Regional Office:

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.

End of Year Report for 2016:

1. Cattle Industry in the Region

The low incidence 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 3,600 cattle herds. There is approximately 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.

Cumbria is primarily a livestock rearing county on the grass growing west of England. Dairy herds mainly on the lower fertile coastal plains and valleys, with beef suckler herds on the higher and marginal land.

Compulsory pre-movement TB testing of cattle as a precautionary measure was established in 2006, so cattle moving into Cumbria before this date were not subjected to pre-movement TB testing. In recent years, farmers are becoming more aware of the risk of buying cattle from high incidence areas of bovine TB, so most herd owners do not buy in many animals, or they source them from local area via local livestock markets.

However, there are some cattle dealers who bring animals from the high risk areas to be sold through local markets, in relatively high numbers. Purchasers of these animals are not aware of the origin until after animals have been bought, although they have to be pre-movement tested for TB with negative results.

Such movements from the high risk areas require additionally to be retained on that first holding of destination and to be post movement tested within a required period unless destined for slaughter within that time frame.

Also a substantial number of Irish imports (Northern Ireland and Republic of Ireland) come through the county.

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

There are no pre-movement testing Exempt Finishing Units (EFUs), Licensed Finishing Units (LFUs), or TB Isolation Units in Cumbria.

There are eleven cattle city farms in Cumbria.
1.2 The county of **Lancashire** has approximately 2,200 cattle herds. Dairy herds predominately in Lancashire. The size of herds is very variable, ranging from smallholdings with 1 or 2 animals to several very large dairy herds with up to 2500 animals per herd.

In general terms, most 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.

As with Cumbria, compulsory post-movement testing is now undertaken on cattle moving into Lancashire, Merseyside and Greater Manchester from the higher risk areas of GB.

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 520 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. There is an approximately 50-50 split between beef and dairy herds.

It quite common for herds in this area to have links with holdings outwith the low risk area as they are very close geographically to the Edge Areas of Cheshire and Derbyshire.

A great proportion of herds in these two counties are small herds, with little investment in cattle housing, machinery and equipment.

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 1 January 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>CUMBRIA 08</td>
<td>25</td>
<td>1190</td>
<td>502</td>
<td>624</td>
<td>448</td>
<td>173</td>
<td>150</td>
<td>3112</td>
<td>145</td>
<td>83</td>
</tr>
<tr>
<td>LANCASHIRE 21</td>
<td>25</td>
<td>873</td>
<td>273</td>
<td>291</td>
<td>200</td>
<td>104</td>
<td>83</td>
<td>1849</td>
<td>126</td>
<td>55</td>
</tr>
<tr>
<td>MERSEYSIDE 25</td>
<td>1</td>
<td>33</td>
<td>15</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>62</td>
<td>96</td>
<td>34</td>
</tr>
<tr>
<td>GREATER MANCHESTER 44</td>
<td>8</td>
<td>309</td>
<td>65</td>
<td>47</td>
<td>19</td>
<td>5</td>
<td>1</td>
<td>454</td>
<td>53</td>
<td>24</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>210344 (46.6%)</td>
<td>228136 (50.5%)</td>
<td>13275 (2.9%)</td>
<td>51 (0.0%)</td>
<td>451806</td>
</tr>
<tr>
<td>LANCASHIRE 21</td>
<td>73726 (31.7%)</td>
<td>147060 (63.2%)</td>
<td>11808 (5.1%)</td>
<td>8 (0.0%)</td>
<td>232602</td>
</tr>
<tr>
<td>MERSEYSIDE 25</td>
<td>2941 (49.5%)</td>
<td>2851 (47.9%)</td>
<td>155 (2.6%)</td>
<td>0 (0.0%)</td>
<td>5947</td>
</tr>
<tr>
<td>GREATER MANCHESTER 44</td>
<td>14522 (60.8%)</td>
<td>8811 (36.9%)</td>
<td>540 (2.3%)</td>
<td>21 (0.1%)</td>
<td>23894</td>
</tr>
</tbody>
</table>
Density of cattle and cattle premises at 1 January of the reporting year.
2. Geographical Distribution of Bovine TB Breakdowns in the Region in 2016:

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>3575</td>
<td>2181</td>
<td>88</td>
<td>515</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>715</td>
<td>281</td>
<td>8</td>
<td>82</td>
</tr>
<tr>
<td>(c) Total number of herd tests carried out in the period</td>
<td>1899</td>
<td>753</td>
<td>35</td>
<td>265</td>
</tr>
<tr>
<td>(d) Total number of OTF cattle herds TB tested during the period for any reason</td>
<td>701</td>
<td>375</td>
<td>18</td>
<td>130</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>3546</td>
<td>2158</td>
<td>88</td>
<td>501</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>3563</td>
<td>2178</td>
<td>87</td>
<td>511</td>
</tr>
<tr>
<td>(g) Total number of new TB breakdowns detected in cattle herds during the report period</td>
<td>32</td>
<td>13</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>• OTF status suspended (OTFS)</td>
<td>17</td>
<td>10</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>• OTF status withdrawn (OTFW)</td>
<td>15</td>
<td>3</td>
<td>0</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>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>0</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>0</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>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>• were first detected through routine slaughterhouse TB surveillance?</td>
<td>4</td>
<td>2</td>
<td>0</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>13</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• OTFW</td>
<td>5</td>
<td>0</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>6 *</td>
<td>1</td>
<td>0</td>
<td>1 **</td>
</tr>
<tr>
<td>(k) New confirmed (positive M. bovis culture) incidents in non-bovine species detected during the report period (indicate host species involved)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (cat)</td>
</tr>
</tbody>
</table>

* 2 premises have since regained OTF in 2017  ** premises regained OTF in 2017
### Animal-level statistics (cattle)

