Year End Descriptive Epidemiology Report: Bovine TB Epidemic in the England Edge Area

Regional Office: South East
County: Oxfordshire

Year-end report for 2016

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1. Executive Summary

a. Two new clusters – one in north of the county in presumed wildlife infected area and with long history of breakdowns, and the other near Henley-on-Thames.

b. High uncertainty associated with source for the Henley cluster but this could represent significant spread of the presumptive wildlife infected area.

c. Incidence risk almost doubled from 8% in 2015 to 15% in 2016, with breakdown numbers also increasing from 31 breakdowns in 2015 to 53 in 2016.

d. The proportion of breakdowns attributed to purchase of infected cattle has tripled compared to 2015. Of 38 OTFW breakdowns, 20 were attributed to purchase of infected cattle compared to 18 attributed to wildlife (1.4 times that of 2015). The proportion is similarly high for OTFS breakdowns, with 12 of the 15 most likely attributed to purchase. In summary over 60% of all breakdowns were attributed to purchase and two thirds of these to cattle from the HRA.

e. Source of infection by industry sector reflected the need for purchase: purchase accounting for all fattener breakdowns and half of suckler and only one out of eight dairy breakdowns.

f. Increase in deer source reporting – probably biased by observations of high deer populations

g. There is no formal wildlife surveillance in Oxfordshire and badgers have never been tested. However, deer are widespread and hunting for game probably provides reasonable passive surveillance of this species. Despite this there have been no wildlife confirmations since 2009 from a muntjac deer.

h. 45% breakdowns were detected by non-routine testing suggesting that increasing from annual to 6 monthly testing might speed up detection.

i. Number of reactors per breakdown has remained unchanged at nine.

j. The 70% increase in total number of reactors has been attributed to increased incidence.

k. Key drivers of the epidemic – purchase of infected cattle and presumed infected wildlife.

l. The increased number of Approved Finishing Units (‘AFUs’, which channel riskier cattle into a controlled environment) from three to five with two more planned in 2017 may help mitigate the risk from purchased infected cattle.

m. Risk to LRA from movement of cattle from Oxfordshire increased due to higher incidence and more long-term, spread of infected wildlife.

n. Risk from HRA – movement of infected cattle, and infected wildlife.

o. Forward look – movement controls or other methods of changing purchase behaviour The increased focus that the establishment of the proposed Eradication Board for Oxfordshire, Buckinghamshire and Berkshire should help to promote changes in purchase behaviour.
2. Introduction

A key action in the implementation of the Government’s objective to achieve Officially Bovine Tuberculosis Free (OTF) status for England by 2038 was to recognise the different levels of bTB in different parts of the country and varying the approach to control accordingly. To this end three management regions or zones have been established. This report describes the epidemiology of Bovine TB in the ‘Edge area’ of Oxfordshire which comprises over two thirds of the county (see Appendix 1). The Edge area in England has a low but recently rising incidence of infected farms and control efforts are seeking to slow down and reverse geographic spread, and reduce the incidence rate, with the aim of obtaining OTF status for this area as soon as possible.

Data statement

All data are derived directly from the transactional database ‘Sam’ and so may differ slightly from similar data quoted in other reports which were downloaded later in the year so are more complete, and have had additional review to remove duplicates and correct errors.

3. Cattle industry in the Edge Area of Oxfordshire

There is a mixture of beef suckler, dairy, and fattening units. Many dairy units have disappeared reverting to beef in Oxfordshire. However, relatively high concentrations of large dairy farms still exist in south-west Oxfordshire (partially in the Edge area). The majority of the fattening units in Oxfordshire source cattle from the High Risk Area (HRA) particularly the South-West through markets or directly from farms, with a smaller number purchased locally from farms and Thame market (Oxfordshire). There are a few large finishing units providing weekly quotas to abattoirs of cattle finished from buildings to fulfil supermarket contracts. The orange market at Cirencester has provided a valued outlet for bTB restricted cattle. Some pedigree cattle breeders are located within the county providing pedigree breeding cattle for the whole country. There are a handful of organic farms, both dairy and beef. The majority of cattle are grass fed whilst outside, with some supplementation for dairy cows, and young stock. Fattening cattle on large units are often fed with blends of grass and maize silage and by-products from the human food industry. Use of mineral licks at pasture is variable although where used, almost all are accessible to badgers. There is a trend towards lesser dependence on maize silage as conserved winter forage compared to recent years.

