Highlights in this issue:

- African Horse Sickness
- Rising Equine Herpes Virus-1 (EHV-1) Abortion cases in the UK
- Focus Article: Vesicular Stomatitis

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 Great Britain.
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Welcome to the first quarterly equine disease surveillance report for 2016 produced by Department for Food, Environment and Rural Affairs (DEFRA), British Equine Veterinary Association (BEVA), Animal & Plant Health Agency (APHA) and the Animal Health Trust (AHT).

The national disease data is collated through multiple diagnostic laboratories and veterinary practices throughout the United Kingdom, providing an in-depth insight to the incidence and prevalence of infectious disease. Due to the global mixing of the equine population through international trade and travel, collaboration on infectious disease surveillance between countries occurs on a frequent basis to inform and alert. Both national and international information will be summarised within this report.

**National disease occurrence**

**EQUINE HERPES VIRUS-1 (EHV-1) ABORTION**

On 5th April, a further case of EHV-1 abortion on a Thoroughbred stud farm in Hertfordshire was confirmed. This case was epidemiologically linked to the ongoing outbreak on these premises.

On 6th May 2016, a case of EHV-1 abortion was confirmed on a stud farm in Shropshire. The affected animal was vaccinated and aborted whilst stabled. To date, no further cases on these premises have been reported.

**EQUINE HERPES VIRUS-1 (EHV-1) NEUROLOGICAL DISEASE**

On 5th May 2016, the Animal Health Trust reported a suspected case of EHV-1 neurological disease on a Thoroughbred racing yard in Surrey.

**EQUINE HERPES VIRUS 1 (EHV-1) RESPIRATORY DISEASE**

On 5th May 2016, the Animal Health Trust reports two cases of EHV-1 respiratory disease in two-day-old and five-day-old foals on a Thoroughbred Stud Farm in Suffolk. These premises had previously reported a confirmed case of EHV-1 neonatal mortality in February 2016.

On 1st June 2016, the Animal Health Trust reported two cases of EHV-1 respiratory disease in a two-day-old foal and vaccinated mare on premises in Kent. EHV-1 DNA was detected at high levels in fetal tissues, and at low levels in the nasopharyngeal swab from the mare.

For all of the above reported EHV infections, appropriate biosecurity measures have again been implemented in accordance with the HBLB Codes of Practice and will continue as required.
EQUINE INFLUENZA (EI)

During June, two separate outbreaks of EI have occurred on premises in Hampshire and Kent. None of the affected animals were vaccinated. Further details on each outbreak can be found International Collating Centre website  https://www.google.co.uk/?gws_rd=ssl#q=international+collating+centre

International Disease Occurrence

AFRICAN HORSE SICKNESS (AHS)

South Africa

Introduction

A case of African horse sickness (AHS) was detected through clinical surveillance by a private veterinarian in Paarl on 2nd April 2016. Samples collected from the colt that became ill and died tested positive for AHS virus, subsequently shown to be serotype 1.

Cases

Three more horses on the same property as the index case, and four horses on four other properties in the Drakenstein Local Municipality have tested positive for AHS since 26th April 2016. Two of the latter cases have died. On all affected properties, the virus has been identified as serotype 1.

Control

Containment area and movement restrictions:

As of 26th April 2016, the borders of the containment area were revised owing to a lack of indication of the outbreak already being widespread as there were no subsequent cases of AHS up to this date. Movement restrictions are still in force within this containment area surrounding the case. No movement of horses into, out of, through or within the containment area will be allowed without a movement permit from a state veterinarian. An interactive map of the containment area can be obtained at www.elsenburg.com/vetepi
Vaccination
Currently no vaccination against AHS is permitted within the containment area. Even when no outbreaks of AHS are occurring in the control zones, vaccination against AHS is strictly prohibited in the AHS surveillance and protection zones during the high vector risk period which is between 1st November and 31st May each year. A map of the AHS control zones can also be found at www.elsenburg.com/vetepi.

Owner actions
Horse owners are encouraged to stable their horses from two hours before sunset to two hours after dawn (to decrease the risk of the vector of the disease having contact with their horses) and to make use of a registered insect repellent on their horses during the vector feeding periods as indicated above. Further protection of the stabled horses can be attained by covering all stable openings with 80-100% shade cloth. Any owner within the AHS surveillance zone detecting illness in horses involving unexplained fever, swelling of the head and neck and difficulty breathing should report the case to their local State Veterinarian as quickly as possible.

Response
An initial census and surveillance programme by state officials in the area surrounding the affected property was performed to determine the extent of the outbreak. All properties on which horses are kept within 5km of the index farm were visited and approximately 200 horses sampled. All results were initially negative for AHS virus, and positive cases were only detected once a second round of surveillance within this area began. Surveillance activities within the containment area are continuing, with 54 properties having been visited for surveillance activities to date.

Private veterinarians in the affected area have also been requested to inform the State of any suspect AHS cases or cases indicative of infectious disease both within the containment area and within the AHS surveillance zone. All reports are followed up on and, where necessary, samples are taken to exclude AHS.

Source of infection
The source of infection is being investigated, but is yet to be established.

**EQUINE HERPES VIRUS-1 (EHV-1) ABORTION**

*Belgium*
During April, Equi Focus Point reported three separate cases of EHV-1 abortion. Two of the affected animals were not vaccinated, and one had an unknown status.

**EQUINE HERPES VIRUS-1 (EHV-1) NEUROLOGICAL DISEASE**

*BELGIUM*
On 11th April 2016, Equi Focus Point, Belgium reported three unrelated outbreaks of EHV-1 neurological disease. For one outbreak, all confirmed cases were vaccinated. For two outbreaks, all confirmed cases had an unvaccinated status.

*USA*
On 13th April, an outbreak of EHV-1 neurological disease was confirmed at Parx Racetrack, Bensalem, PA. The index case was diagnosed 1st April 2016 and since then, seven secondary cases have been reported. To date, four cases that developed signs of EHV-1 neurological disease have either died or been euthanased.
On 19th April, an outbreak of EHV-1 neurological disease was confirmed on Fonner Park Racetrack in Grand Island, Nebraska. Several horses, stabled within the same barn, developed neurological signs, of which one has been euthanased.