<table>
<thead>
<tr>
<th>(a) Total number of cattle tested in the period (animal tests)</th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>261315</td>
<td>77356</td>
<td>3200</td>
<td>8370</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(b) Reactors detected:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="tuberculin skin test" /></td>
<td>104</td>
<td>17</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td><img src="#" alt="additional IFN-gamma blood test reactors (skin-test negative or IR animals)" /></td>
<td>134</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(c) Reactors per breakdown</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(d) Reactors per 1000 animal tests</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.91</td>
<td>0.22</td>
<td>0.94</td>
<td>1.31</td>
</tr>
</tbody>
</table>

| (e) Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs) |         |            |            |                |
|                                                                 | 1       | 2          | 0          | 1              |

| (f) SLH cases (tuberculous carcases) reported by FSA          |         |            |            |                |
|                                                             | 6       | 4          | 0          | 3              |

| (g) SLH cases confirmed by culture of M. bovis                |         |            |            |                |
|                                                            | 4       | 2          | 0          | 0              |

### 2015 (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><img src="#" alt="OTF status suspended (OTFS)" /></td>
<td>20</td>
<td>15</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td><img src="#" alt="OTF status withdrawn (OTFW)" /></td>
<td>10</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
</tbody>
</table>

| (s) Of the new OTFW herd breakdowns, how many:                |         |            |            |                |
| ![occurred in a holding affected by another OTFW breakdown in the previous three years?](#) | 0       | 0          | 0          | 0              |
| ![could be considered secondary to a primary breakdown based on current evidence?](#) | NA      | NA         | NA         | NA             |
| ![were triggered by skin test reactors or 2xIRs at routine herd tests?](#) | 4       | 0          | 0          | 0              |
- were triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, etc.)?
  4  0  0  2

- were first detected through routine slaughterhouse TB surveillance?
  2  2*  0  0
  (* inc one PME by PVS)

(t) Number of new breakdowns revealed by enhanced TB surveillance (radial testing) conducted around those OTFW herds

- OTFS
  14  0  0  0
- OTFW
  2  0  0  0

(u) Number of OTFW herds still open at the end of the period (including any ongoing OTFW breakdowns that began in a previous quarter)
  8  1  0  2

(v) New confirmed (positive *M. bovis* culture) incidents in non-bovine species detected during the report period (indicate host species involved)
  1 - Pig  0  0  1 - Pig

<table>
<thead>
<tr>
<th>Animal-level statistics (cattle)</th>
<th>CUMBRIA</th>
<th>LANCASHIRE</th>
<th>MERSEYSIDE</th>
<th>GTR MANCHESTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>(h) Total number of cattle tested in the period (animal tests)</td>
<td>220005</td>
<td>106757</td>
<td>4083</td>
<td>10180</td>
</tr>
<tr>
<td>(i) Reactors detected:</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>(j) Reactors per breakdown</td>
<td>5.13</td>
<td>2.58</td>
<td>1.00</td>
<td>1.67</td>
</tr>
<tr>
<td>(k) Reactors per 1000 animal tests</td>
<td>0.7</td>
<td>0.46</td>
<td>0.24</td>
<td>0.98</td>
</tr>
<tr>
<td>(l) Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs)</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>(m) SLH cases (tuberculous carcasses) reported by FSA</td>
<td>2</td>
<td>2*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(* inc one PME by PVS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(n) SLH cases confirmed by culture of <em>M. bovis</em></td>
<td>2</td>
<td>2*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(* inc one PME by PVS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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 (OTF-W) breakdowns per km² taken in the reporting period

Density of skin test reactors, IFN-gamma test reactors and slaughterhouse cases in OTF-W and Officially TB Free Suspended (OTF-S) 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>2</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></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>15</td>
<td></td>
</tr>
<tr>
<td>Other (explain)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please attempt to categorise all new OTFW TB breakdowns identified in your region using the following risk matrix, according to (a) the probability of them being the result of introduced infection (inward cattle movements) and (b) the strength of evidence that we are dealing with an isolated incident without further propagation from the index farm to neighbouring herds (or vice versa). Enter the corresponding numbers of breakdowns in the relevant boxes. Any OTFW breakdowns falling in the greyed-in boxes may be removed from the county bTB incidence calculations for the purposes of EU reporting:

<table>
<thead>
<tr>
<th>Probability of introduced M. bovis infection introduced via cattle movements</th>
<th>Probability of isolated, sporadic ('one-off') breakdown, without secondary local spread from the index case</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Likely (no secondary breakdowns detected)</td>
</tr>
<tr>
<td>Definite</td>
<td>2</td>
</tr>
<tr>
<td>Likely</td>
<td>2</td>
</tr>
<tr>
<td>Possible</td>
<td>2</td>
</tr>
<tr>
<td>Not likely (indigenous infection in the locality)</td>
<td>8</td>
</tr>
</tbody>
</table>

5. Overview of the bTB Control Programme in the Region

The enhanced TB surveillance (radial testing) regime has been instigated for all new OTFW breakdowns, with very few exceptions.

Regular communication/meeting with local NFU representatives ongoing regarding the disease situation. In addition close liaison with the veterinary practices in the affected areas which has been well received.

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

An increase in the number of OTFW breakdowns has occurred in Cumbria during the reporting period (15 in 2016 cf 10 OTFW breakdowns in 2015 and 4 OTFW breakdowns in 2014), six of them in the Penrith/Shap area of East Cumbria.

The origin of these breakdowns in most cases is obscure at present, with now a suspicion of local spread within one specified area— see Shap Summary later.

