine influenza with an infected dog travelling from the US



Further reading:

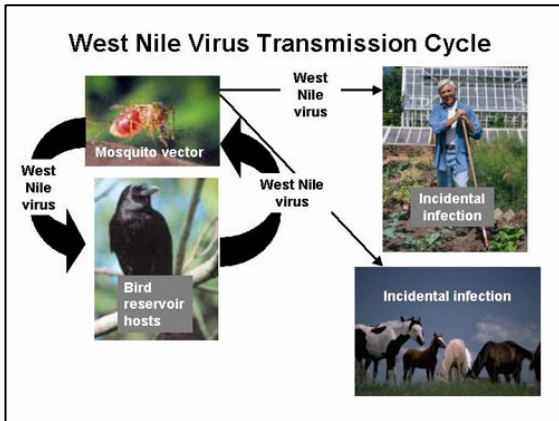
Crawford PC, Dubovi EJ, Castleman WL, Stephenson I, Gibbs EPJ, Chen L, Smith, C, Hill RC, Ferro P, Pompey J, Bright RA, Medina M-J, Influenza Genomics Group, Johnson CM, Olsen CW, Cox NJ, Klimov AJ, Katz JM, Donis RO (2005) Transmission of equine influenza virus to dogs. *Science* 310, 482–485.

Daly JM (2006) Equine influenza in dogs: Too late to bolt the stable door? *The Veterinary Journal* 171, 7–8.



FOCUS ARTICLE: West Nile Virus in horses (Dr Javier Castillo-Olivares, Centre for Preventive Medicine, Animal Health Trust)

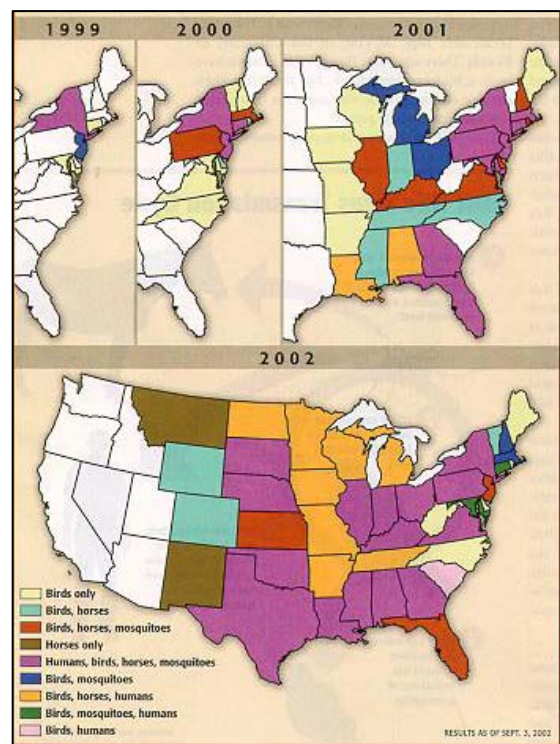
In the last decade, WNV has re-emerged as an important pathogen of humans and horses, with more frequent outbreaks with increased proportion of neurological disease cases being reported. Outbreaks in Romania and Morocco in 1996, Tunisia in 1997, Italy in 1998, Russia, United States and Israel in 1999, and France, United States and Israel in 2000 presented either an increase in the number of severe human cases, an increase in the severity of neurological disease in horses or high bird mortality. In some instances all three features were present, as was the case in the US outbreaks. In Europe, WNV activity was again reported in September 2004 from the Camargue region of France where 37 suspected equine WNV infections were identified, of which 14 were laboratory confirmed. Furthermore, in the summer of 2005, in the Volgograd and Astrakhan regions of Russia, 151 people fell ill with WNV infection with 35 deaths.



West Nile Virus in horses is a notifiable disease and this, as with other notifiable diseases, is a key component of disease surveillance. As yet no cases have been diagnosed in the UK.

To date there are no reports of UK horses becoming infected with WNV during travel to affected areas, however the risk of this is apparent from confirmation that two Irish people diagnosed with WNV infection had contracted the disease while on holiday in the Algarve, Portugal. It is believed that migratory birds, originating from Africa and other areas where WNV is endemic, provide a potential source of WNV infection in the UK. Furthermore, serological investigations in birds suggest that WNV or a WN-like virus has been circulating amongst UK non-migratory bird populations. The Animal Health Trust has developed basic diagnostic capabilities for equine WNV but further work is necessary. Currently, there are no seroprevalence data to indicate whether WNV has been circulating within the UK horse population. However, it would be important to establish the WNV transmission baseline to analyse the spread of WNV by serological means should an outbreak of WNV neurological disease occur in Britain.

Serological testing is a key component of surveillance strategies for WNV and essential to conduct epidemiological studies to determine the prevalence of the infection within a population. Detection of WNV specific antibodies in serum for laboratory diagnosis and epidemiological studies





of WNV infection in horses is made by virus neutralisation and WNV-specific IgM and IgG ELISA tests. The interpretation of serological data is not always straightforward due to cross-reactivity of antibodies and/or use of WNV vaccines.

The rapid spread of WNV across North America and its impact on equine health (over 17000 clinically affected horses) triggered the development of equine WNV vaccines. Two vaccines are currently available commercially against WNV in the US. A whole virus inactivated vaccine appeared in 2003 and has been used widely since. More recently, a recombinant pox-virus vectored WNV vaccine has also been released. All vaccines have been shown to induce virus neutralising antibodies, as occurs during natural WNV infection. Therefore, serum samples obtained during a serosurvey that produce a positive result by the virus neutralisation, IgM or IgG tests may be the result of vaccination rather than infection. However, as recombinant vaccines are unable to stimulate immune responses against non-structural proteins (NS1), it should be possible to determine whether a vaccinated animal has been naturally exposed to WNV by testing serum for the presence of anti-NS1 specific antibodies. An epitope blocking ELISA test has been developed but awaits validation in equine sera.