4. Overview of the bTB epidemic in the Edge Area of Oxfordshire

History of bTB in the Edge area of Oxfordshire – see previous reports (2014 and 2015 year reports for the South East region)

The geographical distribution of Bovine TB cases (new and ongoing) in the Edge Area of Oxfordshire is shown in Figure 1.
Figure 1. Geographical distribution of 2016 breakdowns with genotypes, holding density and clusters.
Referring to Figure 1, changes of note compared to 2015 in the distribution of breakdowns in the county are an increased density in the northern tip of the county, including a cluster around the Deddington area (red ellipse a) and a cluster of cases north-west of Henley-on-Thames in the south east corner of the county (red ellipse b).

**Figure 2. Oxfordshire cattle breakdowns attributed to wildlife sources plotted 2000 to 2016. 3km radius included to suggest area affected in line with radial testing policy. Dark grey = genotype 10:a.**

**Genotypes –** The predominant genotype continues to be 10a, mirroring the presumptive wildlife endemic area illustrated by the dark grey areas shown in figures 2 & 3. In the former, the bright green pentagons with hatched 3km discs demonstrate new 2016 10:a breakdowns attributed to wildlife right across this area. Historically there was a narrow band running from west to east midway at the level of Oxford attributed to wildlife infection involving spoligotype 17 and genotype 9:d (see Figure 3 - represented as orange and lime green discs respectively). In the Edge area in 2016, of these two, only one new breakdown of 9:d was attributed to wildlife close to Bicester NNE of Oxford - represented by a red pentagon and white 3km radius.
Figure 3. Overview of genotype areas in Oxfordshire, Berkshire and Hampshire.
5. Descriptive epidemiology of Bovine TB in the Edge Area of Oxfordshire

Level of Bovine TB

Figure 4. Monthly distribution of breakdowns showing OTFS (strongly suspected) and OTFW in different colours

Figure 5. Incidence Risk over last 3 years expressed as a percentage.

The incidence risk calculated as the probability of OTF herds breaking down in the year when tested has increased by a factor of 1.8 from 2015 to 2016. There were 31 breakdowns in 2015 and 53 in 2016. See discussion below regarding source of infection for most likely explanation of this rise. Note that the figures for 2014 and 2015 are much higher than in previous reports because an adjusted denominator has been used. Previously this included some herds more than once because they had been tested several times in the year. The figure used for these incidence risk calculations is the number of OTF ‘herds’ tested during the year as opposed to OTF ‘tests’.

The neighbouring High Risk Area (HRA) of Oxfordshire which is likely to be realigned as Edge, has remained stable over the past few years with 19 breakdowns in 2014, 24 in 2015 and 24 in 2016 (15 OTFW and 9 OTFS). It is likely that addition of this population of breakdowns will increase the overall county incidence because the number of breakdowns in the HRA were just

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under half the number in the Edge but with only 30% the number of cattle herds compared to the Edge.

The main geographical differences comparing the picture in 2016 to that of 2015, were the two new clusters as discussed above. Cluster 1 - about 6 breakdowns were grouped around Deddington (south of Banbury). Two of these were probably due to purchased infected cattle and the remainder infected from local wildlife. This area has been active before with wildlife attributed breakdowns. Cluster 2 - occurred in the south-east corner of the county around Nettlebed (north-west of Henley-on-Thames). Most of these could be related to cattle purchases. However, several involve the main Oxfordshire genotype, 10:a which led some case vets to suggest that wildlife infection also had to be ranked as a likely source. If wildlife are implicated this would represent a large jump of the presumptive wildlife infected area towards the Buckinghamshire border. This cluster is shown in the genotype maps, – Figures 2 and 3.

**Figure 6. Herd size frequency distribution (left) and herd size frequency distribution for breakdowns only (right)**

As for previous years, breakdowns showed a predilection for larger herd size – see Figure 6 which shows herd size almost evenly distributed across the categories for breakdowns compared to the frequency distribution of herd size (left) which shows a steady decrease in numbers as herd size increases.