As a result, a further wildlife surveillance area has been instigated for an area within the Eden Valley, Cumbria (‘HS -21’). This will cover the area around the Penrith/Shap breakdowns (see map below).
Lancashire had three OTFW breakdowns in the reporting period, one of which was can be attributed to direct purchase of infected cattle from the higher risk areas of GB. The origin of the other two remains obscure at the time of writing. In one case the farm records were not accurate and the other breakdown lies very close to a dealer’s herd that purchases from all over the country, including HRAs, as well as having problems with straying animals from neighbouring herds.

Manchester had one breakdown, which may have originated via spread from the surrounding area which is very close to the Edge Area of Cheshire.
6. Wildlife

Four ‘potential hotspot’ areas of enhanced TB surveillance in cattle herds and wildlife are in force in this region within the reporting period, following the identification in 2014 of OTFW TB breakdowns of obscure origin, namely:

- HS – 15, Lancashire (ongoing):
  22 submissions to date. 20 badgers and 2 deer. 10 culture negative results received. 12 Culture results still pending

- HS – 16, Lancashire (notification 04/04/2014):
  1 deer submission to date, culture still pending

- HS-17, Cumbria (notification 17/04/2014):
  4 submissions to date, 1 deer and 3 badgers. Cultures pending

- HS – 21 Cumbria
  6 badgers and 2 deer submitted to date – First four submissions have negative results with the remaining cultures outstanding

7. Other Susceptible Species

A pet cat that lived near Cheadle Hume was confirmed *M. bovis* positive after euthanasia. He regularly went outside and the owners reported that he frequently had injuries suggestive of fighting. This area of Greater Manchester is very close to the Edge Area of Cheshire (see map in Section 2). The genotype of *M. bovis* was confirmed to be 25:a in this cat, which is the most common type of the bacterium found Cheshire.

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.

Cumbria

The following OTFW breakdown started in 2015 and was still outstanding at the time of writing the report for the first half of 2016:

**Ref 15/04903 Penrith, Cumbria**
( see also Shap Summary later )

This is a family-run beef fattening herd comprising ~520 animals. Animals are taken through to finishing weight. Purchases of replacement heifers/stock bulls are made from local markets. No history of TB on this premises. OTF status was lost due to the positive test of a traced animal on 04/12/2015. The animal in question, BRB, female, DOB 25/05/2015 was purchased from its natal farm in North Yorkshire on 01/07/2015. This farm of origin had been under TB2 restrictions since 17/08/2015 due to a SLH case disclosed in Northern Ireland. The index animal had not been TB tested before as ineligible. At the tracing test she was a standard reactor, VL on PME (BM M2YOcT) and culture positive, genotype 12:a. A check test on the remainder of the herd at Shap Abbey revealed three further reactors, one of which was VL and subsequently culture positive.

The genotype from the natal farm has now been confirmed as 25:a. The traced animal only remained on her natal farm for 5 weeks before sale.

The first VE-SIT and parallel interferon-gamma test at Shap Abbey in March 2016 revealed 7 skin test reactors and 9 gamma test reactors, 3 of which were also skin test reactors. One skin and gamma test reactor was VL on PM examination. The remainder of the reactors were NVL. Unfortunately, due to an administrative error, samples were not taken from this reactor. A radial testing regime has been instigated around this premises..

The next SIT revealed another two reactors, NVL on PME, culture negative.
To date we have only the one genotype result for the holding which is 12a. However, it appears likely that this herd was simultaneously infected by two different genotypes of *M. bovis*.

Animals sold from the herd were routinely traced and in our region, two further herds had their OTF status withdrawn as a result during the reporting period due to TB reactor animals purchased directly from the holding. However, these two premises: Ref 16/00978 and Ref 16/00156 (see later for their full reports) returned an identical genotype on culture: 17:Z, which differs from that found at Shap Alley. This genotype is also identical to that found at a very close neighbour to the holding, Ref 14/04865, which in November 2014 was considered to be unique having not been seen in the GB before.

The next SIT undertaken in September 2016 was clear, but another parallel interferon-gamma test revealed five reactors which were all NVL on PME.

Following the next SIT in November 2016 with negative results, the OTF status of the herd was restored.

**Cumbria 2016 – End Year Report**

In 2016 there were 15 new OTFW breakdowns.

**Carlisle**

This premises is a large finishing unit with in excess of 1000 cattle. This is the first OTFW breakdown on this premises. Incoming cattle are purchased from markets all over the UK with no policy with regards to TB risk (apart from statutory pre- and post-movement testing). OTF status was lost due to a SLH case on 13/1/2016, resulting in a positive culture and genotype 11:a. The animal in question had been purchased from a farm in Devon some four months earlier. The origin farm has had repeated TB breakdowns in recent years and is currently OTFW again with genotype 11:a isolated.

The premises regained OTF status on 06/06/2016 following the required clear SITs. The farm was radial and interferon-gamma testing exempt following a satisfactory VRA. The 6-month check test in November 2016 was also negative.

The most likely origin of this breakdown is therefore deemed to be an infected animal purchased from a herd in a higher risk area of GB.

**Newby Penrith**

This is a traditional family-run dairy herd, with some beef followers and sheep kept over winter. It is not a closed herd but purchases are limited and sourced from LRAs. This premises is currently located in the radial testing area for 15/04903 (see above). In 2006, this premises did have its first OTFS breakdown, which was not confirmed.

In February 2015, at the initial radial test for 15/04903, a homebred IR was disclosed which subsequently became a R, NVL on PME and culture negative. The subsequent SIT was clear and the herd regained OTF in June 2015.

However, at the second radial test carried out six months later on 19 January 2016, 11 Rs were disclosed. Three of these had VLs and a positive culture result was obtained. Genotype identified was 17:z. This is the identical genotype to that referred to earlier in this report. The farm is local to (but not considered contiguous) to Ref 14/04865.