WNV is a re-emerging disease that has spread very rapidly across the entire North American continent in a relatively short space of time and continues to cause disease in horses and humans both in Europe and America. Its control depends on appropriate surveillance strategies for which adoption of accurate and validated diagnostic procedures is key.

Further reading

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Bacteriology Disease Report for the Fourth Quarter of 2005

A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) 11 of 28 HBLB approved laboratories contributed data. None of the 11 contributing laboratories isolated the organism and no infection was confirmed during the quarter.

We are pleased to include data relating to CEM testing from the Veterinary Laboratories Agency (VLA), in this quarterly report. The sample population for the VLA is different from that for the other contributing laboratories as the VLA tests are principally in relation to international trade. Of the 2743 samples submitted from 1170 animals, none were found to be positive. During this period there were no suspect isolates or samples from incident tracings tested.

Table 2: Diagnostic bacteriology sample throughput and positive results for fourth quarter 2005

	Number of Samples Tested	Number Positive	% Positive	Number of Contributing Laboratories
CEMO (HBLB)	1573	0	0%	11
CEMO (VLA)	2743	0	0%	1
Strangles (<i>S. equi</i>)	956	119	12%	10
Salmonellosis	169	3	2%	6
MRSA	94	4	4%	3
<i>Clostridium difficile</i>	10	1	10%	3

CEMO = contagious equine metritis organism (*Taylorella equigenitalis*)

HBLB = HBLB accredited laboratories VLA = VLA reference laboratory

MRSA = methicillin resistant *Staphylococcus aureus*

Toxicosis Report for the Fourth Quarter of 2005

A summary of diagnostic toxicosis testing undertaken by several contributing laboratories is presented in Table 3.

Table 3: Diagnostic toxicosis sample throughput and positive results for fourth quarter 2005

	Number of Samples Tested	Number Positive	% Positive	Number of Contributing Laboratories
Grass Sickness	5	3	60%	1
Ragwort	5	2	40%	1
Hepatic toxicoses	3	0	0%	2



Parasitology Report for the Fourth Quarter of 2005

A summary of diagnostic parasitology testing undertaken by several contributing laboratories is presented in Table 4.

Table 4: Diagnostic parasitology sample throughput and positive results for fourth quarter 2005

	Number of Samples Tested	Number Positive	% Positive	Number of Contributing Laboratories
<u>Endoparasites</u>				
Strongyles	79	20	25%	3
Tapeworms	326	12	4%	3
Cyathostomes	689	158	23%	4
Dictyocaulus	93	4	4%	3
Ascarids	562	16	3%	3
Trichostrongyles	34	12	35%	1
<u>Ectoparasites</u>				
Lice	53	1	2%	4
Ringworm	46	4	9%	4
Mites	251	6	2%	6

Report on *Post Mortem* Examinations for Fourth Quarter of 2005

Reports on gross *post mortem* examinations were received from 6 laboratories. Reports are presented regionally below:

EAST ANGLIA

A total of 78 post mortem examinations were performed during the reporting period. Of this total, all but 7 of the examinations were routine abortion investigations. The results of the abortion investigations over the 2005-6 breeding season will be reported in a future article. Findings from the other investigations are described below.

An aged Welsh Mountain pony euthanased electively with chronic colic and constipation was diagnosed with phaeochromocytoma infiltrating the coeliacomesenteric ganglion causing presumptive secondary dysautonomia (distinct from equine grass sickness, which is a primary dysautonomia). A 21 year-old mare euthanased electively with a four-day history of ataxia was found to have ovarian carcinoma with multifocal cerebral haemorrhage consistent with the effects of a paraneoplastic clotting defect. An adult horse euthanased electively with a two-day history of ataxia, head tilt and nystagmus was diagnosed with granulomatous encephalitis. An 11 month-old captive zebra found dead with a history of chronic ataxia and ill-thrift was found to have a healed atlanto-occipital injury. Single cases of sudden death, neurological disease and unspecified cranial trauma were examined but no definitive diagnosis made.



SOUTH WEST

Five post mortem examinations were performed over the quarter; comprising single cases of alimentary lymphoma, small colon rupture associated with impaction, pituitary adenoma and adrenocortical hyperplasia, arthritis and a spinal fracture.

MIDLANDS

Three cases of abortion were examined at post mortem. Two were found to be the result of twisted umbilicus (one fetus also affected by hydrocephalus) and in one case no diagnosis was reached due to submission of an incomplete fetus.

NORTHERN IRELAND

Ten cases were examined at post mortem during the last quarter. Three abortion investigations failed to identify a significant causative pathogen. A single case of sudden death was found to have intestinal displacement and obstruction with associated marked vascular compromise. Viscera submitted from three post mortem examinations in the field were used to diagnose two cases of *Streptococcus zooepidemicus* pneumonia and one case of parasitic infection with *Strongyloides*.



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Avonvale Veterinary Practice Ltd
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Hampden Veterinary Hospital
J.S.C Equine Laboratory Ltd
Liphook Equine Hospital
Nationwide Laboratories
SAC Veterinary Science Division
Three Counties Equine Hospital
University of Bristol, Department of Pathology
University of Cambridge, Central Diagnostic Services
University of Liverpool, Equine Hospital, Leahurst
Vetlab Services Ltd
Veterinary Laboratories Agency

All laboratories contributing to this report operate Quality Assurance schemes. These schemes differ between laboratories, however, all the contagious equine metritis testing reported was accredited by the Horserace Betting Levy Board with the exception of the VLA, which acts as the reference laboratory.

**We would welcome feedback including contributions on focus articles
and/or case reports to the following address:**

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