Regional Six-monthly Report of Descriptive Bovine TB Epidemiology for the Low Risk (Four Yearly Testing) Areas of England

Regional Office:

NW England.

This report contains bovine tuberculosis (TB) information related to the counties of Cumbria (county number 8), Lancashire (21), Greater Manchester (44) and Merseyside (25), all of which make up the low incidence (4-yearly testing) region of the North West of England.

Year-end report for 2017

1. Cattle Industry in the Region

The low risk area of the North West of England is formed by four counties and several Metropolitan district local authorities. From a bovine TB point of view and for simplicity, we have divided the region into three geographical areas.

1.1 The county of Cumbria has approximately about 3,100 cattle herds. There is roughly a similar number of beef and dairy herds. The size of herds is very variable, ranging from smallholdings with one or two animals to large dairy herds with up to 1,000 animals per herd.

Compulsory pre-movement TB testing of cattle from higher risk (annually and six-monthly tested) herds was established as a precautionary measure in March 2006 to mitigate the risk of spreading TB through movements of infected cattle from these areas. In recent years, farmers within the Cumbrian LRA are becoming increasingly aware of the risk of buying cattle from high incidence areas of bovine TB. Thus many herd owners who need to purchase cattle, source them locally via livestock markets.

However, there are cattle dealers who continue to bring animals from the higher risk areas of GB to be sold through markets within the county. Purchasers of these animals are not aware of the origin until after animals have been bought, although they have been pre-movement tested for TB with negative results. Additionally, since April 2016, those animals require a post-movement test too, which has to be completed with negative results between 60 and 120 after arrival on the first destination holding in the LRA. Herds for final finishing tend to be less cautious of the sources of their purchased cattle, as many of these cattle will be slaughtered prior to completion of their post movement test.

There are twelve livestock markets in Cumbria. There is an important trade of cattle from Cumbria into Scotland.

A substantial number of cattle imported from Northern Ireland and the Republic of Ireland come through the county, generally ending on beef finishing/fattening herds. A number of pedigree breeding bulls from Northern Ireland also move onto Cumbrian farms.

Approximately, on average, four to five hundred live cattle movements from other parts of England to Cumbria takes place every month. APHA carry out tracing tests on cattle moved into Cumbria from herds that are found to be infected with bTB after the cattle movement took place.

There are no pre-movement testing Exempt Finishing Units (EFUs) or Licensed Finishing Units (LFUs).

There is one TB isolation unit which will close shortly when the last of the cattle go to slaughter.
There are eleven cattle city farms in Cumbria.

1.2 The county of Lancashire has approximately 1,800 cattle herds. There are a similar number of beef and dairy herds. The size of herds is very variable, ranging from smallholding with 1 or 2 animals to several very large dairy herds with up to 2,800 animals per herd.

The larger dairy herds tend to source their dairy replacements, usually in-calf heifers, from Germany and The Netherlands.

In general terms, most breeding herds do not buy in many animals and replacements are often sourced from local areas or via local livestock markets.

Large intensive beef units try to source cattle locally, but often go further afield into high bTB incidence areas, as cattle prices are cheaper in the high risk (endemic) TB areas.

There is currently one LFU in Lancashire, but no EFUs or TB Isolation Units. There are four livestock markets in Lancashire and 14 city farms in the county.

1.3 The counties of Greater Manchester and Merseyside have a very small population of cattle. Both counties encompass two of the biggest cities of England and their surrounding metropolitan Boroughs. By contrast, the number of equine premises has increased significantly during recent years.

The number of cattle herds in Greater Manchester is approximately 500 and in Merseyside only about 90 cattle herds. Most of the herds are very small holdings, with an average herd size of 30 to 60 animals, with little investment in cattle housing, machinery and equipment. There is an approximately 50-50 split between beef and dairy herds.

There is one large finishing unit in Merseyside which sources animals from high risk areas. Fortunately, this unit is surrounded by urban areas and has no neighbouring cattle farms. Many holdings rarely buy in replacements, as the cattle keepers consider their cattle as non-commercial pet animals.

There are no EFUs, LFUs or TB Isolation Units in Greater Manchester and Merseyside. Likewise, there are no livestock markets in Greater Manchester and Merseyside.

Number of cattle premises by size band in the division at 31 December of the reporting year.

<table>
<thead>
<tr>
<th>Cattle per premises</th>
<th>0</th>
<th>1 - 50</th>
<th>51 - 100</th>
<th>101 - 200</th>
<th>201 - 350</th>
<th>351 - 500</th>
<th>501+</th>
<th>All</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CUMBRIA</strong></td>
<td>08</td>
<td>20</td>
<td>1168</td>
<td>518</td>
<td>611</td>
<td>429</td>
<td>183</td>
<td>150</td>
<td>3079</td>
<td>145</td>
</tr>
<tr>
<td><strong>LANCASHIRE</strong></td>
<td>21</td>
<td>29</td>
<td>845</td>
<td>261</td>
<td>293</td>
<td>203</td>
<td>98</td>
<td>84</td>
<td>1813</td>
<td>128</td>
</tr>
<tr>
<td><strong>MERSEYSDIDE</strong></td>
<td>25</td>
<td>0</td>
<td>33</td>
<td>12</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>59</td>
<td>98</td>
</tr>
<tr>
<td><strong>GREATER MANCHESTER</strong></td>
<td>44</td>
<td>7</td>
<td>306</td>
<td>57</td>
<td>46</td>
<td>18</td>
<td>4</td>
<td>1</td>
<td>439</td>
<td>53</td>
</tr>
</tbody>
</table>
Cattle breed purpose - numbers and percentages at 1 January of the reporting year.

<table>
<thead>
<tr>
<th>County</th>
<th>Beef</th>
<th>Dairy</th>
<th>Dual Breed</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CUMBRIA 08</td>
<td>213076 (47.7%)</td>
<td>220004 (49.2%)</td>
<td>13941 (3.1%)</td>
<td>39 (0.0%)</td>
<td>447060</td>
</tr>
<tr>
<td>LANCASTER 21</td>
<td>75848 (32.7%)</td>
<td>143976 (62.0%)</td>
<td>12426 (5.4%)</td>
<td>5 (0.0%)</td>
<td>232255</td>
</tr>
<tr>
<td>MERSEYSIDE 25</td>
<td>2739 (47.4%)</td>
<td>2890 (50.0%)</td>
<td>153 (2.6%)</td>
<td>0 (0.0%)</td>
<td>5782</td>
</tr>
<tr>
<td>GREATER MANCHESTER</td>
<td>14082 (60.9%)</td>
<td>8471 (36.6%)</td>
<td>548 (2.4%)</td>
<td>21 (0.1%)</td>
<td>23122</td>
</tr>
</tbody>
</table>

Density of cattle and cattle premises at 1 January of the reporting year.

Map - Cattle per square km

Map - Number of premises per 100 square km
2. Geographical Distribution of Bovine TB Breakdowns in the Region

OTFW New
- Introduced^:
  - Spoligotype 9 (2)
  - Spoligotype 17 (2)
  - Spoligotype 25 (1)

Other cases:
- Spoligotype 9 (1)
- Spoligotype 17-2 (1)
- Spoligotype 25 (4)
- Spoligotype 35 (1)
- Badger (3)
- Wild Roe Deer (1)

OTFW Pre
- Pre 2017 Cases (1)

OTFS:
- OTFS 2017
- Edge (Cheshire)
- North West

Cattle holdings / 100km²:
- 0
- 0 - 25
- 25 - 50
- 50 - 75
- 75 - 100
- 100 - 130

^Introduced incidents are isolated cases definitely caused by introductions of infected cattle.