The first SIT undertaken on 11 April 2016, revealed a further two reactors, one of which was VL. The parallel interferon-gamma test revealed a further 7 Rs all NVL. The next SIT undertaken on 14 June 2016, revealed a further R, NVL and three gamma reactors which were all NVL.

The next SIT undertaken on 12/13 September 2016 was clear and OTF herd status was restored.

A radial testing regime has been instigated around this farm.

The origin of infection is obscure at present. There may have been some limited indirect contact with Ref 14/04865 via some shared machinery, but this is not certain.
Cockermouth

This is a family run suckler herd comprising ~250 cattle. Most of the cattle are home bred with only bulls purchased infrequently. Care is taken to source from LRA. Greenlands has had a previous clear TB history.

This premises has a suspect SLH case on 22 January 2016 in a 9 yr old homebred, Lim x Cow. Already booked for later that week was the RHT, which, when read, disclosed four Rs and two IRs, two of which had VL. Culture was subsequently positive and genotype 9:d confirmed. This spoligotype has a GB homrange in Wiltshire but also appears to have filtered over from Northern Ireland into Scotland and North England.

A check test of the remaining animals in the herd was undertaken on 1 March 2016 and was clear as was the first SIT in May 2016. However the parallel gamma blood test performed at the same time, revealed a further 14 Rs, 5 of which had VLs.

The next SIT in July was again clear, but the parallel interferon-gamma blood test revealed 6 further reactors which were all NVL.

The subsequent SIT undertaken on 24 October was negative and the herd’s OTF status was restored.

The origin of this breakdown remains obscure at present. The owner has commented that many of the reactor cattle have grazed a certain field. Also of concern is a contiguous premises which buys in from all over the UK with apparently no regard for purchase risk. However this premises has a clear TB history and recently was clear in its initial radial test.

An enhanced TB testing regime has been instigated for the cattle premises in a 3km radius of this herd.

Askham PENRITH

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 is the first OTFW breakdown on this premises. OTF status was lost following disclosure of a suspect SLH case on 1 March 2016. Culture was positive and final genotype confirmed as 17:Z. This animal was purchased five months earlier (on 28 September 2015) from a herd in the locality: 15/04903 – Bindloss (see earlier).

Following a VRA, the usual interferon-gamma test was waived and OTF was regained on 15/07/2016 following the required two successive SITs with negative results. The VRA also concluded that the normal radial testing regime was not necessary in this case.

The most likely origin of this breakdown was considered to be purchased cattle from a local infected herd.

At the 6-month check test undertaken in January 2017 one reactor was disclosed (VL on PME – RPM2YCaT) and one IR (NVL). (Ref 17/00181). The reactor had been purchased in May 2015 via two herds with clear TB history and had been included in the 2016 breakdown testing with negative results. The IR had been purchased in September 2016 from a farm with clear TB history. The reactor’s culture was positive for M. bovis, with genotype pending at time of writing. An IFN-γ parallel test of the herd and radial surveillance have been instigated.

Blackford, Carlisle

This is a large, closed, dairy herd comprising ~800 cattle, undergoing it’s first TB breakdown. The cattle graze out for three months during the summer, the rest of the time they are house. The farm operates over three premises under the same CPH. Dykehead is the main premises with overspill heifers housed nearby at premises in a rented building there and beef finishers in a separate building. All can be considered as one epidemiological unit.

(The holding was included in the TB2 restrictions and the remaining cattle underwent full breakdown skin and gamma testing with clear results and has now regained OTF).

There is no contact with neighbouring cattle.
At the RHT on 1st March 2016, a single homebred reactor was disclosed which was VL on PME. Culture was positive and genotype 51:d confirmed. A check test of the remaining animals in the herd two weeks later was clear.

The first SIT in June revealed a further standard R and IR, both of which were NVL at slaughter. The parallel gamma test revealed 3 Rs all of which were NVL.

The next SIT undertaken in August was negative, but the additional parallel interferon-gamma test revealed 6 reactors, all of which were NVL at slaughter.

The subsequent SIT was undertaken in November and was clear enabling the OTF status of the herd to be restored.

The origin of this breakdown remains obscure at present.

A radial testing regime has been instigated. To date only one OTFS breakdown has been disclosed in this radial with culture pending at time of writing.

**Dalston**

This is a traditional mixed dairy and beef farm. This is the first OTFW breakdown on the premises although many IRs have been disclosed at the RHTs over the years. Most retested clear but there were two unconfirmed reactors in 2004 and 2012.

There are regular purchases of cattle sourced from local markets.

There are a small group of pet pygmy goats kept on farm which have been subjected to SIT skin tests on two occasions and passed. They remained under restrictions as the bovine herd. They had been kept isolated since OTFW of the cattle herd but mixed with the cattle before then.

The holding is in the radial testing regime for Ref 14/00523. The radial and Rad 6 tests were completed with clear results but the radial 12 test undertaken in January 2016 disclosed 6 IRs. On retest in March, two of those animals passed but four remained IRs, so were taken as reactors. One of these was VL at slaughter (PSC M2YCfT). The animal in question was purchased: Ayr, DOB 15/08/2009, female, purchased from mart on 22/08/2012, born in Scotland. Farm of origin has a clear TB history. However, culture from this animal was negative.

The first SIT in June revealed a further standard R and two IRs which were all slaughtered and were NVL. Samples were submitted but culture was again negative. The parallel interferon-gamma test revealed 13 Rs, all of which were NVL.

The next SIT in August 2016 was negative, but the parallel gamma test revealed a further 9 Rs, all of which were NVL at slaughter.

OTF herd status was restored following the subsequent clear SIT in October 2016.