On 22nd April, an outbreak of EHV-1 neurological disease was confirmed on a farm in Howard County, Maryland. The index case and secondary case were positive for a non-neuropathogenic strain of EHV-1.

On 6th May, an outbreak of EHV-1 neurological disease was confirmed in Erie County, New York. All three cases were confirmed positive for EHV-1 on PCR.

On 12th May, a horse on premises in Palm Beach County, Florida developed neurological signs and was confirmed positive for EHV-1 on PCR.

On 13th May, a horse in Washington County, Wisconsin that developed neurological signs was confirmed positive for EHV-1 on PCR.

**EQUINE HERPES VIRUS 1 (EHV-1) RESPIRATORY DISEASE**

**ITALY**

On 11th May 2016, the National Reference Centre for Equine Diseases confirmed an outbreak of EHV-1 respiratory disease on premises in Rome. The positive diagnoses were confirmed in five horses by PCR on nasopharyngeal swabs.

For all of the above EHV outbreaks, biosecurity measures were implemented to minimise the risk of onward transmission.

**EQUINE INFECTION ANAEMIA (EIA)**

**USA**

Two separate cases of EIA have been confirmed in Pennsylvania, USA during April and May.

**PIROPLASMOsis**

**USA**

On 22nd March, 2016 a case of equine piroplasmosis was confirmed at a private training facility associated with Sunland Park Racetrack in New Mexico.

**RABIES**

**USA**

In April, a case of rabies was confirmed in a horse in the Nogales area in Arizona, USA. The vaccination status of this animal is unknown.
DEFRA business

Central Equine Database
Defra is in the final stages of agreeing the contract with a supplier who will deliver a new Central Equine Database. Work should begin shortly, with the database fully operational by the end of the year.

EU Regulation on Equine Identification
We will also be consulting on our proposed approach to implementing the new EU Regulation on Equine Identification in England later in the summer.

Focus article

In this report we are pleased to include a focus article written by Peter Timoney, MVB (Hons), MS, PhD, FRCVS from the Gluck Equine Research Center, University of Kentucky, Lexington, Kentucky, USA on Vesicular Stomatitis. This focus article provides information on the disease dynamics and how prevention and control are managed in the USA. As in the USA, Vesicular Stomatitis is a notifiable disease in the UK. We reiterate that the views expressed in this focus article are the author’s own and should not be interpreted as official statements of APHA, BEVA or the AHT.


We would remind readers and their colleagues that a form is available on the AHT website for registration to receive reports free of charge, via e-mail, on a quarterly basis. The link for this registration form is available via http://www.aht.org.uk/cms-display/equine_disease_registration.html
The results of virological testing for March to January 2016 are summarised in Table 1 and include data relating to Equine Viral Arteritis (EVA), Equine Infectious Anaemia (EIA) and West Nile Virus (WNV) from the Animal & Plant Health Agency (APHA), Weybridge. The sample population for the APHA is different from that for the other contributing laboratories, as the APHA’s tests are principally in relation to international trade (EVA and EIA). APHA now provides testing for WNV as part of clinical work up of neurological cases on specific request and provided the local regional APHA office has been informed.

Table 1: Diagnostic virology sample throughput and positive results for the first quarter of 2016

<table>
<thead>
<tr>
<th>Serological Tests</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
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<tbody>
<tr>
<td>EVA ELISA</td>
<td>5958</td>
<td>76*</td>
<td>6</td>
</tr>
<tr>
<td>EVA VN</td>
<td>1092</td>
<td>235*</td>
<td>2</td>
</tr>
<tr>
<td>APHA EVA VN</td>
<td>351</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>EHV-1/-4 CF test</td>
<td>1142</td>
<td>10*</td>
<td>2</td>
</tr>
<tr>
<td>EHV-3 VN test</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ERV-A/B CF test</td>
<td>115</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Influenza HI test</td>
<td>148</td>
<td>0*</td>
<td>1</td>
</tr>
<tr>
<td>EIA (Coggins)</td>
<td>401</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>APHA EIA (Coggins)</td>
<td>608</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>APHA WNV (cELISA)</td>
<td>1</td>
<td>0</td>
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<table>
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<tr>
<th>Virus Detection</th>
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<tr>
<td>EHV-1/-4 PCR</td>
<td>485</td>
<td>18</td>
<td>2</td>
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<tr>
<td>EHV-2/-5 PCR</td>
<td>21</td>
<td>2</td>
<td>1</td>
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<tr>
<td>EHV-3 virus isolation</td>
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<tr>
<td>Influenza NP ELISA</td>
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<tr>
<td>Influenza Directigen</td>
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<td>Influenza PCR</td>
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<td>1</td>
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<tr>
<td>APHA Influenza PCR</td>
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<tr>
<td>Influenza VI in eggs</td>
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<tr>
<td>EHV VI</td>
<td>94</td>
<td>25</td>
<td>1</td>
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<td>EVA VI/PCR</td>
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<td>0</td>
<td>1</td>
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<tr>
<td>AHVLA EVA VI/PCR</td>
<td>2</td>
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<tr>
<td>Rotavirus</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

ELISA = enzyme-linked immunosorbent assay, VN = virus neutralisation, VLA = Animal Health Veterinary Laboratories Agency, CF = complement fixation, HI = haemagglutination inhibition, Coggins = agar gel immuno diffusion test, PCR = polymerase chain reaction, NP = nucleoprotein, VI = virus isolation, EVA = equine viral arteritis, EHV = equine herpes virus, ERV = equine rhinitis virus, EIA = equine infectious anaemia

* = Diagnosed positive on basis of seroconversion between paired sera  ** = Seropositive due to vaccination, 1= inconclusive on ELISA, confirmed negative by Coggins
EQUINE HERPES VIRUS-1 (EHV-1) ABORTION

On 20th January 2016, the Animal Health Trust, Newmarket confirmed a case of EHV-1 on private premises in North Yorkshire, England. The unvaccinated mare of unknown breed aborted whilst stabled and was placed into isolation with appropriate biosecurity measures implemented. The positive diagnosis was confirmed by histopathology and PCR on placental and fetal tissues.

