Highlights in this issue:
- Equine Influenza in the UK
- Focus article: Tetanus

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.
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION &amp; NATIONAL DISEASE OCCURRENCE BEGINNING 3Q 2015</td>
<td>3</td>
</tr>
<tr>
<td>INTERNATIONAL DISEASE OCCURRENCE BEGINNING 3Q 2015</td>
<td>3-7</td>
</tr>
<tr>
<td>VIROLOGY DISEASE REPORT FOR THE 2Q 2015</td>
<td>8-9</td>
</tr>
<tr>
<td>BACTERIOLOGY DISEASE REPORT FOR THE 2Q 2015</td>
<td>10-11</td>
</tr>
<tr>
<td>TOXIC AND PARASITIC DISEASE REPORT FOR THE 2Q 2015</td>
<td>12-13</td>
</tr>
<tr>
<td>FOCUS ARTICLE: TETANUS</td>
<td>14-16</td>
</tr>
<tr>
<td>REPORT ON POST-MORTEM EXAMINATIONS FOR THE 2Q 2015</td>
<td></td>
</tr>
<tr>
<td>EAST ANGLIA</td>
<td>17</td>
</tr>
<tr>
<td>HOME COUNTIES</td>
<td>17-18</td>
</tr>
<tr>
<td>NORTHERN ENGLAND</td>
<td>18</td>
</tr>
<tr>
<td>SOUTH WEST</td>
<td>18</td>
</tr>
<tr>
<td>SCOTLAND</td>
<td>18</td>
</tr>
<tr>
<td>NORTHERN IRELAND</td>
<td>18</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>19</td>
</tr>
</tbody>
</table>
Introduction

Welcome to the second quarterly equine disease surveillance report for 2015 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). 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.

National disease occurrence

EQUINE INFLUENZA VIRUS (EI)

Six outbreaks of EI were reported in July and August 2015; five in July (West Midlands, Tyne and Wear, Scottish Borders and two in Lanarkshire) and one in August (Norfolk). All cases were diagnosed by qPCR on nasopharyngeal swabs in unvaccinated horses. Affected animals presented with pyrexia, depression, dry cough, enlarged lymph nodes and serous mucopurulent nasal discharge.

The outbreaks were 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.

EQUINE HERPES VIRUS-1 (EHV-1) ABORTION

On the 10th August 2015, a case of EHV-1 abortion was confirmed on a stud farm in West Sussex. The affected mare was a 19-year-old unvaccinated Warmblood. There were 70 other mares on the premises.

International disease occurrence

ANTHRAX

USA
The Texas Animal Health Commission confirmed a case of anthrax in a horse in Uvalde County, Texas on the 13th August 2015. The source of infection was probably from environmental contamination with Bacillus anthracis. Quarantine restrictions were placed on the affected holding and vaccination of other livestock on the premises against anthrax.
**CONTAIGOUS EQUINE METRITIS (CEM)**

**South Korea**

On 19th June 2015, the South Korean Ministry of Agriculture, Food and Rural Affairs, reported subclinical infections of *Taylorella equigenitalis* in 17 horses held in seven locations in Jejudo. The positive diagnoses, which are the first in the country, were made by PCR conducted by the national laboratory of the Animal and Plant Quarantine Agency on 7th May 2015. Control measures were established including quarantine, screening, zoning and disinfection with movement restrictions applied within the country and treatment of affected animals using antibiotics.

**Germany**

CEM was confirmed in three horses in three separate premises. Diagnoses were made by bacterial culture and PCR on genital swabs.

**EASTERN EQUINE ENCEPHALOMYELITIS (EEE)**

**USA**

A case of EEE has been reported in early September in a two-year-old filly in Gloucester County, New Jersey, USA, the first in the state in 2015. The horse which had not been vaccinated against EEE was euthanased. This latest case brings the national total to 40 of which 20 have been in Florida, 12 in Texas, two in North Carolina and Virginia, and one each in South Carolina, Alabama, Mississippi and New Jersey.