**Figure 7. Breakdowns according to Industry Sector**
Referring to Figure 7, categorisation of breakdown numbers according to herd type suggests a predilection for dairy herds because they represent only about 8% of cattle herds in the whole county. However, this effect is probably mostly due to size of herd rather than a sector association as suggested by other reports, when incidence is adjusted for size in multivariable analysis.

**Risk pathways for bTB infection**

![Oxfordshire OTFW 2016 distribution pie chart](image1)

*Figure 8. Distribution pie chart for infection source in OTFW (confirmed) breakdowns*

![Oxfordshire OTFS 2016 distribution pie chart](image2)

*Figure 9. Distribution pie chart for infection source in OTFS (strongly suspected) breakdowns*
The graphs in Figures 8 to 10 illustrate the most likely reasons for the increase in incidence in Oxfordshire compared to 2015. For OTFW herds which comprise 72% of the new breakdowns in 2016, purchase (movements) of infected cattle have contributed most to this increase. OTFW breakdowns attributed to purchase have more than tripled compared to 2015 whilst likely wildlife sourced breakdowns have increased about 1.4 times. OTFS data for source in 2015 are not available. However, it is possible to extrapolate that as 80% of OTFS breakdowns in 2016 were most likely purchased, then the increase in OTFS from 2015 to 2016 of 10 to 15 may be entirely due to purchased infected cattle. In conclusion, the increase of incidence in 2016 has most likely been caused mainly by purchase of infected cattle with a smaller proportion of the increase due to an increase in wildlife sourced infection.

A notable difference in attributed source to previous years has been a higher fraction ‘possibly’ attributed to deer (about 10% compared to almost zero previously). However, caution should be exercised in attaching significance to this because the main reason for these conclusions have been based on local high density deer populations without evidence of any recent wild deer bTB cases (last confirmed 2009). It would be expected that wild deer bTB would be reported if present because of high throughput and reasonable passive surveillance in local game larders unless there remains a misconceived conception amongst game handlers that reporting has a negative impact on farmers.

Spread of infection between herds has been attributed to movement of cattle. No breakdowns were attributed to contiguous spread, an observation consistent with previous years. Apart from cattle purchase which has been mostly from the HRA outside Oxfordshire, spread of infection within the county has been attributed mainly to infected wildlife.

Referring to Figure 11, which displays the distribution of probable infection source by sector, the attributed source of infection is clearly associated with the need to purchase cattle. All of the fatteners were attributed to purchase (cattle movements) whereas almost all of the dairies (7/8) were attributed to wildlife. Sucklers had an even spread attributed to both.

**Figure 10. Comparison with 2015 of OTFW breakdown numbers attributed to purchase and wildlife.**
Figure 11. Probable source of infection according to Herd Type (OTFW and OTFS)

Role of other species

Badgers and other wildlife

An absence of any recent data for *M. bovis* infection in any wildlife continues to add a significant degree of uncertainty to any conclusions for source for cattle as wildlife. Referring to previous reports, the last confirmed infection in Oxfordshire was in a muntjac deer found in the far south-west corner of the county in 2009.

Other domestic species

None to report.

Detection of cases

Referring to Figure 11, 55% of all Oxfordshire breakdowns were detected by routine annual tests – a proportion that was the same for both OTFW and OTFS cases. Six of these involved a failed retest of an inconclusive reactor detected at the annual test. 13% were detected by slaughterhouse post mortem examination and 9% at 6 month check tests following the conclusion of a previous breakdown. Of the seven breakdowns detected at slaughter, four were from fattening herds and three from sucklers. None were from Approved Finishing Units. Over 25% of OTFW herds had previous breakdowns during the last three years.

The 45% of breakdowns not detected by routine herd testing reinforces the importance of these other active surveillance methods in this county. The introduction of twice yearly testing would therefore be beneficial to detect infection earlier and increase the proportion of breakdowns detected by routine herd testing decreasing the dependency on unplanned surveillance.
Breakdown Numbers
Types of Disclosing Test
Breakdown Detection Method
Oxfordshire 2016
OTFS
OTFW

Figure 12. Breakdowns according to detection method.