Creator: iMT GIS
Source: Tam
OTFW data as at 18th of April 2018
OTFS data as at 18th of April 2018
CTS Density data at 31st of December 2017
Ref: 20180430_NW_24

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Defra Defra Defra Defra
### 3. Summary of the Regional Headline Cattle TB Statistics

<table>
<thead>
<tr>
<th>Herd-level statistics</th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Total number of cattle herds live on Sam at the end of the reporting period</td>
<td>3476</td>
<td>2125</td>
<td>81</td>
<td>505</td>
</tr>
<tr>
<td>(b) Total number of cattle herds subject to annual TB testing at the end of the reporting period (any reason)</td>
<td>750</td>
<td>290</td>
<td>11</td>
<td>79</td>
</tr>
<tr>
<td>(c) Total number of herd tests carried out in the period</td>
<td>1924</td>
<td>856</td>
<td>30</td>
<td>194</td>
</tr>
<tr>
<td>(d) Total number of OTF cattle herds TB tested during the period for any reason</td>
<td>775</td>
<td>370</td>
<td>22</td>
<td>105</td>
</tr>
<tr>
<td>(e) Total number of OTF cattle herds at the end of the report period (i.e. herds not under any type of TB2 restrictions)</td>
<td>3410</td>
<td>2092</td>
<td>77</td>
<td>490</td>
</tr>
<tr>
<td>(f) Total number of cattle herds that were not under restrictions due to an ongoing TB breakdown at the end of the report period.</td>
<td>3426</td>
<td>2109</td>
<td>79</td>
<td>498</td>
</tr>
<tr>
<td>(g) Total number of new TB breakdowns detected in cattle herds during the report period</td>
<td>33</td>
<td>6</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>• OTF status suspended (OTFS)</td>
<td>21</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>• OTF status withdrawn (OTFW)</td>
<td>12</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>(h) Of the new OTFW herd breakdowns, how many:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• occurred in a holding affected by another OTFW breakdown in the previous three years?</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• could be considered secondary to a primary breakdown based on current evidence?</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• were triggered by skin test reactors or 2xIRs at routine herd tests?</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>• were triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, etc.)?</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>• were first detected through routine slaughterhouse TB surveillance?</td>
<td>2</td>
<td>1*</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>(i) Number of new breakdowns revealed by enhanced TB surveillance (radial testing) conducted around those OTFW herds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• OTFS</td>
<td>8</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>• OTFW</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(j) Number of OTFW herds still open at the end of the period (including any ongoing OTFW breakdowns that began in a previous quarter)</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(k) New confirmed (positive <em>M. bovis</em> culture) incidents in non-bovine species detected during the report period (indicate host species involved)</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(3 x badger 1 x deer)
Animal-level statistics (cattle)

<table>
<thead>
<tr>
<th></th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Total number of cattle tested in the period (animal tests)</td>
<td>261,206</td>
<td>97,081</td>
<td>2,689</td>
<td>8,113</td>
</tr>
<tr>
<td>(b) Reactors detected:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• tuberculin skin test</td>
<td>62</td>
<td>12</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>• additional IFN-gamma blood test reactors (skin-test negative or IR animals)</td>
<td>199</td>
<td>59</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>(c) Reactors per breakdown</td>
<td>8</td>
<td>12</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>(d) Reactors per 1000 animal tests</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>(e) Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>(f) SLH cases (tuberculous carcases) reported by FSA</td>
<td>15</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>(g) SLH cases confirmed by culture of M. bovis</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

* Lancashire Case disclosed in a Northern Ireland slaughterhouse

2016 (for comparison purposes)

<table>
<thead>
<tr>
<th>Herd-level statistics</th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>(l) Total number of cattle herds live on Sam at the end of the reporting period</td>
<td>3598</td>
<td>2169</td>
<td>88</td>
<td>521</td>
</tr>
<tr>
<td>(m) Total number of cattle herds subject to annual TB testing at the end of the reporting period (any reason)</td>
<td>544</td>
<td>214</td>
<td>17</td>
<td>50</td>
</tr>
<tr>
<td>(n) Total number of herd tests carried out in the period</td>
<td>1829</td>
<td>1027</td>
<td>52</td>
<td>344</td>
</tr>
<tr>
<td>(o) Total number of OTF cattle herds TB tested during the period for any reason</td>
<td>866</td>
<td>666</td>
<td>38</td>
<td>297</td>
</tr>
<tr>
<td>(p) Total number of OTF cattle herds at the end of the report period (i.e. herds not under any type of TB2 restrictions)</td>
<td>3571</td>
<td>2148</td>
<td>88</td>
<td>516</td>
</tr>
<tr>
<td>(q) Total number of cattle herds that were not under restrictions due to an ongoing TB breakdown at the end of the report period.</td>
<td>3588</td>
<td>2165</td>
<td>88</td>
<td>520</td>
</tr>
<tr>
<td>(r) Total number of new TB breakdowns detected in cattle herds during the report period</td>
<td>30</td>
<td>17</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>• OTF status suspended (OTFS)</td>
<td>20</td>
<td>15</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>• OTF status withdrawn (OTFW)</td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>(s) Of the new OTFW herd breakdowns, how many:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• occurred in a holding affected by another OTFW breakdown in the previous three years?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• could be considered secondary to a primary breakdown based on current evidence?</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Question</td>
<td>CUMBRIA</td>
<td>LANCASHIRE</td>
<td>MERSEYSIDE</td>
<td>GTR MANCHESTER</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>---------</td>
<td>------------</td>
<td>------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Number of new breakdowns revealed by enhanced TB surveillance (radial testing) conducted around those OTFW herds</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OTFS</td>
<td>14</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>OTFW</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of OTFW herds still open at the end of the period (including any ongoing OTFW breakdowns that began in a previous quarter)</td>
<td>8</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>New confirmed (positive M. bovis culture) incidents in non-bovine species detected during the report period (indicate host species involved)</td>
<td>1 - Pig</td>
<td>0</td>
<td>0</td>
<td>1 - Pig</td>
</tr>
</tbody>
</table>

### Animal-level statistics (cattle)

<table>
<thead>
<tr>
<th>Statistic</th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total number of cattle tested in the period (animal tests)</strong></td>
<td>220005</td>
<td>106757</td>
<td>4083</td>
<td>10180</td>
</tr>
<tr>
<td><strong>Reactors detected:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tuberculin skin test</td>
<td>96</td>
<td>18</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>additional IFN-gamma blood test reactors (skin-test negative or IR animals)</td>
<td>58</td>
<td>31</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Reactors per breakdown</strong></td>
<td>5.13</td>
<td>2.58</td>
<td>1.00</td>
<td>1.67</td>
</tr>
<tr>
<td><strong>Reactors per 1000 animal tests</strong></td>
<td>0.7</td>
<td>0.46</td>
<td>0.24</td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs)</strong></td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>SLH cases (tuberculous carcases) reported by FSA</strong></td>
<td>2</td>
<td>2*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>SLH cases confirmed by culture of M. bovis</strong></td>
<td>2</td>
<td>2*</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

(*) inc one PME by PVS
Density of TB reactors and slaughterhouse cases in TB breakdowns per km²

- Density of skin test reactors, IFN-gamma test reactors and slaughterhouse cases in Officially TB Free Status Withdrawn (OTFW) breakdowns per km² taken in the reporting period
- Density of skin test reactors, IFN-gamma test reactors and slaughterhouse cases in OTFW and Officially TB Free Suspended (OTFS) breakdowns per km² taken in the reporting period

4. Suspected Sources of *M. bovis* Infection for all the New OTFW Breakdowns Identified in the Report Period

<table>
<thead>
<tr>
<th>Most likely origin</th>
<th>Provisional</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction (e.g. purchase) of infected animal(s)</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Local - lateral spread from neighbouring holdings:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• exposure to infected wildlife e.g. badgers</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>• other farmed species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• recrudescence of residual infection from a previous TB breakdown</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• infected human source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetermined/obscure</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Other (explain)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table: Probability of isolated, sporadic ('one-off') breakdown, without secondary local spread from the index case

<table>
<thead>
<tr>
<th>Probability of introduced <em>M. bovis</em> infection introduced via cattle movements</th>
<th>Likely (no secondary breakdowns detected)</th>
<th>Possible (no secondary breakdowns detected, but dataset incomplete)</th>
<th>Not likely (secondary spread from the index case, or exposure to a common wildlife source has occurred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definite</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likely</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Not likely (indigenous infection in the locality)</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

### 5. Overview of the bTB Eradication Programme in the Region

The enhanced TB surveillance (radial testing) regime has been instigated for all new OTFW breakdowns, with very few exceptions applied (always backed up by a veterinary risk assessment of the index case).