**GLANDERS (Burkholderia mallei)**

**Germany**

Regarding the positive case that occurred in Osnabruck in December 2014, it was established that the affected horse had never been moved to other Member States or third countries. A total of 398 contact horses were identified on other holdings in Germany. All contact horses have been tested negative for glanders. In addition to this, tests for export to third countries were carried out on 4,694 horses in 2014 and 2,665 horses in 2015 (as of 13 June 2015, which in the end of six-month period following the euthanasia of the animal concerned); they all tested negatively for glanders. The competent veterinary authorities in Germany have not received any information on signs indicating glanders, neither through the framework of passive monitoring (examinations of horses intended for slaughter or found dead) or in the movement of horses from other Member States or importation of horses from third countries the origin of the introduction of *B. mallei* was not able to be determined, despite intensive testing. The conclusion drawn from all tests carried out is that the case in question was an isolated case. In accordance with Article 12.10.2 of the OIE Terrestrial Animal Health Code Germany declares itself free of glanders with effect of 14th June 2015.

**HENDRA VIRUS (HV)**

**Australia**

On the 25th June, a case of HV was confirmed on a premises in Murwillumbah, New South Wales. The affected animal was a non-vaccinated 19-year-old gelding that presented with lethargy during the preceding three days and died subsequently. Samples from the horse were sent for laboratory analysis and results confirmed Hendra virus. Two other horses and two dogs on the infected property were closely monitored for any signs of viral infection.
On the 24th July, another case of Hendra virus was reported on a premises in the Atherton Tablelands in North Queensland. There were a number of other horses on the property that were monitored for signs of disease. The property was released from quarantine on the 21st August as no further infection was detected at the premises.

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

**Abortion**

**Argentina**

One outbreak of EHV-1 abortion was reported in early June 2015, affecting one vaccinated Thoroughbred mare out of 80 animals on the property.

**France**

Three outbreaks have been confirmed including one in French Saddlebreds. These outbreaks occurred in Aisne, Calvados and Loire-Atlantique. Positive diagnoses were confirmed by PCR on fetal organs.

**Japan**

A total of ten cases of EHV-1 abortion (seven cases) and neonatal foal death (three cases) were reported in Thoroughbreds between 4th April 2015 and 30th April 2015, on seven separate premises. EHV-1 vaccination was incomplete in three animals. Diagnoses were made by serology at the Hokkaido Hidaka Livestock Hygiene Service Centre.

**Germany**

EHV-1 was confirmed in nine cases of abortion with diagnoses by PCR on swabs from uterine discharges and fetal lung puncture aspirates during the second quarter of 2015.

**Neurological Disease**

**Germany**

Two cases of EHV-1 neurological disease presenting with fever, ataxia and urinary incontinence were confirmed by PCR on nasopharyngeal swabs during the second quarter of 2015.

**USA**

During the second quarter of 2015 outbreaks of EHV-1 neurological disease were confirmed in the seven states of California, Iowa, Illinois, Maryland, Oregon, Pennsylvania and Virginia, with more than one affected premises in three states. The majority of the outbreaks involved isolated cases of the disease.

**EQUINE INFLUENZA (EI)**

**USA**

EI is considered endemic in the USA. A significant outbreak of EI was diagnosed involving at least 15 affected horses at a show in Redmond, Oregon, the majority sharing the same barn. Additional single cases/outbreaks were recorded in Tennessee, Minnesota and Kentucky.

**Equine Infectious Anaemia (EIA)**

**Canada**

Between 1st April 2015 and 30th June 2015, there were a total of 16 EIA-virus infections which were confirmed by serology using agar gel immunodiffusion (Coggins) and being reported in the following provinces: British Columbia (three), Alberta (eight), Saskatchewan (three) and Yukon (two). The
positive animals were found on nine separate premises in Yukon (two), British Columbia (two), Alberta (two) and Saskatchewan (three). In Saskatchewan one affected premises had positive animals identified in 2011 and one premises was affected in both 2011 and 2014.

FRANCE
A single case of EIA was confirmed on 4th May 2015 in Ardeche. The positive diagnosis was made by serology. Control measures were applied including, screening, disinfection of infected establishment(s) and epidemiological investigations. The infected horse was euthanased.

Germany
On 17th July 2015, a case of EIA was confirmed on a premises in Landkreis Rosenheim Bavaria. One horse tested positive on the 15th July by Coggins test out of 41 horses on the premises. Control measures were implemented immediately including quarantine and screening of all resident equidae and potential in contact horses as well as trying to establish the source of infection.

