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

Delivery Area: Southern  
County: Hampshire

YEAR END REPORT FOR 2017

TB Edge Area - HAMPSHIRE
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1. Executive Summary

1. There have been only minimal changes to the cattle herd numbers, type and structure in Hampshire.

2. There has been a small reduction in the number of new herd breakdowns in Hampshire relative to 2016.

3. The annual incidence has reduced by 0.9% from 5.5% (2016) to 4.6% (2017).

4. The proportion of OTFW breakdowns attributed to movements of infected cattle is 66% compared with 25% most likely related to wildlife. Of the breakdowns attributed to infected cattle introductions, in 87% of cases the animals were sourced from the High Risk Area (HRA).

5. Badgers and maybe other wildlife continue to play a role in transmission in the endemic areas in north-west Hampshire.

6. The risk of spread into the Low Risk Area (LRA) from northern Hampshire through the advance of the endemic area is low due to the low density of cattle to the east of the infection front.

7. The risk to Hampshire from incursion of wildlife infection from the HRA is medium, but the risk from cattle purchased from the HRA remains high.

8. Current bovine tuberculosis (bTB) control measures focusing only on cattle (and not wildlife) will not be effective in reducing the incidence of cattle bTB in north west Hampshire unless fully effective biosecurity measures to reduce badger-cattle interactions can be implemented in the absence of badger measures.

9. We await to see the effect of the implementation from 1st January 2018 of six monthly testing in the endemic area in the north west of the county and radial testing in the remainder of Hampshire where OTFW herds are disclosed.

10. The burden of bTB control measures on both the taxpayer and farmers was reduced in 2017 when compared with 2016.

11. The possibility of reaching the target incidence and prevalence for OTF county status in 2025 in Hampshire appear to be remote.

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 TB 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 bTB in Hampshire, which has formed part of the Edge Area in full since 2013. (see Appendix 1). This area has a low but recently rising incidence of infected herds 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.

3. Cattle industry in the Edge Area of Hampshire

There are a total of 910 cattle herds in Hampshire with approximately 68,000 cattle. Of these cattle, 57% are beef, 37.2% are dairy and 5.7% are dual purpose animals. There are no livestock markets in Hampshire, which means that to purchase or sell stock farmers have to rely on markets in neighbouring counties. The markets predominantly used are in the HRA, therefore there is a flow of cattle especially for fattening from HRA into Hampshire. There is one medium-sized abattoir in Hampshire at Farnborough. Feeding and husbandry practices vary greatly within the county depending on herd type and size. Winter housing takes place on most premises from October to April. Summer grazing on temporary grazing is not uncommon.
Figure 1 Herd size ranges for Hampshire 2017

Dairy herds are spread evenly though the county and tend to be the larger herds (>201). Sucklers are also not geographically apportioned but are commonly smaller herds (<201) There are a small number of large fattening herds (>350) in the county.

4. Overview of the TB epidemic in the Edge Area of Hampshire

a. History of TB in the Edge Area of Hampshire

Figure 2 Epidemic curve for breakdowns in Hampshire from 2006 -2017

This figure shows that from the steady levels for the period 2006-2009, the doubling of breakdowns in 2010 has been more than maintained in subsequent years with an apparent up-and-down cycle of about three years length and peaks progressively increasing with 2016 the highest levels recorded for Hampshire.
b. Geographical distribution of bovine TB breakdowns (new and ongoing cases) in the Edge Area of Hampshire

Figure 3 shows that, apart from the northern tip of the county, most of the breakdowns are OTFS (black dots) and appear randomly distributed, which is consistent with a purchase origin (cattle movements) for the majority. The cluster in the north is part of the endemic area that extends into west Berkshire and was first apparent in 2014.
Figure 4 shows a reduction of 25% in OTFW breakdowns and a reduction of 15% in OTFS breakdowns from 2016 to 2017.