Burden of Bovine TB

Figure 13. Oxfordshire Edge total annual reactor numbers 2014 to 2016

Using numbers of reactors removed as a proxy for relative comparison year-to-year for a measure of the burden to the taxpayer of Bovine TB in Oxfordshire, almost 200 more reactors were removed (mostly identified by the skin test) in 2016 compared to 2015 - equivalent to a 70% increase (see Figure 13). However, on an individual breakdown level, the number of reactors taken per breakdown did not change significantly suggesting that the overall increase in reactors and reactors per 1000 animal tests was all due to an increased number of breakdowns (see Figures 13 and 14).
Key drivers of the Bovine TB epidemic in the Oxfordshire Edge

Purchase behaviour – over 60% of breakdowns in 2016 were attributed most likely to the purchase of infected cattle - two thirds being from the HRA. This most likely accounted for all breakdowns in fatteners, and over half of those in sucklers. The increase compared to 2015 is difficult to explain, and maybe due to several factors such as change in incidence in source areas, and change in buyer behaviour. Most were purchased through markets.

Infected wildlife – although there is uncertainty, it is likely that almost 40% of breakdowns were caused from infected wildlife. The gradual spread over time in an eastwards direction from the Gloucestershire border has been reported previously. However, a new area may be appearing in the south-east of the county, formerly considered clear of endemic wildlife infection. Monitoring of wildlife (badgers and deer) may provide more certainty although it is likely from the picture over the past few years that prevalence in wildlife maybe low and difficult to detect from a survey unless large numbers are tested (i.e. large sample sizes are used).

6. Summary of risks to the Low Risk Area (LRA) and any mitigating factors

Spread of the presumptive wildlife infected area eastwards towards the LRA counties is the most serious long term risk to the future possible OTF status of the LRA. The potential Henley cluster illustrates this risk. If this is confirmed as a new area of wildlife infection, then the infection front is closing in on the LRA over a much larger area.

Movement of cattle from Oxfordshire to the LRA mainly through local markets has become more risky with the increase in incidence risk in 2016. Breeding cattle are likely to pose most risk to receiving herds because of their longer lives and wider contact with other cattle groups at destination farms. Voluntary private gamma interferon tests as an additional pre-movement test provides significant mitigation. Compulsory post-movement testing now provides good extra mitigation for all cattle movements into the LRA.
Summary of the risk to the Edge Area from the HRA
Two thirds of breakdowns attributed to purchase of cattle involved cattle from the HRA. The increasing number of AFUs in Oxfordshire (2017: one approved and two more proposed) mitigates this risk by channelling these riskier cattle into a controlled environment.

Spread of infected wildlife from the HRA threatens to increase: what is probably a relatively low prevalence of *M. bovis* infection in the Edge area wildlife and introduce new genotypes which will confuse the epidemiological assessment of breakdowns.

7. Assessment of effectiveness of controls and forward look
The large increase in incidence in 2016 does not favour the long term objective of OTF status in 2025. If the movement of cattle is controlled better, the general year on year increase in incidence will be much less. In fact if the purchase element were removed or significantly reduced in 2017, then incidence risk is likely to fall in 2017
8. Appendices

Appendix 1: Overview of risk and surveillance areas of England and Edge Area objectives and controls

![Map of England with risk areas]

**Low Risk Area (2016):**
- 72,621 km²
- ~21,000 herds
- Four-yearly herd testing
- Very low & sporadic incidence: 1.0 new incidents per 100 herd-yrs. at risk (0.3 for OTFW incidents)

**Edge Area (2016):**
- 21,574 km²
- ~7,200 herds
- Annual herd testing (six-monthly in Cheshire)
- Low, but rising incidence: 6.6 new incidents per 100 herd-yrs. at risk

**High Risk Area (2016):**
- 38,570 km²
- ~23,100 herds
- Annual herd testing
- High herd incidence, with local variations (17.7 new incidents per 100 herd-yrs. at risk)

**Figure A1.** Bovine bTB risk and surveillance areas of England (effective since January 2013) as set out in the strategy for achieving Officially Bovine Tuberculosis Free status for England

### 1.1 Policy objectives for the Edge Area:

**Short to medium term:**
- slow down geographic spread
- maintain crude herd incidence of OTFW breakdowns <2% overall by 2019
- begin to reduce the incidence rate

**Longer term:**
- reduce geographic spread of bTB and push the Edge Area boundaries westward
- reduce OTFW herd incidence to <1% by 2025
attain OTF status (incidence of indigenous OTFW herd breakdowns <0.1) for the lowest incidence counties in the Edge Area.