Poland
On 17th June 2015, a subclinical case of EIA in the Province of Malopolske near Krakow was reported. The positive diagnosis, which is the first in the country since 1960, was made by agar gel immunodiffusion (Coggins). There are 14 other horses on the affected premises, which are under quarantine restrictions with further control measures of vector control and cessation of horse movement inside the country being implemented.

Romania
Several outbreaks were reported from June to September 2015: Caras Severin (one), Cluj (one), Maramures (three), Sibiu (one).

Hungary
On 1st September 2015, an outbreak of EIA was reported in Gyor-Moson-Sopron region of Hungary. No further details about the outbreak were made available.

USA
During the second quarter of 2015, four cases of EIA were confirmed at different locations in western Tennessee.

VESICULAR STOMATITIS (VS)

USA
As of 2nd September 2015, VS has been confirmed on 125 premises in seven affected states including Arizona (13), Colorado (69), New Mexico (11), S. Dakota (eight), Texas (three), Utah (six) and Wyoming (15). Presently, 129 affected premises remain under quarantine in five states (Colorado, New Mexico, S. Dakota, Utah and Wyoming).

WEST NILE VIRUS (WNV)

France
Two cases were reported in August 2015 one in Gard and another in Bouches-du-Rhone. Affected animals presented with neurological signs, ataxia and recumbency. Both unvaccinated animals were euthanased. The French government has established a restricted area around the premises and control measures including vaccination, vector control and spraying are in place.
Hungary
On the 4th July 2015, a case was reported in Komaron-Esztergom region. The affected horse showed mild clinical signs but has since recovered. Twenty-five other horses at the premises were tested with negative results.

USA
As of 2nd September 2015, the national total of cases is 23, of which 10 have been in Texas, six in Washington State, three in Kentucky and one each in Oklahoma, New Mexico, Virginia, and Nevada.

PYTHIOSIS

USA
A case of an infrequently encountered and usually fatal disease, pythiosis, caused by an aquatic fungal pathogen, Pythium insidiosum was diagnosed in a trail horse in Florida in August. The affected animal had a large facial lesion caused by the fungus. Exposure to infection is postulated to occur by the oral route through drinking water containing the fungus or through the pathogen gaining entry via an open wound.

CUTANEOUS LEISHMANIASIS

Switzerland
On 13th April 2015, one case of cutaneous leishmaniasis was reported. Diagnosis was made by PCR.

MELIOIDOSIS

Singapore
An outbreak was confirmed on 2nd May 2015. A pre-export sample of a riding school horse submitted to the USDA laboratory in Iowa tested positive on a CFT for glanders. Repeat blood samples, submitted on two occasions to the two OIE reference laboratories for Glanders (one in Germany and one in Dubai) together with samples submitted to the AVA Animal Health Laboratory and the DSO National Laboratory to conclude that the initial test was a false positive due to a cross reaction with Burkholderia pseudomallei antibodies and led them to classify it as a case of i, rather than glanders.

Focus article

In this report we are pleased to include the focus article written by Deidre Carlson, Rossdales & Partners, Newmarket, UK about Tetanus in horses. 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 April to June 2015 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 second quarter of 2015