Since 2006, cattle in annually tested herds in England and Wales (which includes all herds in the HRA and Edge Area and approximately 10% of herds in the Low Risk Area) must have a skin test with negative results in the 60 days before the are moved to other herds. Cattle moved into any part of England from Ireland or Northern Ireland are post-movement tested. These movement controls were strengthened in April 2016 with the introduction of compulsory post-movement testing cattle entering the Low Risk Area of England from other parts of England and Wales.

Within the HS21 area of East Cumbria (see the map on the penultimate page), alongside the found dead wildlife surveillance and routine radial testing around OTFW cases, in September 2017 additional enhanced cattle testing measures were implemented. These are further detailed in the HS21 section within this report.

Liaison and educational meetings with NFU and local farmers regarding the regional bTB situation and control have been held regularly in Cumbria and in Lancashire.

### 6. Wildlife

There is one active ‘hotspot’ area with found dead wildlife surveillance in force in this region within the reporting period (see the map in the penultimate page):

- **HS-21 Cumbria (as of end April 2018)**
  - Badgers 44 submitted: 3 cultured positive 17.z genotype: 32 cultured negative 9 results pending.
  - Deer 6 submitted: 6 cultured negative.

#### Summary report on a cluster of TB herd breakdowns in East Cumbria caused by infection with genotype 17:z of *M. bovis* (2014-2017)

A cluster of TB herd breakdowns due to infection with *M. bovis* genotype 17:z has emerged to the southeast of Penrith in central eastern Cumbria. The evolution of this cluster has been reported upon in previous field epidemiology reports for the LRA of the Northwest of England and here we provide a summary of the situation as at the end of 2017.

Since September 2016 this localised bTB outbreak has been managed within a defined area known as ‘Hotspot 21’ (HS21). Herds of cattle and certain non-bovine livestock species within this area HS21 have been subjected to exceptional surveillance and control measures over and above the standard response applicable to OTFW breakdowns in the LRA. The additional TB surveillance was also extended to include carcasses of badgers and wild deer found dead (and in the case of deer, also shot) within the designated area.
The index case was detected in November 2014, and further breakdowns have occurred on holdings with cattle herds within the defined area HS21, or holdings within their 3km radial testing zones, since then until the present time. In the three-year period from November 2014 to the end of December 2017, this geographic cluster of bTB included 24 breakdowns on 21 separate cattle holdings (Figure 1):

- 13 of the 21 affected holdings have had at least one OTFW breakdown (i.e. infection confirmed by culture of *M. bovis* and/or evidence of visible lesions indicative of TB at post mortem examination of test reactors).
- All 13 herds with OTFW breakdowns have been infected with genotype 17:z of *M. bovis*.
- Recurrent breakdowns have occurred on three of the 21 affected holdings.
- One breakdown herd, primarily located approximately 20km distant from the HS21 area, had historically grazed cattle on a single field within the HS21 area.

**Figure 1: Temporal distribution of the 24 TB herd breakdowns identified in the East Cumbria cluster between 2014 and 2017.**

In addition to the 24 cattle herd breakdowns within area HS21, APHA has identified three other cattle herd breakdowns due to the same *M. bovis* genotype (17:z) as a result of reported cattle movements out of this area (i.e. spread tracings): one just outside HS21 in Cumbria and two in LRA counties of the North of England (Lancashire and North Yorkshire). In these three cases the infection was contained in the herds of destination with no evidence of secondary spread of bTB to other herds.

**Cattle TB breakdowns in HS21/‘17z’ cluster area during 2017**

- At the commencement of 2017, there were two holdings within this geographic cluster under herd movement restrictions due to an active TB herd breakdown.
- During 2017, ten additional cattle herd breakdowns were identified in the cluster, seven of which were OTFW.
- Three of the breakdowns were initially detected by re-testing of inconclusive reactors (IRs).
- Two of the seven OTFW breakdown herds had previously had OTFW breakdowns during 2016.
- At the end of December 2017, seven holdings remained under TB herd movement restrictions, as a result of active herd bTB breakdowns.
- Of the ten herd breakdowns disclosed during 2017, at the time of reporting (April 2018), seven of them had had only one or two skin test positive reactors disclosed. Parallel gamma interferon testing of these breakdown herds has resulted in additional reactors being culled (up to maximum of sixteen per herd, at the time of reporting).
- One skin test negative bovine, which was positive on interferon gamma testing, was confirmed to have visible lesions indicative of bTB at post mortem examination. The culture results are pending.
- One inconclusive skin test reactor animal, showed visible lesions suggestive of bTB at PME, and was later confirmed to be due to *M. bovis* 17z.

In this NW England LRA 2017 report, the individual OTFW breakdowns are reported elsewhere.
### Table 1: Summary of TB breakdowns related to the East Cumbria cluster (area HS21) that were detected or active during 2017.

<table>
<thead>
<tr>
<th>Breakdown start date</th>
<th>Breakdown end date</th>
<th>Disclosing test type</th>
<th>Number of skin test reactors or SLH cases (as of 17/04/18)</th>
<th>Number of additional IFN-gamma test reactors or DCs removed (as of 17/04/18)</th>
<th>OTF status</th>
<th>M. bovis genotype</th>
<th>M. bovis source assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sep-16</td>
<td>Mar-17</td>
<td>Pre-movement</td>
<td>4</td>
<td>5</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Dec-16</td>
<td>Aug-17</td>
<td>Radial (6-month)</td>
<td>1</td>
<td>1</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Jan-17</td>
<td>n/a</td>
<td>Six-month check test after regaining OTF status</td>
<td>6</td>
<td>16</td>
<td>OTFW</td>
<td>17z</td>
<td>recrudescence/local (previous 16/00978)</td>
</tr>
<tr>
<td>Jan-17</td>
<td>Jul-17</td>
<td>IR at radial test (12-mo.)</td>
<td>1</td>
<td>8</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Feb-17</td>
<td>Oct-17</td>
<td>IR at radial test (12-mo.)</td>
<td>2</td>
<td>6</td>
<td>OTFS</td>
<td>n/a</td>
<td>local/unknown</td>
</tr>
<tr>
<td>Sep-17</td>
<td>Nov-17</td>
<td>Post-movement test</td>
<td>1</td>
<td>n/a</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Nov-17</td>
<td>Apr-18</td>
<td>Enhanced surveillance (6-mo.) test in HS21</td>
<td>1</td>
<td>0</td>
<td>OTFS</td>
<td>17z</td>
<td>local/unknown</td>
</tr>
<tr>
<td>Nov-17</td>
<td>n/a</td>
<td>Routine herd testing</td>
<td>3</td>
<td>6</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Nov-17</td>
<td>n/a</td>
<td>Enhanced surveillance (6-mo.) test in HS21</td>
<td>2</td>
<td>13</td>
<td>OTFS</td>
<td>n/a</td>
<td>unknown</td>
</tr>
<tr>
<td>Nov-17</td>
<td>n/a</td>
<td>Enhanced surveillance (6-mo.) test in HS21</td>
<td>4</td>
<td>2</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
<tr>
<td>Nov-17</td>
<td>n/a</td>
<td>Enhanced surveillance (6-mo.) test in HS21</td>
<td>1</td>
<td>5</td>
<td>OTFW</td>
<td>17z</td>
<td>recrudescence/local (previous 16/01300)</td>
</tr>
<tr>
<td>Sep-17</td>
<td>n/a</td>
<td>IR at pre-movement test</td>
<td>1</td>
<td>0</td>
<td>OTFW</td>
<td>17z</td>
<td>local</td>
</tr>
</tbody>
</table>

### Wildlife surveillance in HS21

In September 2016, an ad-hoc TB survey of ‘found-dead’ badgers and wild deer was rolled out across the affected area (HS21). In June and July 2017, three badger carcases that had been collected from the central area within HS21 and submitted to APHA earlier in the year, were reported as culture positive for *M. bovis*. The isolates were all subsequently confirmed as genotype 17:z.