5. Descriptive epidemiology of bovine TB in the Edge Area of Hampshire

The map below (Figure 5) shows the breakdowns which have been attributed to endemic *M. bovis* infection in wildlife in the northern area of Hampshire. Those with triangular centres (green – genotype 10:a and dark blue – genotype 10:u) are breakdowns from 2017. It can be seen that there has been an expansion south eastwards around St Mary Bourne of genotype 10:a (grey circles) but that those of genotype 10:u (pink circles) remain within the previously defined area. A larger Edge Area map including Oxfordshire and Buckinghamshire (Figure 6) shows that the endemic 10:a in Hampshire has spread from the border with Wiltshire in comparison with the situation in Berkshire where the same genotype appears to have spread south from Oxfordshire.
Figure 5 Map showing breakdowns with *M. bovis* genotypes 10:a (grey circles) and 10:u (pink circles) in Hampshire and Berkshire
Figure 6 Map showing overall distribution of presumptive endemic areas according to genotypes
a. Incidence Risk

Figure 7. Annual incidence risk 2015-2017 Hampshire (new breakdowns expressed as a percentage of herds tested during 2017 which were unrestricted at the beginning of the year)

Following an almost doubling of incidence from 2015 to 2016 (3.0% to 5.5%) the incidence has reduced to 4.6%. The year-end prevalence for Hampshire was 2.6%.

b. Risk pathways for bTB infection

An epidemiological investigation of each breakdown was carried out by a government veterinary surgeon and the most likely source(s) were concluded by a process of elimination considering risk factors such as cattle movement history.

Figure 8. Most likely source of infection in new OTFW breakdowns detected in Hampshire during 2017
As can be seen from figure 8 above, a large percentage of OTFW breakdowns were attributed to the purchase of cattle. Those attributed to wildlife were in the north western area of Hampshire where genotype 10:u and 10:a predominate.

Figure 9. Origin of purchased infected cattle linked with new OTFW breakdowns in Hampshire 2017

As can be seen from Figure 8 and 9 the majority of infections have been introduced by purchases of infected cattle from the HRA. This has been deduced by the identification of genotypes linked to purchases of cattle from confirmed breakdown herds or contiguous herds or from herds in home range areas of the particular genotype.

The purchase from the LRA was a link to a breakdown in Cumbria with genotype 11:a.

c. Role of other species:

Badgers and other wildlife:

Anecdotal evidence suggests the badger population is stable, but that wild deer populations continue to rise. Muntjac especially seem to have spread and increased and unusually they are now being seen during daylight hours and many are being seen as road traffic casualties.

A Defra-funded survey for TB in found dead badgers was carried out by the University of Surrey in 2016-17 which included Hampshire. Unfortunately, the number of target carcasses was not obtained and results from this survey had not been published at the time of compiling this report.

We are not aware of any voluntary badger vaccination programmes that are currently running or planned in Hampshire.

There is no hard evidence through recently confirmed wildlife cases of spread either from the HRA to the Edge Area or from the Edge Area to the LRA.

There have been no confirmed wildlife cases in Hampshire in 2017. We therefore cannot confirm that there have been further wildlife incursions from Dorset and Wiltshire (HRA). The infection front does not extent to the Surrey and West Sussex border (LRA), therefore the risk to the LRA from Hampshire is currently low.

Other domestic species:

An alpaca OTFW breakdown in the New Forest in the south of the county was attributed to purchase of infected stock from a breeding alpaca herd in Wiltshire which, subsequent to the purchase, suffered an explosive TB breakdown. Genotyping confirmed the epidemiological connection. This herd had clinical cases and TB seropositive animals throughout 2017.
d. Detection of cases

![Figure 10 Detection methods of new TB breakdowns in Hampshire during 2017](image)

A quarter of the OTFW cases were detected at pre-movement tests (PRMT) the rest were at the whole herd test (WHT) and a 12 month post-breakdown test (12M). This means that a significant number of breakdowns were detected earlier than if detection had taken place at the annual test. No breakdowns were disclosed by routine post-mortem surveillance at abattoirs, suggesting that infection is being detected at an early stage. The single slaughterhouse case was confirmed on a premises which was already under restrictions and awaiting culture results from a skin test reactor which was also subsequently confirmed.