<table>
<thead>
<tr>
<th>Serological Tests</th>
<th>Number of Samples Tested</th>
<th>Number Positive</th>
<th>Number of Contributing Laboratories</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA ELISA</td>
<td>2495</td>
<td>54#</td>
<td>5</td>
</tr>
<tr>
<td>EVA VN</td>
<td>351</td>
<td>35#</td>
<td>2</td>
</tr>
<tr>
<td>APHA EVA VN</td>
<td>279</td>
<td>30#</td>
<td>1</td>
</tr>
<tr>
<td>EHV-1/-4 CF test</td>
<td>242</td>
<td>63*</td>
<td>1</td>
</tr>
<tr>
<td>EHV-3 VN test</td>
<td>7</td>
<td>2*</td>
<td>1</td>
</tr>
<tr>
<td>ERV-A/B CF test</td>
<td>258</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Influenza HI test</td>
<td>145</td>
<td>1*</td>
<td>1</td>
</tr>
<tr>
<td>EIA (Coggins)</td>
<td>548</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>EIA ELISA</td>
<td>1571</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>APHA EIA (Coggins)</td>
<td>577</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>AHVLA WNV (cELISA))</td>
<td>1</td>
<td>0†</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Virus Detection</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EHV-1/-4 PCR</td>
<td>265</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>EHV-2/-5 PCR</td>
<td>28</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>EHV-3 virus isolation</td>
<td>38</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Influenza NP ELISA</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Influenza Directigen</td>
<td>59</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Influenza PCR</td>
<td>216</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>APHA Influenza PCR</td>
<td>62</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Influenza VI in eggs</td>
<td>7</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>EHV VI</td>
<td>38</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>EVA VI/PCR</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>AHVLA EVA VI/PCR</td>
<td>6</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rotavirus</td>
<td>70</td>
<td>10</td>
<td>3</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

# = Seropositives include vaccinated stallions, * = Diagnosed positive on basis of seroconversion between paired sera ** = Seropositive due to vaccination
Equine Influenza Virus (EI)

On 8th April 2015, an outbreak was reported on a premises in North Yorkshire. The infected horse was an unvaccinated two-year-old Shetland pony filly that presented with dry harsh cough, serous nasal discharge, swollen lymph nodes and lethargy for the preceding three days. Positive diagnosis was made by qPCR on a nasopharyngeal swab. There were four horses affected out of 20 on the premises.

On 22nd April 2015, a case of EI was confirmed on a premises in Leicestershire, England. The affected mare was a six-year-old unvaccinated Irish sport horse that had recently arrived from Ireland. The mare presented with mucopurulent nasal discharge, dry cough, pyrexia, depression and enlarged lymph nodes. Positive diagnosis was made by qPCR on a nasopharyngeal swab. There were nine other horses at the premises of which none showed signs of disease.

On 8th May 2015, the Animal Health Trust confirmed a case of EI on a premises in the Scottish Borders. The affected horse was a four-year-old unvaccinated Irish sport horse gelding that had recently been purchased from a dealer's yard after arriving from Ireland. The gelding was first noted with clinical signs of serous nasal discharge, dry cough, and enlarged lymph nodes on 30th April 2015. The positive diagnosis was made by qPCR on a nasopharyngeal swab taken on 7th May 2015. There were two other vaccinated horses on the premises but neither showed signs of disease.

On 22nd June 2015, an outbreak of EI was confirmed on a premises in Dorset. The affected animals presented with pyrexia, dry cough, nasal discharge and inappetence. There were three affected animals all unvaccinated and positive diagnosis was made by qPCR on a nasal swab from one of them. Two further in-contact vaccinated horses were at the premises, both currently healthy.

On 25th June 2015 two separate outbreaks of EI on a premises in Lanarkshire (Scotland) and Glamorganshire (Wales) were confirmed. The affected horse in Scotland was an unvaccinated seven-year-old Welsh mare that had attended a show the previous weekend. The mare presented with clinical signs of mucopurulent nasal discharge, cough and pyrexia. The positive horse in Wales was an unvaccinated six-year-old gelding presented with pyrexia, dry cough, enlarged lymph nodes, mucopurulent nasal discharge and depression. There were 50 other horses on the premises of which 10 showed signs of disease. Positive diagnoses were made in both cases by PCR on a nasopharyngeal swab.

Equine Herpes Virus-1 (EHV-1)

Abortion
On 13th April 2015, a case of EHV-1 abortion was confirmed on a premises in Shropshire. Positive diagnosis was made by qPCR on fetal samples. No further information was provided.

Respiratory Disease
On the 12th June 2015, a case of EHV-1 respiratory disease was reported in a donkey on a premises in Devon. The affected animal presented with pyrexia, dry cough and serous nasal discharge. There were six in-contact donkeys of which four have since developed clinical signs. The diagnosis was confirmed by qPCR and virus isolation on a nasopharyngeal swab.
A summary of the diagnostic bacteriology testing undertaken by different contributing laboratories is presented in Table 2. For contagious equine metritis (CEM) 25 HBLB approved laboratories in the UK contributed data.