### Table 2: Results of carcase submissions from area HS21 up to 31 December 2017.

<table>
<thead>
<tr>
<th>M. bovis culture</th>
<th>Badgers</th>
<th>Deer</th>
</tr>
</thead>
<tbody>
<tr>
<td>positive</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>negative</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>pending</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>35</strong></td>
<td><strong>6</strong></td>
</tr>
</tbody>
</table>
In September 2017 the HS21 area was extended on the western side following a re-assessment of the OTFW cases within the cluster. – see map below.

**Figure 2: Map showing the original and Sept 2017 revised boundaries of HS21.**

Molecular epidemiology of the TB cluster in HS21

The strain of *M. bovis* responsible for this bTB cluster, genotype 17:z, had not previously been identified in GB cattle herds, but it is frequently found in Northern Ireland (NI). Current evidence suggests it most likely that an undetected infected bovine from NI brought this strain of *M. bovis* to GB and then, either that animal itself or a subsequently infected animal, caused the infection in badgers within the HS21. It remains uncertain as to whether the local badgers were infected before or after the first (index) case detected in the area. It would appear less likely that infected badgers were relocated to this area from Northern Ireland.

The novel genotype in this cluster provides clear evidence that local spread of TB is occurring to both cattle and badgers within this part of the LRA. There has been onward spread of TB to other farms inside and outside of HS21 as a result of cattle movements, and amplification of infection within some herds. However, for a number of herds the transmission pathway is far from clear and acquisition of infection from wildlife (badgers) is a plausible risk pathway.

Whole genome sequencing (WGS), has been applied to the cattle isolates from this cluster and this analysis reveals a cluster of seven differing, but very closely related *M. bovis* isolates. The WGS of the isolate from the index cattle case is the earliest common ancestor to all the detected cattle cases, and is identical to an isolate detected within Northern Ireland, indicating that it is highly likely this is the exact strain of *M. bovis* which was imported from Northern Ireland.

One of the badger isolate (2017) WGS matches the ancestral WGS isolate from the index cattle case (2014). On the assumption that it was most likely a bovine which carried the *M. bovis* 17z into Cumbria, this would appear to confirm that *M. bovis* has been transmitted from cattle to badgers within HS21. Despite extensive and frequent cattle herd testing across the area, this ancestral WGS of *M. bovis* 17z was not detected again in cattle cases from 2014 until 2017, when several isolates were detected in spatially close grazed cattle herds. The epidemiology suggests it highly likely that these specific cattle herd infections occurred either directly or indirectly from infected badgers to cattle at this location. The sequences of the remaining two badger isolates do not identically match those from any cattle cases.
The presence of infection in badgers indicates that they are a potential source of infection for the local cattle herds and represent a risk of bTB persistence in this area. Local stakeholder engagement has taken place, and APHA processes reviewed, in an attempt to increase the number of badger and wild deer carcases examined within this area. As a result of these activities, the number of badger carcases reported and tested rose from seven in the first six months of 2017 to an additional 28 in the latter six months of the year.

The weight of evidence suggests that a novel genotype of *M. bovis* is becoming established in this area as a result of an initial introduction by infected cattle, followed by onward transmission of *M. bovis* infection amongst cattle and wildlife.

**Additional bTB controls rolled out in HS21 during 2017**

Since September 2017, additional surveillance and breakdown control measures have been implemented across area HS21 to increase the detection of infection at an early stage. The enhanced control measures are:

1. Six monthly whole-herd check testing of all cattle herds, with consequential pre-movement testing of all cattle over 42 days moving out of these herds.
2. When IRs alone are detected in an unrestricted herd, the herd is placed under movement restrictions (OTF status suspended) pending the 60-day IR retest.
3. Discretionary parallel interferon-gamma testing of OTFS breakdown herds, in addition to the mandatory blood testing of all the OTFW herds.
4. Severe interpretation of skin tests for both OTFW and OTFS breakdown herds.
5. Samples from all cattle with visible lesions of TB at post mortem to be submitted for culture and genotyping.
6. Ad hoc surveillance of camelid (skin testing followed by serology) and goat (skin testing only) herds.

One alpaca within a herd at the periphery of HS21 gave a positive result to a TB antibody test. The animal presented with suspicious lesions of TB at post-mortem examination, and *M. bovis* genotype 17a was subsequently cultured (i.e. not the local genotype 17z). The field epidemiology assessment concluded that it most likely this alpaca had picked up this infection during its earlier life within the HRA of England. A further reactor has since been removed from this herd, with culture results pending.

The size and persistence of this cluster of *M. bovis* 17:z cases in cattle, despite the intensive TB control measures implemented, is unprecedented in the LRA. A badger sett survey has been conducted across the HS21 to enable estimations of the badger population and sett density. Results from this survey are being assessed together with the surveillance results from all species and will be used to make recommendations for the most appropriate disease control intervention methods for cattle and badgers in this area going forwards.

Between February and April 2018, Defra ran a public consultation on proposals to permit licensed badger control within the LRA to help eradicate any emerging hotspots of infection in cattle herds found to be epidemiologically linked to *M. bovis* infection in badgers. The responses to this consultation are now being analysed and Defra are likely to publish a summary by the end of May 2018.

**7. Other Susceptible Species**

One alpaca herd located in HS-21 had a confirmed TB incident caused by infection with *M. bovis* (genotype 17:a) following ad hoc skin and antibody parallel check testing. The animal was born in Somerset where 17:a is a common genotype amongst cattle breakdowns. After leaving Somerset, it resided in South Yorks. before moving over to Cumbria. South Yorks. has no genotype 17:a to date, so it is very likely that infection was acquired in Somerset.

One wild roe deer that was shot near to Killington, South Cumbria in February 2017, was confirmed positive for *M. bovis* spoligotype 10 (see map in section 2). There have been no historic cattle TB breakdowns with this spoligotype in the vicinity which does have beef herds. The roe deer population is being actively managed in this area to reduce numbers and this was the only animal to show lesions of TB from over 20 animals culled.

A check test of all the cattle herds in the vicinity of the tuberculous deer carcase (i.e. herds located within 3km of the deer cull location) has taken place during the winter housing period. All 33 herds identified as eligible for testing have been tested at the time of writing. Two herds in this area currently have their OTF status suspended due to the disclosure of single NVL reactor in each.
8. Individual summaries of new OTFW breakdowns detected in the region during the report period and ongoing breakdowns from previous years still open at the end of the report period, grouped by county

8.1 Cumbria

The following OTFW case from the previous report was still open during this reporting period:

Aspatria, WIGTON, CA7

This is a family run dairy and beef enterprise undergoing its first breakdown. The premises falls into the radial zones for two other breakdowns ref 16/01787 (21:a) and ref 16/02430 (9:d).

It is not a closed herd, including several purchases from Netherlands and Northern Ireland (NI) recently.

Several grazing areas are utilised under the same CPH. However, fencing is good with no nose to nose contact with neighbouring cattle possible according to the owner. In addition, approximately 50 beef animals graze annually at a common, Newton Marsh.

OTF herd status was withdrawn due to the positive culture from a homebred SLH case. The animal was born in 2011 and was a dairy animal. She never went to Newton Marsh. She was tested clear in the radial test on 11/7/2016 before being reported as suspect SLH case on 28/10/2016, with suspect lesions in both the retropharyngeal and bronchomediastinal lymph nodes.

Culture was confirmed as *M. bovis* with resultant genotype 9:d.

The origin of infection remains obscure.

The first SIT undertaken in Jan 2017 revealed one inconclusive reactor which retested clear. A further suspect SLH originating from the dairy herd was culture negative.

However, the next SIT in March revealed three reactors, one of which was VL and the parallel gamma test revealed 32 reactors, one with VL (not the VL skin reactor).