Over 70% of the OTFS breakdowns were detected at an annual WHT, or 12M test. The rest were detected at six month tests (6M) or PRMT i.e. earlier than if disclosed at an annual test.

The introduction of six monthly testing in endemic areas of Hampshire will further enhance the speed of detection in the north west of the county. The three OTFW breakdowns with a suspected wildlife origin were all detected at an annual test. These might have been detected earlier if six-monthly testing had been in place.

There was only one case which was considered to be due to recurrent infection from a breakdown in 2015.

The probability of spread in Hampshire would appear to be low in 2017 for 10:u as only two breakdowns are attributed to this genotype and both are within an area already noted as endemic. The other wildlife related case, which was confirmed as 10:a, is also within an area where this genotype is endemic.

e. Burden of bovine TB

Of 81,091 cattle tested in Hampshire during 2017, there were 132 reactors: 88 were reactors at comparative skin test and 152 were disclosed at the interferon-gamma blood test (Appendix 3). Compared to 2016, there was a decrease in the total number of cattle tested (94,602 in 2016) with a large drop in the total number of reactors being detected (317 in 2016). The average number of reactors per breakdown fell from seven reported in 2016 to four in 2017. This may be explained by the fact that six of the OTFW breakdown herds were suckler herds of less than fifty head of cattle and none were in large dairy herds.

The above figures suggest that the burden on both the taxpayer and farmers was reduced in 2017 when compared with 2016.
f. Key drivers of the bovine TB epidemic

The data suggests that the key driver of the epidemic in Hampshire is the purchase of stock from the HRA. However, there is evidence that wildlife is still a factor in maintaining the epidemic in the north west quadrant and there are worries that this may still lead to further spread eastwards. Outcomes which could help reduce this risk would be a reduction in purchases from the HRA and biosecurity and controls related to wildlife.

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

The post-movement (POMT) testing requirement in the LRA should partially mitigate some of the risks from cattle movements from Hampshire.

North east and South east Hampshire remain low density areas for cattle premises and cattle per square km. This mitigates the fact that this is the area to the east of the endemic front so may be a factor in reducing the apparent rate of advance of this area.

There were five OTFS premises in the eastern area of Hampshire bordering the LRA one of which is on the border of West Sussex. However, this specific case had restrictions lifted following the non-specific reactor protocol suggesting the breakdown may have been attributed to another cause. The only OTFW close to the border in north east Hampshire was as a result of purchase from the HRA without notable spread within the herd.

7. Summary of the risk to the Edge Area from the High Risk Area

Purchase of cattle from the HRA was the most likely cause of infection of the majority of OTFW herds in Hampshire in 2017.

As previously discussed in the 2016 Edge Area Report, the spread of wildlife infection from the HRA still remains the most significant risk to the Edge Area in Hampshire from Dorset and Wiltshire, but there is little evidence of this happening in 2017. The river Avon acts as a wildlife barrier in the south of the county along the Dorset border helping to protect the New Forest from incursions. The New Forest TB control plan which has run successfully for a number of years is an important strategy to reduce the likelihood of infected cattle being moved onto the common (see Appendix 2).

There are concerns that there have been a number of OTFS breakdowns in the central area of Hampshire in 2016-2017 as described above and the possibility that these may be predictors of a future local deterioration. There have been incidents in the past where there has been a pattern of OTFS breakdowns for a number of years which have then been followed by OTFW breakdowns in the same area (Selborne/Farringdon area).

8. Assessment of effectiveness of controls and forward look

As discussed in the Edge Area 2016 report, current measures focusing on cattle (and not wildlife) will not be effective in reducing the incidence of cattle bTB in Hampshire unless fully effective biosecurity measures to reduce or eliminate badger-cattle interactions can be implemented in the absence of badger control or vaccination.