**Table 2: Diagnostic bacteriology sample throughput and positive results for the second quarter 2015**

<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>6672</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>CEMO (APhA)</td>
<td>283</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><em>Klebsiella pneumoniae</em></td>
<td>5645¹</td>
<td>20#</td>
<td>25</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>6657¹</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>Strangles*culture</td>
<td>1918</td>
<td>91</td>
<td>19</td>
</tr>
<tr>
<td>Strangles PCR</td>
<td>1928</td>
<td>226</td>
<td>5</td>
</tr>
<tr>
<td>Strangles ELISA²</td>
<td>4231</td>
<td>443²</td>
<td>4</td>
</tr>
<tr>
<td>Salmonellosis</td>
<td>485</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>MRSA</td>
<td>342</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td><em>Clostridium perfringens</em></td>
<td>135</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td><em>Clostridium difficile</em> (toxin by ELISA or munochromatography)</td>
<td>159</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>Borrelia (by ELISA)</td>
<td>35</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td><em>Rhodococcus equi culture/PCR</em></td>
<td>25</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><em>Lawsonia intracellularis</em> ** culture/PCR</td>
<td>63</td>
<td>43</td>
<td>2</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 April to June 2015**
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**

Eleven samples were submitted this quarter to the Animal and Plant Health Agency (APHA) and all of these were positive. From the incidents involving strains typed by the APHA, the serovars/phagetypes reported were S. Typhimurium (5 samples; DT41 (1 sample), DT56 (1 sample) U310 (1 sample) and RDNC (2 samples), S. Anatum (1 sample), S. Enteritidis PT8 (2 samples) and monophasic Typhimurium variants S. 4,5,12:i:- (2 samples; 1 DT193 and 1 NOPT) and a single incident of S. 4,12:i:- DT193. S. Enteritidis PT8 is associated with human infection and S. Typhimurium DT41 and DT56 are typically associated with wild birds, as is S. Anatum. Monophasic *Salmonella Typhimurium* DT193 is associated with pigs and cattle and S. Typhimurium U310 is a pig-related phage-type. For more information from APHA about Salmonella in Great Britain, please visit [https://www.gov.uk/government/statistics/salmonella-in-livestock-production-in-great-britain-2013](https://www.gov.uk/government/statistics/salmonella-in-livestock-production-in-great-britain-2013).
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 second quarter 2015

<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>Grass Sickness</td>
<td>50</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>Hepatic toxicoses</td>
<td>43</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Atypical myopathy</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

* Includes contributing laboratories with no cases submitted

### Table 4: Diagnostic parasitology sample throughput and positive results for the second quarter 2015

<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>6305</td>
<td>44</td>
<td>20</td>
</tr>
<tr>
<td>Cyathostomes</td>
<td>3514</td>
<td>527</td>
<td>15</td>
</tr>
<tr>
<td>Dictyocaulus</td>
<td>100</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Strongyles</td>
<td>7270</td>
<td>1806</td>
<td>20</td>
</tr>
<tr>
<td>Tapeworms (ELISA based testing)</td>
<td>17</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Tapeworms (Faecal exam)</td>
<td>2470</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Trichostrongylus</td>
<td>36</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Strongyloids</td>
<td>3991</td>
<td>163</td>
<td>9</td>
</tr>
<tr>
<td>Oxyuris equi</td>
<td>93</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Fasciola</td>
<td>189</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Coccidia</td>
<td>551</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Cryptosporidia</td>
<td>60</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>APHA Theileria equi (CFT)*</td>
<td>94</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>APHA Theileria equi (IFAT)**</td>
<td>167</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>APHA Theileria equi (cELISA)***</td>
<td>140</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>APHA Babesia caballi (CFT)*</td>
<td>94</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>APHA Babesia caballi (IFAT)**</td>
<td>177</td>
<td>10</td>
<td>1</td>
</tr>
<tr>
<td>APHA Babesia caballi ELISA)**</td>
<td>140</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ectoparasites</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mites</td>
<td>395</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Lice</td>
<td>311</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Ringworm</td>
<td>476</td>
<td>147</td>
<td>12</td>
</tr>
<tr>
<td>Dermatophilus</td>
<td>139</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>Candida</td>
<td>106</td>
<td>13</td>
<td>5</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.