The origin of the breakdown is obscure at present

A radial regime has been instigated. No breakdowns have been detected to date in this radial surveillance zone.

**Wigton**

This premises has had a clear TB history to date.

This is a family run dairy farm of 220 animals. Barren cows are sent direct to slaughter as are finished HB beef calves. Whilst not a closed herd, purchases are very limited and would comprise replacement heifers from local markets.

Three fields at another farm are owned by the family and are included in the CPH and used for summer grazing. Cattle are kept separate from the resident herd whilst there. Calvo has had a clear TB history and has been included in the radial testing regime from the premises. Their first Radial test was clear.
The family also have grazing rights to common grazing at another location but have never grazed there, renting their rights out to other farmers since purchase. No contractors, personnel or equipment are shared with other premises.

There were 5 IRs disclosed in a RHT on 08/02/2016. Three of those cattle became reactors at the re-test, one was an IR for a second time (hence a reactor) and one was negative:

F, breed BF, DOB 01/12/2008. This animal was purchased in August 2012 and had previously tested clear in November 2011 whilst in her natal herd. This animal was a reactor at retest on 25/04/2016, VL on PME. Culture was positive and genotype 21:a isolated.

F, Breed BF, DOB 28/05/2011 This animal was purchased in Dec 2014. She was tested clear in Nov 2011 whilst still on her natal farm. She became a reactor again at retest on 24/04/2016, VL on PME. Culture was positive and genotype 21:a isolated.

F, Breed LIMx, DOB 14/12/2014. This animal was homebred. Again a reactor on retest on 24/04/2016, VL on PME. Culture was positive and genotype 21:a isolated.

F, Breed LIMx, DOB 03/05/2015. A homebred animal, she was NVL at slaughter. Not sampled.

CLEAR: F, breed BF, DOB 06/03/2011, This animal was purchased in March 2014. Although she passed her retest on 24/04/2016, she was taken as a DC. NVL on PME.

The first SIT was conducted on 31/05/2016. IFN-gamma parallel testing not completed at the time due to lack of laboratory capacity. This SIT disclosed 20 skin reactors and 7 IRs. 18 of the reactors are homebred with the two other purchased animals originating from OTF herds. The reactors ranged from youngstock and heifers to an 11-year old cow. Nine of the reactors had visible lesions at PM examination, with no obvious correlation between the size of the skin reactions and the presence of lesions. M. bovis genotype 21:a was isolated from two of the reactors, indicating spread of infection within the herd with the same genotype.

The second SIT (supplemented with parallel IFN-gamma testing) was conducted on 15/08/2016 and revealed 8 skin reactors, 7 blood test reactors (six of which were also skin reactors) and three IRs. PM examination disclosed four reactors with visible lesions, all homebred animals.

The third SIT conducted in November 2016 was negative, but the IFN-gamma parallel test disclosed three reactors, all of which with no visible lesions of TB.

A final SIT was undertaken in January 2017 with negative results, which led to the restoration of OTF herds status. The origin of this breakdown is obscure at present. A radial testing regime has been instigated.

Ref Newby, Penrith

This is a dairy farm with ~250 cattle. Stores are occasionally purchased as well and finished on farm. It is not a closed herd, but purchases are made from LRA. It has had a clear TB history to date.

This premises is in the radial zone of two separate breakdowns in the Shap area.

OTF was withdrawn due to the disclosure of a reactor at a pre-movement test on 19/3/2016 (as required for herds subjected to radial testing surveillance). This reactor was a HF male and had been purchased as a 3 week old calf in October 2014. The farm of origin has a clear TB history. Visible lesions of TB (BM M1 YcaT) were found at slaughter, but the culture results were negative. A pre-booked radial test on 04/04/2016 was clear. The first SIT was also clear, but the IFN-γ parallel test undertaken at the same time disclosed one reactor – NVL on PME. The second SIT on 5/9/2016 was clear.

The subsequent SIT undertaken in November 2017 gave negative results, enabling OTF status to be restored.

A radial testing regime has been instigated.
The origin of infection for this herd is obscure. This herd is within 3km of two separate TB breakdown farms in the Shap cluster, but we have no culture result to compare. However, a traced animal from this herd, which had been in the same epidemiological group as the index VL reactor, was subsequently confirmed with genotype 17:z (case 16/02030) strongly suggesting that this was the strain of the bacterium infecting the Wood & Sons herd.

**Penrith**

This is a small beef fattening enterprise with 55 cattle on site. Cattle are purchased from local markets at 12-15 months of age and then taken through to finished weight. All cattle are kept on the home premises, grazing out in the summer and housed in the winter. There is a resident sheep breeding flock. All finished cattle are sent direct to slaughter.

The premises as being a beef fattening herd was not subject to RHTs, However in 2015, it was included in the radial regime for Ref 15/01233. A radial test in April 2015 was clear as was the Radial 6 test in November 2015.

OTF was withdrawn following a tracing test to the premises from **Ref 16/01300** – (see previous summary). Three animals had been purchased from Newby shortly before his R was disclosed in March 2016. On the tracing test, one reactor was disclosed, VL at slaughter and culture positive. Genotype confirmed as 17:z.

A radial testing regime has been instigated.

The first SIT undertaken in July 2016 was clear and the parallel gamma test revealed 4 reactors, all of which were NVL on PM examination.

The second SIT in September was clear and the OTF status of the herd was restored.

The 6 mo check test undertaken January 2017 was also clear.

Origin of infection: most likely due to a TB-infected animal introduced from another herd in the locality. However, this cannot be fully verified since the index VL reactor was culture-negative, so comparison of genotypes is not possible.