The next SIT in June revealed five reactors (3 with VLs) and two IRs. The subsequent SIT in October 2017 revealed one skin reactor with VL and the parallel interferon-gamma test, a further 53 positive animals, one of which was VL.

A radial regime has been instigated with no other additional breakdowns disclosed as a result to date.

Update – April 2018: A gamma test in January 2018 revealed eight NVL positives and the SIT was clear. Following a 2nd clear SIT in March 2018, the herd regained its OTF status

In the period from 1st January 2017 – 31st Dec 2017, there were 12 new OTFW breakdowns in Cumbria.

8.1.2 Askham PENRITH CA10

This is a family run, traditional beef breeding and fattening enterprise. Additional cattle are purchased from local markets and occasionally directly from neighbouring farms.

This premises had an OTFW breakdown (Ref 16/00978) in March 2016, which was attributed then to likely purchased origin. It is located within the hotspot area of East Cumbria (HS21, see above). The infection last year was found in the fattening herd and was due to genotype 17.z. OTF status was regained on 15 July 2016.

At the 6M test undertaken in January 2017 one reactor was disclosed with VL and an IR which was NVL. This reactor was on farm last year and had tested clear during the breakdown testing. The same genotype has been confirmed as was disclosed last year 17.z.

Subsequent testing revealed one skin test reactor, NVL and three separate interferon gamma test positives, all NVL. The next SIT in July was clear, but the following SIT in October 2017 revealed 2 further standard reactors – both NVL.

Update – April 2018: The SIT was clear, but 17 NVL gamma reactors were identified. The next SIT is due May 2018.
Following this latest breakdown, a radial testing regime has been instigated to capture any remaining farms not included in other radial regimes, with no breakdowns disclosed to date.

The origin of this incident is possibly residual cattle infection in the herd, or re-introduction from a local wildlife source at grazing land within the HS21.

8.1.3 Torpenhow, Wigton CA7

This is a new dairy herd established from September 2016 comprising cattle sourced from various farms in Republic of Ireland (ROI). OTF status was withdrawn following a confirmed SLH case on 19 January 2017. Genotype 9.k.

The SLH case was a cow born in 2011, imported along with 12 others from the same premises, from ROI on the 17/09/2016. She grazed for several weeks after arrival and then was housed. She was included in the post import TB test of all the imported cattle performed by APHA on 3rd January 2017. This test was negative.

The first SIT in April 2017 was negative. 11 gamma positive animals were disclosed which were all NVL on PME. The second SIT in July 2017 was also negative and OTF herd status was restored.

6M post-breakdown test in December 2017 was clear.

A radial testing regime has been instigated and has not revealed other reactor herds to date.

Origin of infection is deemed to have been the introduction of cattle purchased from Ireland.

8.1.4 Gosforth, CA20

This is a beef suckler/fattening herd comprising 450 cattle. The cattle are housed in two locations. However, both locations are run as one unit with cattle, machinery, etc. moving between both on a frequent basis. There is no previous history of TB on this farm. There have been some purchases of cattle onto Silverhow, from the HRA as well as locally.

OTF status was withdrawn following a culture-positive slaughterhouse case disclosed on 25 January 2017. The animal was born in March 2010 and was purchased in July 2015 having spent the previous five years on a farm near Crewe, Cheshire, which has a clear TB history to date. The animal herself had tested clear in 2013, 2014 and 2015 whilst on her natal farm before sale.

The genotype has been confirmed as 25:a, the predominant strain of *M. bovis* in Cheshire. The first SIT performed in March 2017 was clear. The second SIT in June 2017 disclosed 3 IRs, which have since retested clear and 7 gamma reactors, all of which were NVL on PME. OTFS was restored flowing the clear SIT in October.

The origin of infection is probably purchased as the farm of origin is located within the same homereange of genotype 25:a and HRA purchases have been recorded. However, the farm of origin has a clear TB history to date (last WHT April 2017) so a definite source infection from there cannot be established.

A radial testing regime has been instigated which has disclosed one OTFS breakdown (now resolved) to date.

8.1.5 Penrith CA10

This is an organic dairy farm comprising 370 animals. There is also a very small pedigree suckler herd kept on site. Sheep are overwintered. This farm is located within the HS21 hotspot area of East Cumbria and had a clear TB history to date. Animals are mostly homebred.

OTF status was withdrawn following disclosure of a homebred VL skin test reactor at the Radial 12 test in January 2017. Greystone is located within the radial testing regime for 14/04865. Positive culture was obtained and genotype 17.z confirmed.

The first SIT in March 2017 gave negative results and the parallel gamma test revealed seven reactors, all NVL on PME. The second SIT disclosed a further IR which was voluntarily slaughtered and was culture negative. Following agreement from the veterinary advisor, OTF herd status was restored at this point.

The subsequent check test carried out in October 2017 (six-months after restoration of OTF status) was clear.
Origin of infection is obscure and most likely from infected wildlife at this location. Several of the farm workers keep stock at home but stated that they do change protective clothing between premises. Also it was noted that the same silage contractor is used as at breakdown Ref 16/00382, which had the same genotype of *M. bovis* (17.z).

8.1.6 Inglewood Edge, Dalston CA5

This is a small beef suckler herd with a clear TB history located in a 48 month testing area.

OTF status was withdrawn following disclosure of a VL reactor at the four-yearly routine herd test in March 2017. Culture from the reactor was positive with genotype 9:c identified.

The reactor, a cow, was born on 26/04/2010. She was amongst 20 animals purchased from the natal herd in Hereford and Worcestershire (High Risk Area) on 21/05/2012. Following the sale at the end of 2012, there was a severe breakdown in this source herd with in excess of 50 VL reactors disclosed. Genotype at the natal herd in Hereford-Worcestershire was confirmed as 9.c.

A tracing test was undertaken at Inglewood Edge in January 2013, following the natal herd breakdown, which all the purchased animals passed. The routine test was also undertaken at this time and was clear.

The first SIT performed in June 2017 disclosed 1 NVL reactor, culture negative. The parallel gamma test and the next SIT in August 2017 were both clear.

OTFS was restored following the clear SIT in November.

A radial testing regime has been instigated and has not revealed other reactor herds to date.

The most likely origin of this breakdown is the purchase of infected cattle from a herd in the High Risk Area of England, as the genotypes from the natal herd breakdown and this one match (9.c). The cow would appear to have given a false negative skin test result 8 months after movement from the source infected holding.

8.1.7 Penrith CA11

This is a dairy and suckler herd run over two separate holdings. The dairy herd and young calves are kept at the main holding. The older cows and beef stock are kept at at another location which is grazing only and is used for growing heifers and store cattle.

This is the first TB breakdown at Greenhill Head. It is essentially a closed herd with only one stock bull purchased in recent years. There is no contact with neighbouring herds. Farm workers do not keep stock at home or work on other livestock premises.

The farm is currently located in the radial testing regime for Ref 14/04743.

The initial radial test and radial 6 month test performed in June 2015 and Jan 2016 were both clear. At the radial 12 test in March 2017, an IR was disclosed which on retest in May 2017 became a VL reactor. Culture was positive and genotype 9.d confirmed.

This reactor was homebred and had tested clear at these previous radial tests.

The first SIT in July 2017 disclosed three reactors - all NVL and 4 IRs. The parallel gamma test revealed six positives – all NVL. (No correlation between the skin reactions and the gamma test positives). The next SIT is pending.

The origin of this breakdown is obscure at this time. The genotype disclosed at Greenhill Head (9.d) does not match that of the index case that triggered the radial surveillance testing (Ref 14/04743), which was 9.a. There have been no other 9.d breakdowns in this area of Cumbria.

A radial testing regime has been instigated which to date has disclosed three OTFS breakdowns and one OTFW breakdown (Ref 17/3173 – see below)

8.1.8 Little Salkeld, Penrith CA10
This is a family run dairy herd with, in addition, some contract rearing of heifers. Heifers are sourced from local farms mainly or elsewhere in LRA and grazed during the summer, running with a bull and then returned home in the autumn. The incoming contract reared cattle are not grazed in the same fields as the resident cattle. In addition some fatstock are reared during the summer for other farmers but again, these animals are not in direct contact with the resident cattle. In addition to the main farm premises, there is summer grazing land at Daleraven, approximately 2.5 km to the east.