A total of 54 cases of equine grass sickness (EGS) were reported during the second quarter of 2015 (April – June), of which 80% occurred in England (n=43) and 20% occurred in Scotland (n=11). Six affected premises reported multiple cases during this quarter (five premises reported two cases and one premises reported three cases), occurring at a median interval of 2.5 days apart (range 0 – 13 days between cases). Of the six recurrently affected premises, three had a prior history of EGS cases. A further six affected premises had a prior history of EGS cases.

The cases comprised 50% geldings (n=27), 48% mares/fillies (n=26) and one stallion (2%). The median age of affected animals was 5 years (range 1.25 – 48 years). The most numerous affected breeds included British native pony breeds (n=11), Cob or Cob crosses (n=11), Welsh or Welsh crosses (n=10), Irish Draught and Irish Draught crosses (n=5).

Fifty percent of cases (n=27) were reported to have acute EGS, 33% (n=18) were reported to have sub-acute EGS and 17% (n=9) were diagnosed with chronic EGS. Of the nine cases of chronic EGS, 33% (n=3) were reported to have survived to date.

The majority of cases (67%, n=36) were diagnosed based solely on clinical signs and clinical examination. Eighteen cases (33%) underwent surgery, with diagnostic confirmation obtained by histopathological examination of ileal biopsy samples in 15 of these cases (83% of animals undergoing surgery). Three of the cases that had histopathology samples obtained during surgery were reported to have a subsequent post mortem examination, with two of these also having histopathological examination of autonomic ganglia.
Tetanus is a frequently fatal condition caused by the bacterium Clostridium tetani (Cl. tetani) which is ubiquitous in soil and is also found in the faeces and intestinal tract of many animal species. Horses are particularly susceptible to tetanus, possibly because their environment is heavily contaminated with spores. The disease was first described in Egypt over 3000 years ago.

The Organism
Cl. tetani is an anaerobic, motile, spore forming gram positive bacterium. Vegetative cells are pleomorphic rods which often appear tennis-racquet or drum stick shaped. They tend to occur in short chains or pairs. The spores can survive in the environment for many years and are resistant to many disinfectant agents and can require long exposure times.

Pathophysiology
Cl. tetani spores commonly gain access to the body via contamination of deep penetrating injuries although even minor wounds, foot abscesses and foaling injuries can allow infection to establish. There is local multiplication of bacteria only if sufficiently anaerobic conditions are present in the damaged tissue. The bacteria do not migrate from the site of the wound. They produce a potent neurotoxin tetanospasmin (TeNT) which is released at the time of cell lysis during the normal growth cycle. The toxin may be transported by blood and the lymphatics or by direct entry into nerve fibres. It enters the CNS and migrates through nerve trunks by retrograde axonal transport and trans-synaptic spread. It works by blocking post synaptic inhibition of spinal motor reflexes by degrading the SNARE protein thus preventing the release of the inhibitory neurotransmitters GABA and glycine. The toxin binding to neurons is virtually irreversible and nerve function can only be returned by the growth of new terminals and synapses. This causes prolonged and excessive spasmodic contractions of skeletal muscles in response to the slightest stimulation. Ingestion of the toxin is harmless.

Clinical Signs
The incubation period is highly variable and may possibly be as little as 24 hours after infection but can be as long as several weeks. The first sign is often trismus (lockjaw) due to spasm of the facial muscles although there may be local rigidity and pain in the region of the initial injury. The membrana nictitans (third eyelid) will protrude partially across the eye, especially if the horse is stimulated or startled or exposed to bright light. Generalised tetanus is characterised by stiffness and rigidity and pain of the skeletal muscles and affected horses often adopt a ‘saw horse’ stance with the hind limbs extended behind the body and the tail held rigidly away from the body.
As hyperaesthesia progresses, the slightest sensory stimulus will result in violent contractions of the skeletal muscles. The body temperature will increase and the horse will sweat, the heart rate increases and breathing becomes laboured. In advanced or severe cases, the horse will be unable to stand and may start to convulse before dying from respiratory failure.