1.2 Key Control Measures

Surveillance
- enhanced herd test coverage (annual)
- extend targeted surveillance to 3km around new OTFW breakdowns in Cheshire and Derbyshire (radial testing), with six month follow-up possible RTA badger survey

Management of cases ('breakdowns')
- increased sensitivity of breakdown herd testing:
  - OTFS breakdowns to pass two short interval tests at severe interpretation to regain OTF status
  - mandatory IFN-g parallel testing in OTFW
- enhanced epidem. investigation and data analysis
- information sharing - location of breakdown herds

Appendix 2: Cattle industry in the Edge Area of the region

Table A2.1. Number of cattle premises by size band in the Edge Area of the region at 1 January 2015

(RADAR Cattle book 2008 (or most current update))

<table>
<thead>
<tr>
<th>Cattle per premises</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>Number of premises</td>
<td>226</td>
<td>97</td>
<td>86</td>
<td>54</td>
<td>25</td>
<td>23</td>
<td>512</td>
<td>126</td>
<td>61</td>
</tr>
</tbody>
</table>

Number of Approved Finishing Units (AFUs) registered in Oxfordshire: 5 (2 more planned for 2017)

Common land in the County: **Port Meadow & Wolvercote Common**: This is a relatively small common with half a dozen graziers and only used from spring to autumn. One cattle keeper who leases common rights brings animals from Herefordshire (in the HRA) which increases the home range of cattle beyond the local vicinity. The common lies adjacent to the River Thames and floods each year during the winter. This may make it an unfavourable habitat for resident wildlife of Bovine TB significance.

Table A2.2. Cattle/herd purpose

<table>
<thead>
<tr>
<th></th>
<th>Beef</th>
<th>Dairy</th>
<th>Dual purpose</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>43898</td>
<td>17707</td>
<td>2881</td>
<td>7</td>
<td>64493</td>
</tr>
<tr>
<td>%</td>
<td>68.1</td>
<td>27.5</td>
<td>4.5</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 3: Summary of the Edge Area regional headline cattle bTB statistics

### Table A3.1. Herd-level statistics

<table>
<thead>
<tr>
<th>Herd-level statistics - Oxfordshire</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a.</strong> Total number of cattle herds live on Sam at the end of the reporting period</td>
<td>440</td>
<td>431</td>
<td>428</td>
</tr>
<tr>
<td><strong>b.</strong> Total number of herd tests carried out in the period</td>
<td>663</td>
<td>757</td>
<td>804</td>
</tr>
<tr>
<td><strong>c.</strong> Total number of OTF cattle herds bTB tested during the period for any reason</td>
<td>362</td>
<td>383</td>
<td>382</td>
</tr>
<tr>
<td><strong>d.</strong> Total number of OTF cattle herds at the end of the report period (i.e. herds not under any type of bTB02 restrictions)</td>
<td>399</td>
<td>407</td>
<td>404</td>
</tr>
<tr>
<td><strong>e.</strong> Total number of cattle herds that were not under restrictions due to an ongoing bTB breakdown at the end of the report period.</td>
<td>408</td>
<td>417</td>
<td>414</td>
</tr>
<tr>
<td><strong>f.</strong> Total number of new bTB breakdowns detected in cattle herds during the report period</td>
<td>53</td>
<td>31</td>
<td>33</td>
</tr>
<tr>
<td>- OTF status suspended (OTF-S)</td>
<td>15</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>- OTF status withdrawn (OTF-W)</td>
<td>38</td>
<td>21</td>
<td>15</td>
</tr>
<tr>
<td><strong>g.</strong> Of the OTF-W herd breakdowns:</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>10</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>- How many can be considered the result of movement, purchase or contact from/with an existing breakdown based on current evidence?</td>
<td>20</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>- New OTF-W breakdowns triggered by skin test reactors or 2xIRs at routine herd tests</td>
<td>19</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>- New OTF-W breakdowns triggered by skin test reactors or 2xIRs at other bTB test types (forward and back-tracings, contiguous, check tests, etc.)</td>
<td>12</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>- New OTF-W breakdowns first detected through routine slaughterhouse bTB surveillance</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>h.</strong> Number of new breakdowns revealed by enhanced bTB surveillance (radial testing) conducted around those OTF-W herds (may not be applicable to every county in the Edge Area)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- OTF-S</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>- OTF-W</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
i. Number of OTF-W herds still open at the end of the period (including any ongoing OTF-W breakdowns that began in a previous quarter)  