This premises is in the radial testing area for Ref 17/2083 above (genotype 9.d). Prior to that it was in radial regime for Ref 15/01233 (genotype 25.a)

This is the first breakdown in this herd. OTF status was lost due to a single VL reactor disclosed at the radial test in August 2017. The R was homebred and born in February 2016 and had tested clear at a radial 12 test in December 2016. Culture was positive with spoligotype 35 confirmed, genotype pending.

The first SIT in October 2017 was clear, but the parallel gamma test revealed eight positive animals, all of which were NVL on PME. The second SIT was clear in December 2017 and the OTF status of the herd was restored.

During her first grazing season in 2016, the singleton skin test reactor grazed at Daleraven before being wintered inside at Long Meg. During the 2017 grazing period, she grazed in all the fields at Long Meg.

There is reportedly no contiguous contact with neighbouring herds, sharing of staff or equipment. Badgers and wild deer are commonly seen within close proximity to Long Meg but not at Daleraven.

Origin of infection at this time is obscure, the spoligotype is different from recent breakdowns in the area.

8.1.9 Little Strickland, Penrith CA10

This premises operates as a finishing unit with store cattle purchased in the spring and fattened through to slaughterweight by the autumn. In 2017 virtually all cattle were sourced from Wales, but historically they were sourced from both Cumbria and Wales.

In addition, a collection centre is operated for sheep and calves from a dedicated building on the premises. There is no contact with the resident cattle.

This is the first TB breakdown on this farm. OTF status was lost following the disclosure of a VL reactor disclosed at a post movement test on 2nd September 2017. This reactor was one of five purchased at the same time from the same natal farm in Abergele, Conwy (North Wales) on 22 April 2017. The reactor was born in August 2015 and had tested clear on two previous occasions in March 2016 and March 2017. The natal herd has a clear TB history to date. The other four animals purchased and remaining with the reactor were tested clear on postmovement. Since its purchase the reactor animal had grazed out continuously.

According to the owner, there is no sharing of personnel or equipment etc with other holdings. There have been multiple linked holdings used in the past for cattle, both within and outwith Cumbria, which may have returned to the farm.

The genotype has been confirmed as 17.z and this herd is located with HS-21. This genotype, confirmed by subsequent whole genome sequencing, indicates that infection was picked up locally within Cumbria. It appears that the animal contracted the infection either directly or indirectly from infected wildlife during the four months at grazing since purchase.

8.1.10 St John in the Vale, Keswick CA12

This premises operates as a suckler cow unit with approximately 60 cows with calves at foot and 20 store bulls. This herd lost its OTF status in November 2017 when a RHT disclosed 2 reactors and 2 inconclusive reactors.

The herd is described as virtually closed with very limited purchases. Animals are sourced from the LRA and purchased usually from market. Any animals not retained for future breeding are sold as stores.

Following disclosure of visable lesions in three of the animals at slaughter, another animal was slaughtered as a dangerous contact. Culture was positive, and genotype 17.z confirmed.

A check test of the remaining animals in the herd was undertaken in December 2017 and was clear. A gamma test undertaken in January 2018 has revealed five NVL positives.
Update April 2018 – The SIT undertaken in February 2018 was clear with the next SIT due from Mid April 2018.

The cattle graze out during the summer mainly in the fields around the farmstead. In recent years, the herd has used multiple linked summer grazing premises across Cumbria. At the end of summer the cattle would return home. No breakdowns have been disclosed at these holdings, but one of the locations is within the HS21 and contiguous to a previous OTFW breakdown (2015). The farmer reports that he last used this grazing land for cattle during summer 2014.

There have been movements onto the farm of which one is from a OTF premises within the HS-21 in May 2015 and another from Ireland in February 2015.

The genotype 17z and its whole genome sequence are identical to the breakdown on the contiguous holding within the HS21, supporting that the most likely source of infection to the cattle occurred at that location, either from locally infected cattle or wildlife. However, this would imply that the *M. bovis* genotype 17z was present at this location as early as the summer of 2014.

### 8.1.11 Penrith CA10

This is a beef breeding and fattening herd. Purchases are sourced from local markets and farms and any surplus stock sold locally as stores.

This herd is located in the HS-21 area and is undergoing its first TB breakdown. OTF status was lost due to the disclosure of 2 reactors at the check test undertaken in November 2017. VLs were seen in one of the reactors and positive culture obtained, genotype 17.z.

Update April 2018 – The SIT in January disclosed 2 x NVL reactor. The gamma test disclosed two different NVL positive animals. The next SIT is due in April 2018.

One of the reactors was homebred, born in July 2012 had tested clear on three previous occasions : RHT in February 2014, A radial test in April 2016 and a radial 6 test in November 2016.

The other reactor had been purchased in July 2016. She had been born in Northumberland in October 2014, (clear TB history) and had been sold when still a very young calf. She was tested clear at a radial in November 2015 before moving to the the farm the following summer.

There is no reported sharing of personnel or equipment etc from the farm.

Origin of infection is most likely directly or indirectly from infected wildlife or infected cattle at grazing land within the HS21 distant to the main farmstead. The premises is located close to other OTFW herds. There is nose to nose contact with neighbouring cattle on two premises. One of these premises, is currently OTFS2 having disclosed a NVL reactor with subsequent negative culture. This contiguous farm is itself also contiguous to three currently OTFW herds.

There are common sightings of wildlife and badgers have been seen in the grazing fields with at least one sett located within the farmland.

### 8.1.12 Newby Penrith CA10

A family run dairy farm which also purchases and store animals from local sources.

This premises is located in the HS-21 area and is OTFW for the second time. (previously, Ref 16/01300, VL reactor culture negative but with a positive 17z tracing from this breakdown).

OTF status was lost in November 2017 at a check test when one homebred reactor (DOB April 2015) was disclosed which subsequently had VLs on PME and was culture positive, genotype 17.z.

Update April 2018 – SIT in Jan 2018 was clear but parallel gamma test revealed five positives, one of which was VL.

The next SIT in April 2018 was clear.
The cattle graze out during the season on land close by Longlands. In addition there is a some rented land in Little Strickland which is used as additional grazing. This piece of land was in fact grazed by the reactor during the summer of 2017 and also for a short time the previous year in 2016.

Whole genome sequencing indicates that this new breakdown was more likely to have been a local reintroduction of infection, rather than a recrudescence of previous uncleared herd infection.

8.1.13 Morland, Penrith CA10

This is a very small fattening herd containing approximately 40 animals in total. Stores are purchased from local farms and markets and taken through to slaughter weight.

This premises is also located in the HS-21 area and is undergoing it’s first TB breakdown. OTF status was lost due a VL reactor disclosed at it’s IR retest in November 2017. Culture for M.bovis was positive and genotype confirmed as 17.z. The reactor animal was born in Castle Douglas, Scotland in August 2015 and sold to Mr Dinsdale’s son in November 2015. After spending a month of the son’s farm it moved to Highfield in December 2015. The natal farm has a clear TB history as does the son’s premises which is no longer used for cattle.

During the 2016 and 2017 grazing seasons the reactor grazed in the fields surrounding Highfield.

The source of infection to this herd has been assessed as local, most likely directly or indirectly from infected wildlife within HS21.

8.2 Lancashire

The following OTFW case from the previous report was still open during this reporting period:

8.2.1 Preston PR5

This is a family run pedigree dairy herd comprising 400 cattle and tested for TB every four years. It has been a closed herd for the past 16 years. There are no linked holdings but for the first time in 2016, an area of grazing land for his heifers was taken at a further holding located about 10 miles away. This grazing area has had no TB breakdowns according to our records.

The farm has had a clear TB history to date. No equipment/personnel are shared with other premises.

The adult cattle are continually housed after calving, only the heifers/ store calves graze out. There is very limited contact with any neighbouring cattle.