As culture of the organism at best is difficult and frequently impossible, diagnosis is based on characteristic clinical signs. Differential diagnosis will include hypocalcaemic tetani, which is usually seen in lactating mares and severe laminitis, in which the third eye lid does not prolapse.

**Treatment**

Treatment is possible in early and minor cases but may be prolonged and expensive. In most reports, mortality rate is greater than 50% with recent papers reporting mortality rates of 75% and 68%. Horses which survive usually show signs of stability or improvement within two to seven days. Affected horses should be moved to a quiet dark stable with minimal disturbance. Treatment is aimed at removing the bacteria and unbound toxin, reducing pain and muscle spasm and providing necessary supportive therapy. The wound, if apparent, should be debrided, flushed and opened to allow drainage. *Cl. tetani* is rarely cultured from the wound, if found, so sensitivity cannot be ascertained in most cases. Penicillin has been the drug of choice for many but Metronidazole is also widely used. Doses of 20 to 30 mg/kg per os bid or 40 to 60mg/kg per rectum every 6 to 8 hours may be given. Antitoxin should be administered by intravenous, subcutaneous or intramuscular injection at a dose of 10,000 iu daily for 3 to 5 days. However, because TAT does not cross the blood brain barrier, some clinicians have used intrathecal administration even though there does not appear to be conclusive evidence that this provides clinical advantage.

Other treatment includes providing analgesia with NSAID’s such as flunixin meglumine. Sedation and muscle relaxation may be achieved to a greater or lesser extent by the administration of medicines such as ACP, butorphanol, xylazine, diazepam and dantrolene used alone or in combination. Magnesium has been recommended as potentially useful when given as an IV infusion of Magnesium sulphate. It is believed to block neuromuscular transmission as well as being an anticonvulsant and vasodilator.

Intensive supportive therapy may be required. Animals which can still eat should be provided with a manger at head height and palatable food. Others might require feeding by nasogastric tube or intravenous fluid therapy and/or parenteral nutrition.
Prevention

Spores are highly resistant and persist in the environment. Prevention of this disease can be achieved by the administration of a tetanus toxoid vaccine at recommended intervals. Foals will receive a degree of protection via colostrum from their dam if the latter is vaccinated appropriately. A booster given to the mare one to two months prior to foaling will increase this level of protective antibody. Young foals can be vaccinated from six months of age. The primary course consists of two injections approximately four weeks apart. This provides immunity from approximately two weeks after the second injection which lasts for approximately 17 months. A third injection should be given within 17 months of the second and then booster injections should be given every two years. In foals which are at increased risk or have not received adequate colostral protection a first injection may be given from 4 months of age followed by the full course starting at 6 months. Any unvaccinated horse or one in which the vaccination history is unknown or incomplete should receive tetanus antitoxin if wounded or undergoing surgery. Tetanus toxoid can be used at the same time as antitoxin in horses with a wound. The latter will provide protection for approximately three weeks and the second toxoid dose should still be given four weeks later.

It is difficult to be certain about the proportion of horses in the UK that are routinely vaccinated against tetanus. According to the Blue Cross National Equine Health Survey (NEHS) of 2013, virtually all horses (95%) belonging to respondents were up to date with their Influenza and tetanus vaccinations. This contrasts with the 65% identified by Blue Cross on assessment of the horses and ponies taken in by the charity during 2012 and is also far higher than pharmaceutical data that suggests as few as 45% are vaccinated. In the recent 2014 Survey of the British Equine Veterinary Association (BEVA) membership, 276 respondents replied to the question: “What percentage of your clients do you estimate do NOT vaccinate against tetanus?” The median estimated rate was 15% of clients (range 0-90%) who did not have their horses vaccinated against tetanus. Tetanus is simple to prevent and all owners should be encouraged to vaccinate their horses appropriately.

Further reading
**East Anglia**
*A total of 27 cases were examined including five aborted fetuses and fetal membranes.*

Of the five *aborted fetuses* examined, placental insufficiency was identified in two cases and umbilical cord torsion in one case. The cause of abortion could not be determined in two cases.

Six cases of *neonatal death* were reported; all related to dystocia.

Two *foal deaths* one due to interstitial pneumonia caused by *Rhodococcus equi* (*R. equi*) infection and the other due to osteomyelitis of the second lumbar vertebra associated to *R. equi* infection.