**GRANGE OVER SANDS, Cumbria**

The owner is a cattle dealer who buys stores for further fattening. Purchase choices are made based mainly on price from widespread markets. He has regularly bought from the HRA and has been subject to several tracings tests with clear results in 2015. The premises falls in the radial for **Ref 15/04489** (Genotype 12:a).

The reactor was disclosed in a second radial (Rad-6) test on 20/6/2017. He was a Lim x male born on 20/7/2014 who had been purchased 1/7/2016. His natal herd had a clear TB history, but was located in the radial for **Ref 16/03140** (Genotype 17:z). PME of the reactor was NVL, but a positive culture was obtained, genotype 17:a

The first SIT and parallel IFN-gamma test disclosed one gamma reactor, NVL on PME.

The subsequent SIT undertaken in January 2017 was clear enabling lifting of movement restrictions.

A radial testing regime has been instigated.

The most likely origin of this breakdown was purchased infected cattle.

**WIGTON, Cumbria**

This is a family-run dairy farm with a few animals taken up to slaughter weight. It is not a closed herd, but effort is made to purchase replacements from the LRA and abroad. There is no contact with other cattle or sharing of equipment/personnel that can be determined. This is the first breakdown on this premises.

The farm is currently in the radial zone for **Ref 16/01787** (21:a). Two reactors were disclosed at the first radial test. PM examination on both was NVL, but one returned a positive culture, genotype 17:a. Both have tested clear on previous tests whilst at the farm.
These reactors were both purchased from their natal farm in Ayrshire, Scotland in 2011. This natal farm subsequently became OTFW in 2013, some two years after they had left, but the genotype there was confirmed as 9:d, so did not match.

The first SIT was clear as was the subsequent SIT. However the parallel IFN-gamma test undertaken at this second SIT disclosed ten reactors, all of which were NVL on PME.

The next SIT is scheduled from 21 March 2017.

A radial testing regime has been instigated around this farm.

Origin of infection at this point is obscure.

PENRITH, Cumbria
This is a family-run, closed dairy farm (~320 head). The herd relocated from Cheshire, moving the cattle up in batches from the end of 2013 till mid 2015. Prior to moving up from Cheshire, the herd had an OTFW breakdown, genotype 21:a.

The cattle do graze out but there is no nose to nose contact with neighbouring herds.

This premises is located in two overlapping radial zones, Refs 16/00382 and 16/04903 (both with genotype 17:z). At the premises radial test in April 2016, two IRs were disclosed, which on retest became full reactors, one of which was VL on PM examination. Both of the reactors were homebred, but the VL animal had been brought up from Cheshire whilst the other had been born at the premises. Culture was positive from the VL reactor with genotype confirmed as 17:z. The first SIT undertaken on 1 August 2017 was clear and the parallel IFN-gamma test revealed six reactors all of which were NVL.

The subsequent SIT undertaken in October 2016 was clear, enabling restoration of OTF status.

A radial regime has been instigated.

There is no evidence of machinery/personnel being shared with other premises and the herd is closed. There are sightings of deer in the area but no known badger activity on their fields. Source of infection most likely to be local, as this genotype has only been found in this geographic area of GB, but exact risk pathway unknown.

R PENRITH, Cumbria
A family run dairy (~160 head) and beef (~300 head) herd, each kept on separate premises k approximately five miles away. The beef calves are housed at the dairy farm and family members tend both herds, so can be considered as a single epidemiological unit.

The beef farm is located within the radial zones of three OTFW breakdowns in the Shap cluster: Refs 16/00382 and 15/04903 (both with genotype 17:z). and Ref 16/01300 (culture negative).

Both the beef and dairy herd underwent radial testing in March 2016 with negative results. However, at at pre-movement test in August 2016, two reactors were disclosed in the beef herd, both homebred. One was VL and culture positive. A check test was performed in October and revealed another two further homebreed beef herd reactors, one of which was VL and culture positive.

Genotype was confirmed as 17:z.

The first SIT was undertaken in January 2017 and was clear. The parallel IFN-gamma test undertaken at the same time disclosed 4 reactors, all of which were NVL.

A second SIT has just been completed with clear results, enabling TB movement restrictions to be lifted.

A radial regime has been instigated.
This is the first breakdown on this premises. The land used by the beef herd is adjacent to that of two other OTFW breakdowns with the same genotype as found here. However, there is double fencing employed so that direct nose to nose contact between neighbouring herds is not possible.

Owner reports an abundance of wildlife regularly seen within his fields.

Most likely a local source of infection due to gentotype ‘homerange’, but the exact risk pathway unknown.

**WIGTON, Cumbria**

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 (17:a).

It is not a closed herd and includes several cattle recently purchased from the Netherlands and NI.

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

OTF was lost 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 with resultant genotype 9:d.

The first SIT undertaken in Jan 2017 revealed one inconclusive reactor which is awaiting retest and another suspect SLH case has been reported on 3 March 2017 originating from the dairy herd as well.

A radial regime has been instigated.

Origin of infection at this point is obscure.

**CARLISLE, Cumbria**

This is a large beef suckler/fattening herd with 2000 cattle run over three locations as one epidemiological unit. Staff, These locations are within 10 miles of each other with stock and equipment moving between the three locations as required. Staff and equipment are not shared with any other premises This is the first confirmed breakdown in this herd with a previous suspect SLH case in 2011 proving negative.

Purchased cattle are sourced from mainly local markets. Finished cattle are sent either direct to abattoir or via market.

The herd is located within two radial areas Ref 16/00329 (9:d) and Ref 16/01787 (21:a). There is good fencing with ditches separating the farmer's land from his neighbours’, so no nose to nose contact is possible.