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>26</td>
<td>12</td>
<td>11</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>2 farmed deer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Table A3.2. Animal-level statistics (cattle)

<table>
<thead>
<tr>
<th>Animal-level statistics (cattle) Oxfordshire</th>
<th>2016</th>
<th>2015</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Total number of cattle tested in the period (animal tests)</td>
<td>66760</td>
<td>66624</td>
<td>72346</td>
</tr>
<tr>
<td>b. Reactors detected:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• tuberculin skin test</td>
<td>451</td>
<td>266</td>
<td>331</td>
</tr>
<tr>
<td>• additional IFN-gamma blood test reactors (skin-test negative or IR animals)</td>
<td>217</td>
<td>74</td>
<td>96</td>
</tr>
<tr>
<td>• additional IFN-gamma blood test reactors (skin-test negative or IR animals)</td>
<td>234</td>
<td>192</td>
<td>235</td>
</tr>
<tr>
<td>c. Reactors per breakdown</td>
<td>9</td>
<td>8.58</td>
<td>10.03</td>
</tr>
<tr>
<td>d. Reactors per 1000 animal tests</td>
<td>6.76</td>
<td>3.99</td>
<td>4.58</td>
</tr>
<tr>
<td>e. Additional animals identified for slaughter for bTB control reasons (DCs, including any first-time IRs)</td>
<td>2</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>f. SLH cases (tuberculous carcasses) reported by FSA</td>
<td>9</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>g. SLH cases confirmed by culture of <em>M. bovis</em></td>
<td>7</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Appendix 4: Suspected sources of *M. bovis* infection for all the new OTF-W breakdowns identified in the report period

Table A4.1. Suspected sources of *M. bovis* infection for all the new OTF-W breakdowns identified in the report period

<table>
<thead>
<tr>
<th>Most likely origin</th>
<th>Oxfordshire</th>
<th>County Y</th>
<th>County Z</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prov.</td>
<td>Final</td>
<td>Prov.</td>
</tr>
<tr>
<td>Introduction (e.g. purchase) of infected animal(s)</td>
<td>3</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Local - lateral spread from neighbouring holdings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• exposure to infected wildlife</td>
<td>6</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>• other farmed species</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• recrudescence of residual infection from a previous bTB breakdown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• infected human source</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undetermined/obscure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (explain)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please attempt to categorise all new OTFW bTB 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. Use narrative text to describe uncertainties that result in cases being included in the ‘possible’ column or row.

<table>
<thead>
<tr>
<th>Probability of isolated, sporadic (‘one-off’) breakdown, without secondary cattle to cattle spread</th>
<th>Likely (no secondary breakdowns detected)</th>
<th>Possible (no secondary breakdowns detected, but dataset incomplete)</th>
<th>Not likely (secondary spread has occurred)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability of introduced <em>M. bovis</em> infection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definite</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likely</td>
<td>9</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Possible</td>
<td>5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Not likely (indigenous infection in the locality)</td>
<td>9</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 5: Overview of the bTB Control Programme in this Region of the Edge Area

5.1 Edge Testing Policy
- Limited exemption applied for g-IFN testing to one beef fattener during the winter period and only for the proportion of the herd to be slaughtered imminently before next turnout.

5.2 Unusual bTB breakdowns
- None

5.3 Other Testing Measures
- Overdue testing has been brought down to a very low level by working with the county local authority.

5.4 Other Control Measures
- The south east eradication board has continued to meet and discuss initiatives such as holding a veterinary practitioner conference to increase knowledge about local situation – recognising that the private vet is a key to bTB control.
- Looking at 2017, plan with the NFU to establish a new eradication board for Buckinghamshire, Berkshire and Oxfordshire.

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.