Five *cardiovascular cases* were examined; two cases of rupture of the uterine artery with subsequent haemoabdomen, single case of atrial fibrillation and two cases of rupture of the base of the aorta followed by cardiac tamponade were identified.

Four *musculoskeletal* cases were examined; single cases of laminitis, acetabular fracture, head trauma with fracture of zygomatic arch and subdural haemorrhage and rib fracture with associated pleuro-pneumonia.

One *neoplasia* case was investigated, in which a lymphoma was diagnosed.

Two horses were examined following *gastrointestinal disease*; typhlocolitis due to cyathostomin infestation and haemoabdomen following colon surgery were identified.

A single *liver disease* case was reported in which ragwort toxicity was diagnosed.

One *welfare case* was investigated in which severe internal parasitism was identified.

**Home Counties**
*Fifteen cases were reported.*

Nine cases of *gastrointestinal disease* were reported; single cases of colon volvulus, small intestine volvulus, lymphoplasmacytic enteritis and eosinophilic enterocolitis were diagnosed. Two cases of pedunculated lipoma and three cases of grass sickness were also found.

Two *neurological* cases were investigated; in which a cervical vertebral spondylopathy of C6 was confirmed and a case of botulism was suspected.

Two cases of *liver disease* were investigated in which chronic cholangiohepatitis due to fluke infestation and a cholangiohepatitis of unknown origin were diagnosed.

Two *welfare* cases were investigated; single cases of typhlocolitis due to severe cyathostominosis and dental disease were diagnosed.

**Midlands**
*Three cases were reported.*
Two aborted fetuses were examined, in which twins and placentitis were found.

A single case of neonatal death was investigated, in which small colon atresia was found.

**Northern England**
*One case was reported.*

A single gastrointestinal case was investigated in which a perforated colon was found.

**South West**
*Seven cases were examined.*

Five cases of gastrointestinal disease were investigated; two cases of small intestinal volvulus and single cases of gastric ulceration, peritonitis and mild inflammation of the large colon.

A single liver disease case was reported in which an acute and severe hepatic encephalopathy with blindness and laryngeal paralysis was diagnosed.

A single musculoskeletal case was reported in which atypical myopathy was confirmed by histopathology.

**Scotland**
*Thirteen post-mortem examinations were reported.*

One cardiovascular case was investigated in which atrial rupture and haemopericardium was found.

Six gastrointestinal cases were reported. Single cases of gastrosplenic ligament tear with subsequent large colon hernation, mesenteric torsion, right dorsal colon impaction secondary to fibrous adhesions and pelvic flexure impaction. Two cases of grass sickness were also found.

A single case of liver disease was investigated, in which a hepatopathy was determined.

A single musculoskeletal case was examined in which atypical myopathy was diagnosed.

One neoplasia case was reported in which a mesothelioma was diagnosed.

One neurological case was examined in which post-operative myelomalacia was found.

A single case of sepsis was investigated in which suppurative mastitis was diagnosed.

One sudden death case was investigated in which air embolism was found.

**Northern Ireland**
*Five cases were reported.*

Two gastrointestinal cases were reported including cases of epiploic foramen entrapment and typhilitis.

A single neonatal death was investigated in which fracture of the fourth rib and myocardial damage was found.

A single musculoskeletal case was examined in which white muscle disease was diagnosed.

One sudden death case was investigated for which no further information was available.
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 AHVL, 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
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
Oakham Veterinary Hospital
The Donkey Sanctuary
The Royal Veterinary College
Three Counties Equine Hospital
Torrance Diamond Diagnostic Services (TDDS)
University of Edinburgh
University of Glasgow
Valley Equine Hospital

All laboratories contributing to this report operate Quality Assurance schemes, which differ between laboratories. However, all contagious equine metritis (CEM) testing reported was accredited by the Horserace Betting Levy Board (HBLB) with the exception of AHVL, which acts as the reference laboratory. 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:

Animal Health Trust
Lanwades Park, Kentford, Newmarket, Suffolk CB8 7UU
Telephone: 01638 750659  Fax: 01638 555659
Email: equinesurveillance@aht.org.uk  Website: www.aht.org.uk