The index reactor animal was purchased in June 2013 from Aberdeenshire, Scotland. All three herds where she had been located since birth have a clear TB history and since arriving she was tested clear at the RHT in February 2014 and the radial test undertaken in March 2016. She had not grazed out during the summer of 2016 prior to being disclosed as a reactor at a second radial test in November 2016. The reactor had visible lesions on PM examination and a culture positive result in early March 2017. Genotype is pending at time of writing.

The first SIT undertaken in Jan/Feb 2017 revealed one reactor (NVL) and one IR. The interferon-gamma test is due to be completed by 19 May 2017..

A radial testing regime has been instigated.

Origin of infection is obscure at present. No reports of wildlife (deer and badgers) being seen in the vicinity.
Overview of the cluster of *M. bovis* genotype 17:z near Shap (2014-2016)

In central east Cumbria a cluster of bTB herd breakdowns of *M. bovis* genotype 17:z, has been identified. This genotype had never previously been identified within GB, and outwith this cluster of cases, has only since been confirmed once in GB: in December 2015 from a slaughterhouse case disclosed in Scotland of a direct import beast from Northern Ireland. The index case in this cluster was identified in November 2014,

Up to the end of December 2016, this geographical cluster of 17:z isolates, related tracings and other cases within the radial testing zones, included 17 breakdowns on 16 separate cattle holdings.

Of the 16 cattle holdings with breakdowns:
- 2 in other counties, as a result of cattle tracings from the Shap cluster
- 14 of these premises in the area of Shap in Cumbria:

Of the 14 affected holdings in the Shap area, 9 had OTFW breakdowns and 5 had OTFS breakdowns (of unknown/local source). Of the 9 OTFW incidents:
Genotype:
- 8 of genotype 17:z, either on culture or by inference from tracings culture
- 1 genotype pending
Source :
- 7 of unknown source/ local spread
- 2 as a result of known cattle tracings from local OTFW premises

One premises in the cluster sustained a second breakdown during 2016. This herd was OTFS in 2015, but was later identified as OTFW at the 6 month test in 2016. It is unknown whether this was due to residual infection or reintroduced *M. bovis* into the herd.

**Most likely source of M.bovis for breakdowns in local '17z' Cumbrian geographic cluster**

![Pie chart showing the most likely sources of the cluster of M. bovis genotype 17:z near Shap (2014-2016).](chart.png)

- unknown source/ local spread
- tracing from OTFW
- recrudesence
Table summarising the TB breakdowns of genotype 17 z, and geographically related cases in Cumbria.

<table>
<thead>
<tr>
<th>Case ref.</th>
<th>Disclosing test date</th>
<th>Disclosing test type</th>
<th>Location</th>
<th>OTF status</th>
<th>Genotype</th>
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<td>Oct-16</td>
<td>RAD12</td>
<td>OTFS</td>
<td>17 z</td>
<td>unknown/ local</td>
</tr>
<tr>
<td>17</td>
<td>18/04762</td>
<td>Dec-16</td>
<td>RAD6</td>
<td>OTFW</td>
<td>pending</td>
<td>unknown/ local</td>
</tr>
</tbody>
</table>
All the cases had either one or two skin test positive reactors only, with the exception of three cases which had 13, 14 and 4 skin reactors respectively throughout their breakdowns. These three cases also had multiple cattle either with visible lesions indicative of bTb at slaughter, or which subsequently cultured *M. bovis*.

The OTFW premises underwent additional interferon-gamma testing and, of the additional reactors disclosed by this test, none showed visible lesions of bTb.

The affected area is primarily livestock rearing, with an undulating network of stone wall bounded grazing fields to the east of the Shap fells. It is a closely knit rural community, of mainly small to medium sized family farms, both dairy and beef units. Excluding the outlying traced premises, all ‘local’ affected premises have their steading locations within a 15km diameter zone. The index case is approx. 3km from the other OTFW cases, but the remaining six OTFW cases of unknown/local origin are all located very close together at the centre of the geographic cluster.

The source of *M. bovis* 17:z to this cluster is under investigation, but has not been identified at this time. The genotype is believed to be the equivalent Northern Irish strain 122.263, and thus an infected beast from Northern Ireland/Ireland is the most likely original source of the *M. bovis*. It appears highly unlikely that the index case of the cluster,14/04865, was the primary premises with cattle infected by *M. bovis* 17:z. From timeline and movement data analysis it appears most likely that *M. bovis* 17:z had been present on an additional local premises and gone undetected. Alternatively, one of the later affected cases could have previously recorded a false negative herd skin test.

The novel genotype in this cluster, gives clear evidence that local spread is occurring in this part of the LRA, where wildlife infection with *M. bovis* is not known to exist. As a result, in September 2016, an ad hoc TB survey of ‘found dead’ badgers and wild deer was rolled out across the area (known as ‘HS-21’). Most local farmers report badger setts or activity on their land, but the actual population and sett density in this area is unknown by APHA. The results of the current wildlife carcass submissions are still pending. Whole genome sequencing of the *M. bovis* 17:z isolates is being conducted, to ascertain whether it can assist in understanding the transmission dynamics of this outbreak.

The main area of local spread concern is across the central belt of the zone, an area of approx. 8 km diameter. The affected OTFW premises all have grazing land within this area.

At this time it remains unclear how the *M. bovis* 17:z is spreading to the cattle herds. In the absence of evidence that there is a wildlife *M. bovis* infection within the area, it would appear most likely that the local spread is due to either contiguous cattle grazing/housing or indirect spread via fomites between farms, for example via shared equipment and vehicles. Investigations have not indicated possible direct contiguous cattle-to-cattle contact or other links between all the farms, but determining temporary land and steading use in particular has proved difficult. Use of these facilities has often changed on a yearly basis, making this investigation even more complicated when assessing cattle locations over multiple historic seasons.