OTS status was withdrawn due to a positive culture SLH case disclosed originally on 02/12/2016. This animal was born in August 2011 and would have been housed after calving in October 2013. Genotype 17.a was isolated from the infected animal.

When this animal was disclosed, the owners initially disputed its origin from their premises, but it was proved to be their animal after DNA investigation as both the dam and two daughters remain on farm.

In January 2017, a check test of the herd revealed three IRs, which after re-interpretation were taken as reactors at the end of January 2017. Two of these reactors had VLs on PME.

The first SIT and parallel gamma test in April 2017 revealed one reactor with visible lesions on PM examination and 12 gamma test positives with no visible lesions of TB. The next SIT in July 2017 gave negative results. The subsequent SIT in September was clear and the herd regained its OTF status.

A radial testing regime was instigated around this farm and has not identified any reactor herds to date surrounding Green Lane Farm. The radial was also instigated from the 2016 area of grazing land and to date has disclosed two OTFS breakdowns, one of which resolved in July 2017. The second OTFS breakdown, resulted from a NVL reactor at the radial 6 test in November 2017. Culture was negative and following the clear SIT in Jan 2018, this herd has regained it’s OTF status.

Origin of infection is obscure: The herd has been closed for 16 years and is an area with no TB history. There is, however, a very large fattening herd located close by housed/grazed on several holdings which buys in from all over the country. There is no direct contact with this herd. During the radial testing to date, this fattening herd has been
tested clear and submits 200-300 animals on a monthly basis for slaughter with no abnormalities ever having been reported.

Update April 2018 – 6m test clear

In the period 1 January 2017 – 31 December 2017, there were three new OTFW breakdowns in Lancashire:

8.2.2 Lancaster LA2

This is a medium sized family run dairy farm. The farm had a clear TB history to date. Most of the animals in the 150 head herd are homebred with purchases having been bought only from neighbouring farms.

OTF status was withdrawn following disclosure of a reactor with visible lesions of TB at the routine herd test in March 2017. The reactor was homebred and born in June 2010. She had been tested clear at the previous routine herd test in March 2013. On PME she showed extensive lung lesions. Culture was positive and genotype 25.a isolated.

The first SIT undertaken in May 2017 was negative and the parallel gamma test revealed one positive animal, which was NVL on PM examination. The second SIT in August was also negative. The herd regained OTF status in September 2017 after some herd discrepancies were resolved.

A radial test undertaken on the herd in October 2017 was clear.

A radial testing regime has been established. This has disclosed to date one further OTFW premises with the same genotype 25.a Ref 17/02299 (see later)

Origin of infection is obscure. There have been breakdowns attributed to 25.a in the area in 2013/14 (nearest premises ~ 7km distant) but no direct contact can be established with the premises concerned.

Wildlife are not abundant in this area, the occasional deer is seen.

Preston BB7

This is a very large flying dairy herd comprising 2700 cows. Cattle are sourced exclusively from the EU (Denmark, Netherlands and Germany). No cattle have been purchased from the UK since 2012. The cattle are zero grazed. There is a contract with ABP to take all the calves at 2-3 weeks of age for further rearing. There are no youngsters or followers on farm.

The farm has had a clear TB history to date and is located in a 48 month testing area with no disease history in the vicinity.

Cattle do not graze out at all - silage is cut and brought into the sheds. Sheep are overwintered on these fields but return home to lamb. The sheds are not wildlife proof but there are no sightings of badgers in the area nor any knowledge of setts in the vicinity. Deer of unknown species have been sighted, but never seen around the buildings. Approximately 25 permanent employees work at Withgill. There is no sharing of personnel or equipment with other premises.

Silage when needed is purchased locally with straw sourced from Doncaster area. The only other animals at Withgill are several domestic cats that have no contact with the cattle

No contiguous premises as cattle do not graze out at all. No contact is possible with neighbouring herds.

A check test was undertaken in early 2016 as a result of a source tracing from a confirmed breakdown in the HRA (Shropshire). The animal in question had moved from Withgill when two weeks old in August 2015.

The genotype on this farm was confirmed as 25.a and its source was attributed to be most likely from wildlife and not from the origin farm.

This source check test resulted in 2 IRs being disclosed which were then resolved on retest. One of the IRs was the suspect SLH case that was confirmed positive and resulted on OTF status being withdrawn.

The SLH case, DOB 13/4/2011, was purchased directly from Germany on 29/05/2013. As detailed above, this cow was an IR in the CT in Jan 2016 but passed her retest. On slaughter in Northern Ireland on 27 January 2017, lesions were found in the bronchial and mediastinal lymph nodes and a positive culture obtained.
The spoligotype was SB0129 which equates to our genotype 25:a.

There are other animals remaining on farm from this DE origin herd which have subsequently tested clear.

First SIT was undertaken w/c 1 May 2017, which has disclosed five IRs of which three were re-interpreted as Rs on severe interpretation. Post-mortem examination results were NVL for the three re-interpreted reactors.

June/July 2017 – the parallel gamma test revealed a total of 37 positives - all NVL on PME. Two gamma reactors were cultured with a negative result.

In addition, since disclosure, approximately 120 pre-movement tests have been undertaken on calves licenced out for rearing- all with negative results to date.

The subsequent SIT in September/October was clear and the herd regained its OTF status.

Update April 2018 - 6m test clear.

The origin of this breakdown is likely to have been undisclosed introduced infection from a purchased source.

A radial regime was not instigated from this premises as the reactor was purchased and continually housed since that purchase. The herd is zero grazed. The surrounding fields are used for sheep grazing in the winter and silage production in the summer. No wildlife has been reported in the vicinity of the farm or cattle/ feed buildings.

Quernmore, Lancashire LA2

Originally a dairy farm, it is now run as a small suckler unit with approximately 45 cows with calves at foot. No stock bulls kept, AI used from Genus at Garstang. In addition, 300 breeding ewes are kept with replacement ewes purchased. Standard worming and vaccination policy. Family run with no external workers. The owners work involves visiting other farms to discuss slurry/land management etc. Biosecurity protocol involves using different protective clothing from that used at the premises.

Also houses heifers from another location every winter from Oct to late April. These are kept in the same building/airspace as the suckler herd.

That location has a clear TB history to date and had a clear radial test in June 2017 with its Radial 6 test due imminently. In addition he has had clear pre-movment tests undertaken since entering the radial regime.

Single premises with no BCMS/TLA links. Two mapped areas of land. Cattle tend to be kept on the land surrounding Low Moor with sheep and grass silage from the other land about 3km distant to the south east.

No reported sightings or knowledge of badgers in the area. This farm is on the moor land so the ground would not be ideal badger habitat (rocky ground and very open). If badgers were present then contact would be possible as there is no wildlife proofing of housing or pasture. No shared workers or equipment. Occasional sightings of deer in the vicinity. Slurry is spread only on their own land.

This is the farm’s second TB breakdown, the first being OTFS in January 2009.

In this second breakdown, OTF status was withdrawn following disclosure of a single reactor in the initial radial test on 6 June 2017. The reactor was homebred and born in June 2013. She had passed the RHT in March 2017. PME was NVL, however a positive culture was obtained and genotype 25:a confirmed. This is the same genotype to Ref 17/01070 ( see above ). The farms are very close neighbours but not truly contiguous as the grazing land is separated by a road bordered on both sides by good sheep fencing. Both farmers have stated that no nose to nose contact is possible between their herds and no straying of cattle or sharing of tracks etc.

The first SIT in August was clear and the gamma test undertaken in October 2017 disclosed eight positive animals, dispersed through the herd age group. Of these 6 were NVL, with the remaining 2 being sent to a knacker’s yard where PME was not possible. The 2nd SIT was clear and OTF status restored in November 2017.