On 27th January 2016, the Animal Health Trust, confirmed a case of EHV-1 neonatal mortality on premises in Surrey, England. The five year old vaccinated Thoroughbred mare foaled whilst stabled, with the foal subsequently euthanased. The mare was in contact with 15 pregnant Thoroughbred mares on the premises; however no further abortions were reported. The positive diagnosis was confirmed by PCR on placental tissues.

On 1st February 2016, the Animal Health Trust reported a case of EHV-1 abortion on a Thoroughbred stud farm in Hertfordshire. The affected horse was a vaccinated mare that aborted whilst stabled. Prior to abortion, the mare was in contact with ten other pregnant mares. Beaufort Cottage Laboratories confirmed the positive diagnosis by PCR and histopathology on placental and fetal tissues.

On 5th February 2016, the Animal Health Trust confirmed a case of EHV-1 abortion on a Thoroughbred stud farm in Norfolk. The affected horse was a vaccinated maiden mare that aborted whilst stabled. Prior to abortion, the mare was in contact with three other pregnant mares. The positive diagnosis was confirmed by PCR and histopathology on placental tissues.

On 16th February 2016, the Animal Health Trust confirmed a case of EHV-1 abortion on a stud farm in East Suffolk. The affected animal was a vaccinated Thoroughbred mare who aborted whilst stabled. The mare was in contact with one other Thoroughbred mare, which foaled successfully two weeks previously, and 25 Arab horses. The positive diagnosis was confirmed by PCR and histopathology on placental and fetal tissues.

On 16th February 2016, the Animal Health Trust reported a case of EHV-1 neonatal mortality on a Thoroughbred stud farm in Hertfordshire, epidemiologically linked to the case reported on 1st February 2016. Beaufort Cottage Laboratories confirmed the positive diagnosis by PCR and histopathology on placental and fetal tissues.

On 19th February 2016, the Animal Health Trust reported a case of EHV-1 abortion on a small, sport horse stud farm in Berkshire. The affected horse was a vaccinated mare and prior to abortion was in contact with vaccinated pregnant mares on the premises. Beaufort Cottage Laboratories confirmed the positive diagnosis by PCR and histopathology on placental and fetal tissues.

On 24th February 2016, the Animal Health Trust reported a case of EHV-1 abortion on a Thoroughbred stud farm in Hertfordshire. The affected horse was a vaccinated mare that aborted whilst stabled. Prior to abortion, the mare was in contact with seven other pregnant mares. Beaufort Cottage Laboratories confirmed the positive diagnosis through post mortem examination and PCR on fetal and placental tissue.

On 8th March 2016, the Animal Health Trust reported three further cases of EHV-1 abortion on a Thoroughbred stud farm in Hertfordshire, epidemiologically linked to the EHV-1 abortion reported on 24th February 2016. Beaufort Cottage Laboratories confirmed the positive diagnoses through
post mortem examination and PCR on fetal and placental tissues. An important aspect to consider with this outbreak is that for one case, an EHV-1 positive diagnosis through PCR was only identified on placental tissue.

On 15th March 2016, the Animal Health Trust reported four further cases of EHV-1 abortion in vaccinated mares on a Thoroughbred stud farm in Hertfordshire. The four cases are epidemiologically linked, through direct contact, to the index case and secondary cases, reported on 24th February and 8th March 2016. The biosecurity measures in place prior to the outbreak and further implemented on identification of the index case, have resulted in all reported cases having been confined to the area placed under quarantine since the index case, indicated through both clinical and serological monitoring. Beaufort Cottage Laboratories confirmed the positive diagnoses through post mortem examination and PCR on fetal and placental tissues.

On 23rd March 2016, The Animal Health Trust, Newmarket confirmed a case of EHV-1 abortion on a Thoroughbred stud farm in West Sussex, England. This vaccinated index case aborted whilst on barn turnout with three other pregnant mares. On 27th March and 18th April, two secondary cases of EHV-1 abortion occurred within this direct contact group. Due to the direct contact status, these vaccinated animals aborted whilst in isolation. The positive diagnoses were confirmed by gross pathology, histopathology and qPCR on placental and fetal tissues.

On 27th March 2016, The Animal Health Trust, Newmarket reported a case of EHV-1 neonatal infection on a Thoroughbred stud farm in Hertfordshire. This case was epidemiologically linked to the index case reported on 24th February 2016 and presented with clinical signs suggestive of neonatal maladjustment syndrome. The neonate was within an isolated unit prior to diagnosis, due to the biosecurity measures previously implemented. Beaufort Cottage Laboratories confirmed the positive diagnosis by qPCR on placental tissue and the neonate was subsequently euthanased.

**EQUINE HERPES VIRUS-1 (EHV-1) NEUROLOGICAL DISEASE**

On 30th January 2016, the Animal Health Trust made a presumptive serological diagnosis of EHV-1 neurological disease on a Thoroughbred stud farm in Suffolk. The clinically affected horse was a four-year-old vaccinated maiden filly that had arrived at the stud on 20th January 2016, having been transported to the stud from overseas with three other animals on the same lorry. On arrival, prior to the development of clinical signs that included ataxia and bladder dysfunction, the horse was blood sampled and placed into isolation as per normal routine for new arrivals. One in-contact horse that was transported with the index case developed pyrexia and was clinically and virologically monitored in isolation. The positive diagnosis was confirmed by seroconversion on paired serology using the complement fixation (CF) test, although a nasopharyngeal swab taken at the time of development of neurological signs was negative for EHV-1 by PCR. Appropriate biosecurity measures were implemented in accordance with the HBLB Codes of Practice and continued until a clear status was achieved.