We await to see the effect of the 2018 implementation of six monthly testing in the endemic area in the north west of the county and radial testing in the remainder of Hampshire where OTFW herds are disclosed.

There are no indications that the purchase of cattle from the HRA will diminish as there are not enough cattle from the Edge Area or LRA to satisfy demand for fattening cattle and replacement breeding stock. There is also a farmer perception that it is safer to buy pre-movement-tested cattle from the HRA rather than cattle from the LRA where the herd may not have been tested for more than three years. An explosive TB breakdown in Hertfordshire a number of years ago is quoted by the farmers as an example as to why this mindset persists.

The current incidence level and its trajectory from 2016 to 2017 in Hampshire does not suggest that the target of less than 2% incidence will be achieved by 2019 or that OTF status will be achieved by 2025. It will be critical that the reduction from 2016 to 2017 is continued and accelerated in 2018 if there is any chance of reaching these goals.
Appendix 1: Overview of risk and surveillance areas of England and Edge Area objectives and controls

1.1 Policy objectives for the Edge Area:
Short to medium term:
- a. slow down geographic spread
- b. maintain crude herd incidence of OTFW breakdowns <2% overall by 2019
- c. begin to reduce the incidence rate

Longer term:
- d. reduce geographic spread of bTB and push the Edge Area boundaries westward
- e. reduce OTFW herd incidence to <1% by 2025
- f. 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
- a. enhanced herd test coverage (annual)
- b. six month testing in endemic area of north west Hampshire and radial testing in rest of Hampshire from 1st Jan 2018 for OTFW breakdowns.
- c. awaiting results of badger survey 2017
- d. recommencement of badger vaccination programme.

Management of cases (‘breakdowns’)
- a. 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
- b. enhanced epidemic investigation and data analysis
- c. information sharing - location of breakdown herds
Appendix 2: Cattle industry in the Edge Area of the region

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>495</td>
<td>129</td>
<td>104</td>
<td>53</td>
<td>17</td>
<td>32</td>
<td>828</td>
<td>82</td>
<td>30</td>
</tr>
</tbody>
</table>

Number of Approved Finishing Units (AFUs) registered in the Region’s Edge Area
There are currently no AFUs in Hampshire

Common land in the County or Counties: New Forest Common is used all year round with no physical barriers between herds. Where there are roads or railway underpasses are provided. The Commoners operate under the New Forest TB Control Plan which allows exemption from pre-movement testing when moving off the Common
under licence. The plan mitigates risk by imposing a strict four month whole herd testing window on all herds and biosecure quarantine and post movement testing of any cattle joining the Forest herd.

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></td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>Cattle</td>
<td>38957</td>
<td>25412</td>
<td>3912</td>
<td>11</td>
<td>68292</td>
</tr>
<tr>
<td></td>
<td>57.0%</td>
<td>37.2%</td>
<td>5.7%</td>
<td>0%</td>
<td>100%</td>
</tr>
</tbody>
</table>
### Herd-level statistics

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.  Total number of cattle herds live on Sam at the end of the reporting period</td>
<td>934</td>
<td>910</td>
</tr>
<tr>
<td>b.  Total number of herd tests carried out in the period</td>
<td>1205</td>
<td>1143</td>
</tr>
<tr>
<td>c.  Total number of OTF cattle herds TB tested during the period for any reason</td>
<td>796</td>
<td>776</td>
</tr>
<tr>
<td>d.  Total number of OTF cattle herds at the end of the report period (i.e. herds not under any type of TB02 restrictions)</td>
<td>900</td>
<td>865</td>
</tr>
<tr>
<td>e.  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>915</td>
<td>886</td>
</tr>
</tbody>
</table>
| f.  Total number of new TB breakdowns detected in cattle herds during the report period
  | - OTF status suspended (OTF-S) | 28   | 25   |
  | - OTF status withdrawn (OTF-W) | 16   | 12   |
| g.  Of the OTF-W herd breakdowns:
  | - How many can be considered the result of movement, purchase or contact from/with an existing breakdown based on current evidence? | 10   | 7    |
  | - New OTF-W breakdowns triggered by skin test reactors or 2xIRs at routine herd tests | 8    | 7    |
  | - New OTF-W breakdowns triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, etc.) | 8    | 5    |
  | - New OTF-W breakdowns first detected through routine slaughterhouse TB surveillance | 1    | 0    |
| h.  Number of new breakdowns revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds (may not be applicable to every county in the Edge Area)
  | - OTF-S | N/A | N/A |
  | - OTF-W | N/A | N/A |
| 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) | 8    | 7    |
| j.  New confirmed (positive *M. bovis* culture) incidents in non-bovine species detected during the report period (indicate host species involved)
  | 1 (cat) | 1 (Alpaca) |