Investigation into the origin of infection is ongoing. There have been historic breakdowns attributed to 25:a in the area in 2013/14 (nearest premises ~ 5 km distant), but no direct contact can be established with the premises concerned.
8.3 Merseyside

In the period 1 January 2017 – 30 June 2017, there were two OTFW breakdowns, both of which due to introductions of undetected infected cattle from higher TB risk areas of GB:

St Helens Merseyside WA11

This is a very small fattening herd of 27 animals. Store animals are purchased from 12m of age and fattened slowly to finishing weight on waste vegetables. They are housed for this entire period. Cattle are purchased from various markets and sourced regularly from the HRA. Finished cattle are sent direct to slaughter.

The farm is not subject to RHT as it is a fattening unit and this is the first time OTF status has been lost.

OTF herd status was withdrawn due to a positive SLH case disclosed in March 2017, which had been purchased 12 months previously along with eight other animals from the same herd in Flintshire, Northeast Wales.

Genotype has been confirmed as 17.a.

All previous farms where the SLH case had been have clear TB histories to date and the SLH case itself had tested with negative results in July 2015, November 2015 and February 2016 prior to moving onto this current holding.

Following disclosure, the first SIT in May, five Rs were disclosed, 4 of which were VL. The parallel gamma test revealed eight positives. Four of these gamma Rs were also the four skin reactors with VLs.

Following a VRA, it was agreed that the remaining animals would be taken as dangerous contacts (stamping out). These animals were all NVL on PME.

The cattle shed was cleansed and disinfected under APHA supervision and the manure removed and stacked to heat. Restrictions were lifted in September 2017 once the required time has elapsed following this.

The farm is situated in an urban area with no other livestock in the vicinity. There is little wildlife to be seen in the area.

Origin of infection is likely to have been purchased and may be historical. As an animal reached slaughter weight so another young store animal would be purchased to replace it. Many of these cattle would have been purchased from HRAs.

A top layer of manure would be scraped out from the pens inside the shed as necessary and then sold to local vegetable growers with little if any disinfection between groups.

A radial regime was instigated but has disclosed no further breakdowns to date (very few cattle in the vicinity)

The farm was restocked and a postmovement test of the 20 animals brought on was clear in Dec 2017.

Warrington WA12

This is a very small calf rearing enterprise with an average of 25 animals present. Calves are purchased at 3-4 weeks of age, fattened and then sent direct to slaughter when finished.

Animals are purchased from Beeston Market and are sourced from the Edge and HRAs. There is no routine surveillance testing undertaken at this farm which had a negative SLH case in May 2015.

OTF herd status was withdrawn following the disclosure of a reactor at a post movement test in June 2017. The animal was purchased in February 2017 from a farm in Cheshire via Beeston market when three weeks of age. Visible lesions were seen on post-mortem examination and a positive culture obtained, with genotype 25.a confirmed.

The farm of origin did have a clear TB history but is currently OTFS(2) due to disclosure of five NVL reactors at their WHT in June 2017 and subsequent NVL reactors disclosed at SIT.

The first SIT and parallel gamma testing was undertaken at the farm on 4 September 2017. The SIT was clear with the parallel gamma test disclosing a NVL single positive (originating from a different farm than the original reactor). OTF status was restored following the clear SIT in November 2017.
Origin of this infection is considered to be purchased infected cattle due to the high risk purchasing policy of this farm.

Whilst at the farm the cattle are continually housed and no contact is possible with any other livestock. Although the building is not wildlife-proof, there have been no sightings of wildlife in the area.

Following a VRA, an exemption to instigating a radial testing regime was agreed.

**8.4 Greater Manchester**

In the period 1 January 2017 – 30 June 2017, there was one OTFW breakdown

**Bowden, Manchester WA14**

This is a medium sized dairy herd comprising 190 animals. The adult cows are kept at the farm, which is to the south of Manchester adjacent to the Cheshire Edge Area, whilst the young stock are reared near Hazel Grove on temporary premises to the east side of Manchester. This second premises is also adjacent to the Cheshire Edge Area at this point.

Purchases of replacement/additional cows are made from Beeston market (in Cheshire, Edge area) as necessary although most are homebred.

The farm had previously had its OTF status withdrawn in April 2007 when a single culture positive reactor was disclosed (genotype 25.a), but regained it and had remained OTF status since October 2007.

OTF status was lost again 10 years later in March 2017 following the disclosure of a single reactor at the four-yearly routine herd teset, with visible lesions identified on PM examination. Genotype has been confirmed as 17.a.

The reactor was purchased by the owner in September 2016. Prior to this she had been born and kept in a herd in Worcestershire.

This natal herd had an OTFW breakdown (genotype 17.a) in April 2016 and regained OTF status again in July 2016. The reactor had tested clear in both of the breakdown SITs at this holding and was then sold in September 2016.

At the farm, the first SIT in June 2017 was clear and the parallel gamma test revealed one positive which was NVL on post-mortem examination. The second SIT in August 2017 revealed one IR but as this SIT test was carried out less than a month after the gamma reactor removal, another SIT was scheduled for October 2017 which then did not include all the required animals due to an administrative error. OTF status was restored after the remaining animals were tested clear in November 2017.

The most likely origin of infection is purchased infected cattle, as the genotype matches that of the origin herd. Since her purchase by the owner, the reactor had been kept housed. The cattle sheds are not wildlife proof but no wildlife has been seen close to the farm.

A radial testing regime has been instigated from both holdings and has not identified any reactor herds to date.
Glossary

- **bTB** – (bovine) Tuberculosis (infection of cattle with *M. bovis*)

- **Edge Area (EA)** – the annual TB testing area of England situated between the High and Low Risk Areas

- **Epidemiology** – the science that studies the patterns, causes, and effects of health and disease conditions in defined populations

- **Genotype** – the genetic makeup of a cell, an organism, or an individual usually with reference to a specific characteristic under consideration

- **High Risk Area (HRA)** – the annual testing area of England comprising the South West, West Midlands and part of East Sussex, in which *M. bovis* infection is endemic in cattle herds and in badgers

- **IFN-γ** – interferon-gamma test. A supplementary in vitro blood test for TB used by APHA in conjunction with the tuberculin skin test in some situations, usually to improve the overall diagnostic sensitivity in infected herds with OTF status withdrawn

- **Low Risk Area (LRA)** – the four-yearly TB testing area of the North and East of England in which *M. bovis* infection occurs only sporadically in cattle and is not considered endemic in wildlife. Although the default testing interval for routine TB surveillance is four years, some higher risk herds in the LRA are subjected to annual testing. There is also more intensive surveillance testing (radial testing) around any herds in the LRA (and parts of the Edge Area) that have their officially TB free status withdrawn due to a TB breakdown

- **OTF** – Officially Tuberculosis Free status. Herds that are not subjected to TB movement restrictions of any type are classified as OTF

- **OTF-S** – Officially Tuberculosis Free Suspended status. In England, an OTFS breakdown is a herd in which all the reactors removed had no visible lesions (NVL) on post-mortem examination and had negative culture results for *M. bovis*

- **OTF-W** – Officially Tuberculosis Free Withdrawn status. In England, an OTFW breakdown is a herd in which at least one test reactor with visible lesions (VL) and/or an animal with *M. bovis*-positive culture result have been disclosed

- **Persistent herd breakdown** – a herd that has been under TB movement restrictions for 18 months or longer due to infection with *M. bovis*

- **Potential ‘Hotspots’** – a temporary area of enhanced TB cattle and wildlife surveillance that may be declared around some OTFW TB breakdowns of uncertain origin detected in a Region of historically low TB incidence

- **SIT** – short-interval test. A tuberculin skin test of all bovines in a TB breakdown herd, carried out 60 days after the removal of the last test reactor (or laboratory confirmation of a TB slaughterhouse case) in order to restore the OTF herd status. In the majority of cases, two successive SITs with negative results are necessary. The results can be read using standard or severe interpretation of the skin test. Calves under 42 days old are usually exempted.

- **VRA** – Veterinary Risk Assessment.

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APHA is an Executive Agency of the Department for Environment, Food and Rural Affairs and also works on behalf of the Scottish Government, Welsh Government and Food Standards Agency to safeguard animal and plant health for the benefit of people, the environment and the economy.