**EQUINE INFLUENZA (EI)**

On the 2nd March 2016, the Animal Health Trust confirmed a case of EI in Hampshire, England. The affected animal was a four-year-old unvaccinated gelding that had arrived on the premises five weeks previously. The presenting clinical signs were coughing, mucopurulent nasal discharge and lethargy. Prior to diagnosis, this index case was in direct contact with five other animals; however none developed clinical signs of disease. The positive diagnosis was made by qPCR on a nasopharyngeal swab.

In the case of an outbreak, notification will be reported by the text alert service (Tell-Tail) for UK equine practitioners sponsored by Merial Animal Health. This free of charge service alerts practitioners to outbreaks of equine influenza in the UK via text message. Equine veterinary practitioners can
sign-up for this scheme by registering at the following website http://www.merial.co.uk. This service has also been offered to the members of the National Trainers Federation (NTF).

If you would like more information regarding outbreaks of equine influenza virus or would like to sign up for our sentinel practice scheme, please contact: equiflunet@aht.org.uk or follow the link to www.equiflunet.org.uk for more information on equine influenza.

**RISING EHV-1 ABORTION CASES IN THE UK**

During the first quarter of 2016, there has been an apparent increase in incidence of EHV-1 abortions in comparison to the equivalent time period in previous years. However, the primary reason for this increase results from a single cluster of eight, epidemiologically linked cases on premises in Hertfordshire during the thoroughbred stud season, of which two of these were neonatal deaths. Therefore the overall incidence of new, unlinked cases is not necessarily above the expected number. Again, the endemic state of the virus potentiates the ability for abortion ‘storms’ to occur, through recrudescence and sub-clinical infection and therefore highlights that good biosecurity is essential to minimize transmission.

Although abortion ‘storms’ and individual cases are of a major concern to the equine industry, the outbreak data collected during this quarter will allow for further investigation into the behaviour of EHV-1. Future areas of research to be considered include spatiotemporal associations on premises with multiple cases, the effect of the environment on the virus and mares, different strains of EHV-1, their virulence and variation in the ability to recrudesce and the early reproductive performance of mares affected. Through the combination of epidemiological and genetic data, a cohesive framework can be provided to give an improved understanding of the virus, and a greater insight into the determinants of disease.

**Table 1: Quarterly summary of aborted fetuses submitted for post mortem and proportion positive for EHV-1(%)**

<table>
<thead>
<tr>
<th></th>
<th>Number of samples*</th>
<th>Proportion of Positive tests (%)</th>
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</thead>
<tbody>
<tr>
<td>1Q 2013</td>
<td>47</td>
<td>19.2</td>
</tr>
<tr>
<td>1Q 2014</td>
<td>32</td>
<td>15.6</td>
</tr>
<tr>
<td>1Q 2015</td>
<td>49</td>
<td>10.2</td>
</tr>
<tr>
<td>1Q 2016</td>
<td>45</td>
<td>37.8</td>
</tr>
</tbody>
</table>

*Aborted fetuses submitted to contributing laboratories for post mortem examination

**INTERNATIONAL VIRAL DISEASE OCCURRENCE**

**Time period: 1st January – 31st March 2016**

**DOURINE – TRYPANOSOMA EQUIPERDUM**

**BOTSWANA**

On 15th February 2016, the World Organisation for Animal Health (OIE) reported a total of three cases of Dourine in the Central, Southern and Kgalagadi districts of Botswana. Control measures implemented by the Ministry of Agriculture have included movement restrictions and continued surveillance. This has been the first outbreak of Dourine reported in Botswana.

**EASTERN EQUINE ENCEPHALOMYELITIS (EEE)**

**USA**

Four cases of EEE have been confirmed in the USA for 2016, of which three have occurred in Florida and one in South Carolina. None of the cases were vaccinated and all were euthanased post development of clinical signs.
EQUINE HERPES VIRUS-1 (EHV-1) ABORTION

ARGENTINA
One case of EHV-1 abortion was reported in a Thoroughbred on 11th March 2016. The mare was in a group of 20 pregnant mares with the premises having a total of 50 mares on site. The animal was vaccinated and the positive diagnosis confirmed by PCR.

BELGIUM
Three separate cases of EHV-1 abortion have been reported. The affected animals were not vaccinated. The positive diagnoses were confirmed by PCR on fetal tissues on 14th March 2016.

FRANCE
Four cases of EHV-1 abortion have been reported. These cases occurred in Calvados, Meuse, Orne and Seine-Maritime. The positive diagnoses were confirmed by PCR on fetal tissues.

IRELAND
Thirteen cases of EHV-1 abortion were reported during the first quarter 2016 from County Cork (two cases), County Down (two cases), County Kildare (two cases), County Louth (one case), County Meath (one case), County Monaghan (one case), County Offaly (two cases), County Waterford (one case) and County Wicklow (one case). No clinical descriptions were available of the syndrome involved.

ITALY
On 10th March 2016, the Italian Reference Centre for Equine Disease reported a case of EHV-1 abortion in Tuscania, Viterbo. The affected animal was not vaccinated and the positive diagnosis was confirmed by PCR on fetal tissues.

SOUTH AFRICA
Outbreaks of EHV-1 abortion were first confirmed on 3rd January 2016, with the last case reported on 19th March 2016. 51 Thoroughbreds on 19 premises were affected and all animals were vaccinated. The positive diagnoses were confirmed by serology, and the confirming laboratories were Hokkaido Hidaka Livestock Hygiene Service Center and Hokkaido Iburi Livestock Hygiene Service Center.

EQUINE HERPES VIRUS-1 (EHV-1) NEUROLOGICAL DISEASE

BELGIUM
Two separate outbreaks of EHV-1 neurological disease were reported during the first quarter 2016. One outbreak involved 26 horses, with varying clinical presentations. With the implementation of quarantine procedures no further cases were reported.

FRANCE
On 22nd January 2016, Réseau d’Épidémio-Surveillance en Pathologie Equine (RESPE) reported a case of EHV-1 neurological disease on premises in the Loir-et-Cher region. Ten other animals have been reported to be affected but no further details were available.