### Animal-level statistics (cattle)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.  Total number of cattle tested in the period (animal tests)</td>
<td>94602</td>
<td>81091</td>
</tr>
</tbody>
</table>
| b.  Reactors detected:
  |   |   |
  | - tuberculin skin test   | 168  | 88   |
  | - additional IFN-gamma blood test reactors (skin-test negative or IR animals) | 149  | 52   |
| c.  Reactors per breakdown | 7    | 4    |
| d.  Reactors per 1000 animal tests | 3.35 | 1.73 |
| e.  Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs) | 0    | Figures not available |
| f.  SLH cases (tuberculous carcases) reported by FSA | 3    | 3    |

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1 In some cases there is minor variation (under 4) between the total number of breakdowns reported in the Year End Descriptive Epidemiology Reports for individual counties and the report on Bovine tuberculosis in England in 2017. These are due to differences in the breakdown case definition, where incidents first detected in late 2016 are included as 2017 breakdowns in the individual county reports; and where incidents occur in epidemiologically linked premises.
| g. SLH cases confirmed by culture of *M. bovis* | 2 | 1 (found during ongoing OTFW breakdown) |
Appendix 4: 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>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prov.</td>
<td>Final</td>
</tr>
<tr>
<td>Introduction (e.g. purchase) of infected animal(s)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Local - lateral spread from neighbouring holdings</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• exposure to infected wildlife</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>• other farmed species</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• recrudescence of residual infection from a previous TB breakdown</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>• infected human source</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Undetermined/obscure</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Other (explain)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

<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>15/043/0119</td>
<td>15/154/0062</td>
<td>6</td>
</tr>
<tr>
<td>Definite</td>
<td>Likely</td>
<td>Possible</td>
<td>Not likely</td>
</tr>
<tr>
<td>Likely</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Possible</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Not likely (indigenous infection in the locality)</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

List the CPHs of those herds with OTF-W breakdowns categorised as definite or likely introduced cases with no evidence of local spread (greyed-in boxes):
Appendix 5: Overview of the bTB Control Programme in this Region of the Edge Area

5.1 Edge Testing Policy
- OTFW - enhanced testing with interferon-gamma without exemptions has been carried out as per policy.

5.2 Unusual bTB breakdowns
- No unusual breakdowns

5.3 Other Testing Measures
- No exemption have been given for fatteners
- No potential hotspots have been triggered
- No contiguous testing has been undertaken in response to wildlife as no confirmed wildlife cases in 2017.
- No contiguous testing relative to non bovine breakdown (alpaca) as source of infection was confirmed by genotype to be from the source herd which was an OTFW herd in Wiltshire
- Overdue testing is on a very small scale. One premises and one animal and therefore of no great significance

5.4 Other Control Measures
- No specific biosecurity initiatives were set up in Hampshire in 2017
- Audits have been carried out on Official Veterinarians (OVs) performing TB tests in Hampshire and actions taken where necessary.
- Meetings were arranged with OVs and stakeholders to explain changes in policy with regard to introduction of six month testing/radial testing and to update them on current epidemiology.

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