Extensive awareness and communication has been made with the local Industry regarding this novel cluster outbreak of bTb. It remains of concern that, despite such education, upon which we would have expected both within and between farm biosecurity standards to have improved, more cases continue to occur.

**Lancashire – End Year Report 2016**

At the beginning of the reporting period there was one premises still under OTFW TB restrictions from the previous year:

Preesall Lancashire – OTF status restored 15/02/2016.

There were three new OTFW breakdowns in the reporting period:

**Lathom ORMSKIRK**

This is a beef finishing premises, whereby cattle are sourced and fattened for slaughter within a 3 month period. During this period, the cattle are kept inside. Finished cattle are sent direct to a local abattoir and the produce sold exclusively in the farm shop. Approximately 170 cattle are kept, with 2-3 being sent to slaughter weekly.
OTF status was lost as a result of purchasing three animals originating from Ref 15/04903 in the Shap cluster.

A check test was undertaken on 22/01/2016 to enable a VRA to bring animals onto another farm to keep the throughput going. This check test was clear. Exemption was granted to omit the interferon-gamma test and the two SITs undertaken in April 2016 and June 2016 were clear and restrictions lifted. Following a VRA, the radial testing regime was also exempted.

Origin of this breakdown is purchased.

CHORLEY

This is a beef breeding suckler herd. Comprises a herd of beef cattle - 150 (Lincoln Reds, AAx,) plus a separate herd of water buffalo - 150 in total. Buffalo are grazed separately from the beef herd but housed in the same air space during the winter months. Heifers are kept at Bradley Hall till calved. Natural service used with the offspring being raised and sent direct to slaughter to provide produce for their farm shop.

This holding has had severe issues with tagging of livestock in last couple of years. The Local Authority have been involved and have aided in resolving the issue. It is possible therefore that all movements on may have not been recorded accurately. Purchases for store cattle are mainly direct from farm but will occasionally buy from Lancaster Market and premises in Tayinloan, Scotland and near to Halifax.

There are two premises to the enterprise. the enterprise has the winter housing for both herds and the buffalo graze the same fields here every year. is the Fields about 2 miles to the south and is the location of the summer grazing of the cattle herd. Whilst some of the beef herd will be turned out at Bradley Hall, the buffalo have never been to Heskin Hall.

This premises has had a clear TB history as has the surrounding area.

There was a RHT on 18/4/2016, which disclosed an a homebred Lincon Red cow born on 17/6/2011. No previous TB test recorded against her as she would have been ineligible. On retest on 20/6/2016 she became a reactor. On PM examination, visible lesions of TB found in the bronchial and mediastinal lymph nodes. The reactor had grazed both fields. Culture was confirmed with 9:j genotype, which has a homerange in Somerset.

The first SIT and interferon-gamma parallel tests were run over two weeks in mid August 2016. One skin IR was disclosed from the buffalo herd: Female originated from the farm currently under TB restrictions so was taken as a DC. NVL on slaughter. However according to the farm records she was sold from the farm some 10 years before the start of the breakdown. This is the farm of origin for the original buffalo of which there a few individuals remaining on farm. Genotype is 10:a.

The parallel gamma test was clear, although only a percentage of the buffalo's blood could be tested. All eligible beef cattle were blood tested and were clear. Due to the difficulties in sampling the buffalo, it was agreed not to resample them again.

The genotype was confirmed as 9:j so different from the buffalos' origin herd.

A radial regime has been instigated - no further breakdowns in this area disclosed to date.

Origin of infection at this point remains obscure.

Salmesbury, Preston

This is a family run dairy herd which became OTFW as a result of a confirmed suspect homebred SLH case killed in December 2016. This is the first OTFW in this herd and in the surrounding area. Genotype has been confirmed as 17:a.

The herd is closed and has been for years. Two areas of land are utilised in addition to the farm. There have been no confirmed OTFW breakdowns in these areas either. Fencing is good between the farmer’s land and that of
neighbouring herds, but neighbours’ cattle have mixed with the farmer’s cows due to swimming across a small river and jumping fences.

A radial testing regime has been instigated.

Infection origin at this point is obscure. There is however a large dealer’s herd in close proximity which is reported to buy in from all over the country for final fattening.

Greater Manchester – End Year 2016

Ongoing at start of 2016 - Ref 15/04334 Nield 44/617/0260 regained OTF status on 23/8/2016 (reported under Edge Area report but CPH is Gt Manchester).

There was one new OTFW breakdown in the reporting period:

Stockport, Cheshire

This is a very small suckler herd with 18 cows and 10 followers. It lies close to the Edge Area of Cheshire. The holding is currently in three overlapping radial zones (Refs 14/04749, 15/01180 and 15/04334 – all with genotype 25:a)

It is not a closed herd, but buying of cattle is very limited.

OTF status was lost as a result of a twice IR homebred bullock disclosed at a pre-movement test. Culture was positive and genotype 25:a confirmed. This is the most common genotype isolated in the nearby neighbouring county of Cheshire.

The first SIT and parallel interferon-gamma test, undertaken in November 2016, were both negative and OTF status was restored after the second consecutive SIT with negative results in January 2017.

Cattle are grazed in the fields around the holding and there is direct contact between neighbouring cattle. There is reported to be badgers and many foxes in the area, all of which are seen on the holding.

Infection origin is undetermined, but likely to have been spread from the surrounding radial area.

A radial testing regime has been instigated.

Merseyside – End Year 2016

There were no OTFW breakdowns during the reporting period.
Radial overview in our Region: 2012 onwards
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.
- **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
- **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*
- **VRA**: veterinary risk assessment

The Animal and Plant Health Agency is an Executive Agency of the Department for Environment, Food and Rural Affairs working to safeguard animal and plant health for the benefit of people, the environment and the economy.