ITALY
On 10th March 2016, the Italian Reference Centre for Equine Diseases reported four cases of EHV-1 neurological disease on premises in Rome. The four animals were not vaccinated. The positive diagnoses were confirmed on 23rd February by PCR on nasopharyngeal swabs, identifying the neuropathogenic strain of EHV-1.
USA
Seven separate outbreaks of EHV-1 neurological disease were reported during the first quarter 2016. The states with confirmed infection were California, Illinois, New Mexico, Arizona, Atlanta, and Florida. The New Mexico outbreak occurred on racing premises and involved 44 horses where the neuropathogenic strain of the virus was identified. Quarantine procedures were implemented on all premises with confirmed cases.

EQUINE INFECTIOUS ANAEMIA (EIA)

CANADA
A total of two EIA positive animals were reported in the province of Saskatchewan. The positive animals were on two separate premises with no links to each other. One of the affected premises was part of an on-going disease investigation and the EIA positive animal was identified as a result of regular investigation activities. The other positive equine had an epidemiological link to premises that was affected with EIA in 2013.

GREECE
On 9th March 2016, the World Organisation for Animal Health (OIE) reported a sub clinical case of EIA in Kastoria, Western Macedonia, Greece. Control measures implemented have included movement restrictions and tracing of animals. This is the first outbreak of EIA in Greece and has been reported as resolved.

ITALY
Centro di Referenza Nazionale per l’Anemia Infettiva Equina (CRAIE) reported an update on the EIA situation in Italy from 1st January through to 29th February 2016. EIA was identified on six premises, with a total of eight affected animals during this time period. For three premises, this was the first identification of EIA.

USA
A total of six EIA positive animals were reported. Five cases were identified on premises in New York, and a single case on premises in Florida. Quarantine restrictions were implemented, alongside outbreak investigation.

VESICULAR STOMATITIS (VS)

USA
The last case of VS in the 2015-2016 outbreak of the disease in the USA was reported on 10th February 2016. The New Jersey serotype of the virus was identified in all eight affected states involved in the current outbreak: Arizona, Colorado, Nebraska, New Mexico, South Dakota, Texas, Utah and Wyoming. The final tally of VS affected premises was 823 of which three were identified in the first quarter of 2016, all in Colorado. Of the overall total, 329 were on virus-positive premises and 494 were on premises on which the disease was clinically diagnosed but not virologically confirmed.
A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) 24 HBLB approved laboratories in the UK contributed data.

**Table 2: Diagnostic bacteriology sample throughput and positive results for the first quarter 2016**

<table>
<thead>
<tr>
<th></th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>CEMO (HBLB)</td>
<td>13583</td>
<td>0</td>
<td>24</td>
</tr>
<tr>
<td>CEMO (APHA)</td>
<td>822</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em> culture</td>
<td>13374</td>
<td>11*</td>
<td>24</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em> PCR</td>
<td>565</td>
<td>0#</td>
<td>5</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>13137</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Strangles*culture</td>
<td>1125</td>
<td>87</td>
<td>14</td>
</tr>
<tr>
<td>Strangles PCR</td>
<td>1796</td>
<td>251</td>
<td>8</td>
</tr>
<tr>
<td>Strangles ELISA*</td>
<td>3828</td>
<td>4222</td>
<td>4</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>252</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>APHA Salmonellosis</td>
<td>18</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>MRSA</td>
<td>286</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><em>Clostridium perfringens</em></td>
<td>80</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td><em>Clostridium difficile</em> (toxin by ELISA or munochromatography)</td>
<td>92</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Borrelia (by ELISA)</td>
<td>18</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Rhodococcus equi</em> culture/PCR</td>
<td>122</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>APHA <em>Burkholderia mallei</em> (Glanders)</td>
<td>254</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><em>Lawsonia intracellularis</em> culture/PCR</td>
<td>90</td>
<td>35</td>
<td>4</td>
</tr>
</tbody>
</table>

*CEMO = contagious equine metritis organism (Taylorella equigenitalis); HBLB = HBLB accredited laboratories; # = capsule type 1,2,5; APHA = APHA reference laboratory; *Streptococcus equi subsp. equi; MRSA = methicillin resistant Staphylococcus aureus. ** Lawsonia intracellularis identified using PCR applied to faeces or serum for Immunoperoxidasa monolayer (IPMA) and/or ELISA assay; 1 reproductive tract samples only; 2 seropositivity may be attributed to disease exposure, vaccination, infection and carrier states.*

**APHA CEMO Data for the period January to March 2016**

We are again pleased to include data relating to CEM testing from the Animal & Plant Health Agency (APHA), in this quarterly report. The sample population for the APHA is different from that for the other contributing laboratories as the APHA tests are principally in relation to international trade and/or outbreak investigations.

**Strangles**

Strangles remains endemic in the UK, especially among parts of the non-Thoroughbred horse population. Diagnoses are confirmed in the UK based on traditional culture of *S. equi* and qPCR on respiratory samples and/or seropositive using a serological ELISA.

**APHA Salmonella results**

Eighteen samples were submitted this quarter to the Animal and Plant Health Agency (APHA) and fourteen of these were positive for *Salmonella*. From the incidents involving strains typed by the APHA, the serovars/phagetypes reported were *S. Typhimurium* (7 samples; 3 DT193, 1 DT56, 1 DT8, 1 RDNC and one isolate that has not been typed), *S. Agama* (1 sample), *S. Kottbus* (2 samples), *S. Bovismorbificans* (1 sample), *S. Newport* (1 sample) and a single incident of each of the monophasic *Salmonella* Typhimurium strains 4,5,12:i:- DT193 and 4,12,i:- DT41. *S. Typhimurium* DT41 and DT56.
are typically associated with wild birds. *Salmonella* Typhimurium DT193 (including the monophasic variant) and *S. Bovismorbificans* are associated primarily with pigs and DT193 is also found in cattle. *S. Typhimurium DT8* is associated with farmed ducks. *S. Newport, S. Kottbus* and *S. Agama* are often associated with badgers.

A summary of diagnostic toxicosis and parasitology testing undertaken by contributing laboratories is presented in Tables 3 and 4, respectively. Results for toxicosis are based on histopathologically confirmed evidence of disease only (where applicable).

**Table 3: Diagnostic toxicosis sample throughput and positive results for the first quarter 2016**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass Sickness</td>
<td>4</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Hepatic toxicoses</td>
<td>56</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Atypical myopathy</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

**Table 4: Diagnostic parasitology sample throughput and positive results for the first quarter 2016**

<table>
<thead>
<tr>
<th>Endoparasites</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ascarids</td>
<td>3890</td>
<td>132</td>
<td>17</td>
</tr>
<tr>
<td>Cyathostomes</td>
<td>1143</td>
<td>134</td>
<td>10</td>
</tr>
<tr>
<td>Dictyoaculus</td>
<td>131</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Strongyles</td>
<td>4011</td>
<td>1673</td>
<td>20</td>
</tr>
<tr>
<td>Tapeworms (ELISA based testing)</td>
<td>645</td>
<td>140</td>
<td>8</td>
</tr>
<tr>
<td>Tapeworms (Faecal exam)</td>
<td>2692</td>
<td>52</td>
<td>8</td>
</tr>
<tr>
<td>Trichostrongylus</td>
<td>62</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Strongyloides</td>
<td>3082</td>
<td>154</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ectoparasites**

<table>
<thead>
<tr>
<th>Cause</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mites</td>
<td>449</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Lice</td>
<td>348</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Ringworm</td>
<td>485</td>
<td>100</td>
<td>17</td>
</tr>
<tr>
<td>Dermatophilus</td>
<td>203</td>
<td>19</td>
<td>11</td>
</tr>
<tr>
<td>Candida</td>
<td>119</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

*Complement Fixation Test; CFT suspect/positive samples are tested in IFAT test
**Indirect Fluorescent Antibody Test; ***competitive Enzyme-linked immunosorbent assay; positive cELISA results are not undergoing confirmatory testing
Grass sickness surveillance data (http://www.equinegrasssickness.co.uk/)

The nationwide EGS surveillance scheme was established in spring 2008 to facilitate the investigation of changes in geographical distribution and incidence of the disease in Great Britain. Data gathered by this scheme is collated in a strictly confidential database.

Five equine grass sickness (EGS) cases were reported during the first quarter of 2016 (January – March), two of which occurred in January and three in March. Two of the five affected premises reported a prior history of EGS cases. All cases occurred in England, affecting three mares (one Welsh Section A, one Welsh Section D and one Cob) and two geldings (a Thoroughbred and a pony of unspecified breed). Median age was 7.7 years (range 8 months to 12 years).

One of the cases was diagnosed with subacute EGS and the other four cases presented with the chronic clinical form. The subacute case was euthanased and diagnosis was confirmed at post mortem examination, with histopathological examination of autonomic ganglia. All four chronic cases were diagnosed based solely on clinical signs, with three cases having a clinical diagnosis based on veterinary assessment. Only one of the found chronic cases was reported to have survived.
Title: Vesicular Stomatitis
Peter Timoney, MVB (Hons), MS, PhD, FRCVS from the Gluck Equine Research Center, University of Kentucky, Lexington, Kentucky, USA

Introduction
Vesicular stomatitis (VS) is a viral disease most often of cattle and horses and less frequently of sheep, goats, swine and rarely, alpacas and llamas. The disease is characterized by the development of vesicles primarily on the tongue and lips, nose or muzzle, also the mammary glands, the sheath and the coronary band of the hoof. Vesicular Stomatitis is a zoonotic disease that humans can contract by handling affected animals or acquire in the laboratory through respiratory exposure to an infective aerosol or accidental inoculation. Affected individuals develop a flu-like illness.

Although no longer listed by the OIE, VS is an important disease for several reasons. The most significant is that it can be clinically confused with foot and mouth disease in cattle, small ruminant species and swine, which can also be affected with other clinically similar vesicular diseases such as swine vesicular disease, vesicular exanthema and Seneca virus infection, from which it needs to be distinguished. Furthermore, the disease can have a considerable economic impact from a veterinary medical viewpoint, from cancellation of equine events and from trade restrictions that some countries impose on animal movements from affected states/regions.

While the first record of VS in the USA was in 1916, there are anecdotal reports of a clinically similar disease afflicting horses during the Civil War 60 to 70 years earlier. Two serotypes of VS virus have been identified: the Indiana strain in 1925 and the New Jersey serotype the following year.

Aetiology
Vesicular stomatitis virus belongs to the genus Vesiculovirus family Rhabdoviridae. While there are numerous members of this genus, the two of specific relevance in the USA are the Indiana and New Jersey serotypes of VS virus that are the prototype viruses of the genus Vesiculovirus. Other members of this genus include but are not exclusive of Cocal, Jurona, Piry, Alagoas, Isfahan, and Chandipura. Of these, Cocal and Alagoas are subtypes of VS Indiana virus that have been associated with disease in South America. Piry, Isfahan and Chandipura have been shown to produce only mild lesions in experimentally infected animals.

Epidemiology
Vesicular stomatitis is geographically restricted to the Western Hemisphere, being endemic in Mexico, central and northern South American countries, certain Caribbean countries and until recently, Ossabaw Island off the coast of Georgia, USA, where evidence would indicate it no longer exists. For many years, outbreaks of VS occurred sporadically in the USA, especially in the southwestern and western states. Over the past 20 years however, the frequency of outbreaks has increased, with 5 to 6 outbreaks recorded in each of the last two decades. Another feature of occurrences of VS since 1995 is that the preponderance of cases of clinical disease have been recorded in horses and not cattle or other livestock species as was the experience in previously recorded outbreaks.
Vesicular stomatitis is officially considered a transboundary disease in the USA. Phylogenetic analysis of strains of the virus isolated over the period 1928-1998 and from subsequent occurrences of the disease have confirmed very close genetic relatedness with virus strains from southern Mexico where the virus is endemic and circulates year round. Based on these findings and the fact that the vast majority of outbreaks of VS have been initially detected in one of the states bordering Mexico, it is reasonable to assume that the sporadic incursions of the disease into the USA are the result of northward migration of the virus, most likely via infected vectors from regions where the disease is endemic. Although not confirmed, rodents are thought to serve as reservoir hosts of VS in endemic areas.

Outbreaks of VS are seasonal in occurrence, typically commencing in the late spring/early to mid-summer and continuing until the advent of the first frosts. Depending on prevailing climatic conditions and probably other factors, however, virus activity may persist through the winter and into early spring. It is believed that major outbreaks in the USA occur when climatic and ecological factors combine in a manner that favours the insect vectors.

**Transmission**

Available evidence would indicate that VS is primarily arthropod transmitted, with black flies (Simuliidae) and sandflies (Lutzomyia shannoni) serving as biological vectors of both serotypes of the virus. Transmission of the New Jersey serotype has been demonstrated between infected and non-infected black flies co-feeding in close proximity on non-viraemic cattle, indicating that black flies can act as a transfer vector. While the flight range of insect vectors can vary depending on prevailing weather conditions, there is the potential for them to be transported over long distances on wind currents and spread the virus.

Aside from vector transmission, VS virus can also be spread by direct contact with open lesions on affected animals, and with saliva or vesicular fluid from ruptured vesicles. It should be noted that neither horses nor cattle became viraemic at any point in the course of this infection. Transmission may be enhanced if mucous membranes are traumatised from feeding on rough forage. Infection can also be spread indirectly through contact with virus contaminated fomites. Furthermore, livestock movements are considered to play a role in spread of the virus.

**Clinical Outcome and Differential Diagnoses**

Horses and other livestock species may develop subclinical or clinical infection following exposure to VS virus. The majority of infections in horses are subclinical in endemic and non-endemic areas. The incubation period is variable and can range from 2-8 days. Excessive salivation is frequently the first detectable indication of the disease. Pyrexia is usually absent at the time of initial examination. Ulcerative stomatitis is the primary and most frequently encountered clinical sign of infection in affected horses. This is characterised by the development of vesicles on the tongue, mucocutaneous junction of the lips and on the gums. Similar lesions can develop on the palate, muzzle, nostrils, coronary band, ventral abdominal wall, along the sheath and mammary glands, and rarely in the ears. Vesicles are short-lived and rupture leaving ulcerations and erosions.
Lesions often merge together, forming large denuded areas of oral mucosa. Foot lesions start as a coronitis with excoriation, oedema and inflammation extending proximally up the affected limb.

Acutely affected animals experience considerable pain and reluctance to eat or drink. Lameness and weight loss frequently follow. Recovery normally takes place in 7-14 days. Depending on the range and severity of lesions, the recovery period can be prolonged in individual horses. It has been noted that horses less than a year of age appear to be less susceptible to clinical disease than older animals. Clinical and subclinical attack rates can vary greatly between affected premises, with clinical disease perhaps observed more frequently in pastured horses.

A range of infectious and non-infectious diseases can clinically mimic some of the clinical features of VS. With regard to infectious diseases, ulcerative/erosive oral lesions have been described in horses infected with Jamestown Canyon virus, equine arteritis virus, adenovirus and caliciviruses.

Oral ulcerative and erosive lesions have also been attributed to a range of non-infectious causes. They include but are not exclusive of bedding derived from shavings of wood from the Simaroubaceae family, trauma from certain species of coarse grasses or other plants, blister beetle toxicity, photosensitization, equine exfoliative eosinophilic dermatitis, Pemphigus foliaceus and administration of certain drugs e.g. flunixin meglumine.
Diagnosis
Since VS can be clinically confused with a range of other infectious and non-infectious disease conditions, it is essential that it be definitely diagnosed based on agent detection and/or antibody determination. In view of the fact that the clinical signs in cattle are indistinguishable from those of foot and mouth disease, state and federal regulatory authorities in the USA must be legally notified of any such cases in order to rule out a diagnosis of foot and mouth disease. Virus detection can be attempted by various PCR assays, preferably using a real-time PCR assay because of short turn-around time. Isolation of virus in cell culture offers a less rapid but successful means of detection of VS virus. Vesicular fluid, swabs of fresh lesions or tissue samples are optimal for PCR/virus isolation testing. A number of serological tests are available for demonstration of serum antibodies to the virus. These include complement fixation, various ELISA assays (competitive ELISA, MAC-ELISA), and virus neutralisation tests, the latter of particular value for survey and international trade purposes.

Treatment
Vesicular stomatitis is normally a relatively short-lived disease. Treatment is according to clinical signs. Good supportive care should be provided as it can help expedite recovery from the disease. Secondary bacterial infection can usually be controlled by rinsing lesions with mild antiseptic solutions and the application of topical antibiotics.

Prevention and Control within the USA
Vesicular stomatitis is a reportable disease in all 50 states in the USA and suspect cases must immediately be reported to state and federal animal health authorities. Any animal with lesions consistent with VS should be isolated from healthy stock and if feasible, confined indoors. Once the disease is confirmed, restrictions need to be imposed on movement of animals off an affected premises. Premises can be released from quarantine 14 days after the onset of lesions in the last affected animal on the premises.

Insect control programs should be implemented to reduce/eliminate insect breeding areas. Efforts should be made to reduce the risk of insect exposure by accommodating horses indoors from dusk to dawn and through frequent application of insect repellants to individual animals, targeting more sensitive skin areas with little or no hair, areas of broken skin and the inner surface of the pinna of the ears. It is important that personnel observe personal protection measures and take the necessary precautions to avoid indirect transfer of infection to other healthy stock on an affected premises.

Suggested Readings
A total of 87 cases were examined including 45 aborted fetuses and fetal membranes.

Of the 45 aborted fetuses examined, placental insufficiency was identified in one case, umbilical cord torsion in 11 cases, EHV-1 infection in 17 cases and placentitis in five cases. The cause of abortion could not be determined in 11 cases.

Five cardiovascular cases were examined; four cases of hypovolaemic shock and intra-abdominal haemorrhage, and one case of presumed cardiac failure from electric shock.

Eleven cases of gastrointestinal disease were examined; three cases of equine grass sickness, one case of necrotizing and haemorrhagic enterocolitis due to *Clostridium difficile*, one case of small intestinal volvulus, one case of a diaphragmatic rupture with small intestinal strangulation, one case of a large colon torsion, one case of alimentary lymphoma, one case of caecal rupture post-partum and two cases of necrotising typhlocolitis.

Five musculoskeletal cases were examined; a single case of a solar defect resulting in navicular bursitis and distal interphalangeal fibrinous synovitis, alongside a linear defect of the deep digital flexor tendon. A single case of a left proximal femur fracture, a single case of a keratoma, causing compression and lysis of P3, a single case of severe lymphangitis, and a single case of cellulitis, fascitis, myositis and osteomyelitis of the withers.

Thirteen cases of neonatal mortality were examined; one case of bronchopneumonia, five cases of congenital malformation, five cases of dystocia and two cases of septicaemia.

Three neurological cases were examined; a single case of encephalomyelitis with a focal area of necrosis at the base of the cerebellum, and two cases of Cervical Vertebral Malformation (CVM).

Two cases of respiratory disease were examined; a single case of a paranasal sinus cyst was obstructing the left nasal cavity and causing facial deformity and a single case of severe pleuritis, resulting from abscessation at the tip of the right lung.

Three welfare cases were investigated; a single case of severe emaciation, a single case of emaciation and verminous arteritis and a single case of severe typhlocolitis and cyathostominosis.

Home Counties

Nineteen cases were reported.

One aborted fetus was examined, in which an umbilical cord torsion was identified.

Three cardiovascular cases were examined; a single case of presumed cardiac failure from toxicosis after yew ingestion and two cases of presumptive cardiac failure, although an inciting cause was not found on gross pathology or histopathology.

A single case of an endocrine disorder, where examination identified a large, friable pituitary gland and associated abscessation.

Seven cases of gastrointestinal disease were examined that included a single case of large colon impaction due to equine grass sickness, a single case of typhlocolitis due to cyathostominosis, a single case of small intestinal volvulus, two cases of strangulating lipoma and two cases of lymphocytic-plasmacytic enteropathy and muscular hypertrophy of the small intestine.
A single musculoskeletal case was examined in which gross pathology and histopathology identified mottling of skeletal muscle and acute myonecrosis. Atypical or nutritional myopathy was the suspected cause.

One case of neonatal mortality, associated with dystocia and resulting partial atelectasis and laryngeal oedema.

Two neurological cases were examined; one case of C5-C6 vertebral arthropathy, indicative of cervical vertebral malformation, and one case of C4-C6 intervertebral disk degeneration.

Three welfare cases were investigated which identified typhlocolitis due to severe cyathostominosis and ascariasis in all cases.

**Northern England**

*One case was reported.*

A single cardiovascular case was examined in which a small tear to the aorta and associated haemothorax was identified as the cause of death.

**Scotland**

Ten cases were reported.  

One aborted fetus was examined, with an undetermined causality.

One cardiovascular case was examined where cardiac failure was presumed from toxicosis after yew ingestion. Mild gastroenteritis and petechial haemorrhages were also noted.

Two cases of gastrointestinal disease were investigated that identified one case of an epiploic foramen entrapment and on case of an oesophageal rupture.

One musculoskeletal case was examined, identifying navicular disease.

Two cases of neoplasia were examined which identified a single case of a renal carcinoma and a single case of abdominal lymphoma. On identification of lymphoma, multifocal renal infarcts and hydronephrosis were also noted, alongside a moderate right cranial hydroureter.

One case of respiratory disease was examined, which identified fibrinous pleuropneumonia with fibrinohaemorrhagic pleural effusion, tracheitis and lymphadenopathy. Streptococcus zooepidemicus was cultured on a tracheal aspirate.

Two welfare cases were investigated in which emaciation was identified in both cases. In one case, high levels of parasitism was also identified.

**Southern England**

*Five cases were reported.*

One case of dental disease was examined, confirming an open diastema.

One case of gastrointestinal disease was investigated which identified mild typhlocolitis and cyathostominosis.

Two musculoskeletal cases were examined; a single case of ankylosing spondylitis with fusion of the thoracic spine (T1 to T5) and new bone formation of the vertebral bodies and a single case of generalised osteoarthritis, with slight to moderate cartilage erosion of the articular surfaces.

One urology case, which identified mild to moderate interstitial fibrosis on histopathology.
This report was compiled by the Animal Health Trust. We are extremely grateful to the following laboratories for contributing data for this report.

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 AHVLA, which acts as the reference laboratory. We would also like to acknowledge the contribution of the Horserace Betting Levy Board CEMo-scheme.

Agri-Food and Biosciences Institute of Northern Ireland
Animal Health Trust Diagnostic Laboratory
Animal and Plant Health Agency
Arundel Equine Hospital
Axiom Veterinary Laboratory
Beaufort Cottage Laboratories
Biobest Laboratories
Bushy and Willesley (B & W) Equine Group Ltd.
CAPL LTD Laboratory
Capital Diagnostics, Scottish Agricultural College
Carmichael Torrance Diagnostic Services
Chine House Veterinary Hospital
Dechra Laboratories
Donkey Sanctuary
Donnington Grove Veterinary Group
Endell Veterinary Group Equine Hospital
Hampden Veterinary Hospital
IDEXX Laboratories
JSC Equine Laboratory
Lab Services Ltd
Liphook Equine Hospital
Minster Equine Veterinary Clinic
Newmarket Equine Hospital
Oakham Veterinary Hospital
The Royal Veterinary College
Three Counties Equine Hospital
Torrance Diamond Diagnostic Services (TDDS)
University of Edinburgh
University of Glasgow
Valley Equine Hospital

The Animal Health Trust (AHT) is extremely grateful to the Horserace Betting Levy Board (HBLB), Racehorse Owners Association (ROA) and Thoroughbred Breeders’ Association (TBA) for their continued combined contribution to the AHT’s Equine Infectious Disease Service.

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

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