Department for Environment, Food and Rural Affairs

Animal & Plant Health Agency

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

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.

Mid-year (first six months) for 2018:

1. Cattle Industry in the Region

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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 3,080 cattle herds. There is approximately a similar number of beef and dairy herds. The size of herds is very variable, ranging from smallholding with one or two animals to large dairy herds with up to 1,000 animals per herd.

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

However, there are cattle dealers who bring animals from the higher risk areas of GB to be sold through markets within the county. Purchasers of these animals are not aware of the origin until after animals have been bought, although they have been pre-movement tested for TB with negative results and, since April 2016, require a post-movement test too. Herds for final finishing tend to be less cautious of the sources of their purchased cattle, and many of these cattle will be slaughtered prioir to completion of their post movement test.

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

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

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

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

There are eleven cattle city farms in Cumbria.

1.2 The county of **Lancashire** has approximately 1,800 cattle herds. There are a similar number of beef and dairy herds. The size of herds is very variable, ranging from smallholding with 1 or 2 animals to several very large dairy herds with up to 2800 animals per herd.

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

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

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

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

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

The number of cattle herds in Greater Manchester is approximately 440 and in Merseyside only about 60 cattle herds. Most of the herds are very small holdings, with an average herd size of 30 to 60 animal, with little investment in cattle housing, machinery and equipment. There is an approximately 50-50 split between beef and dairy herds.

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

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

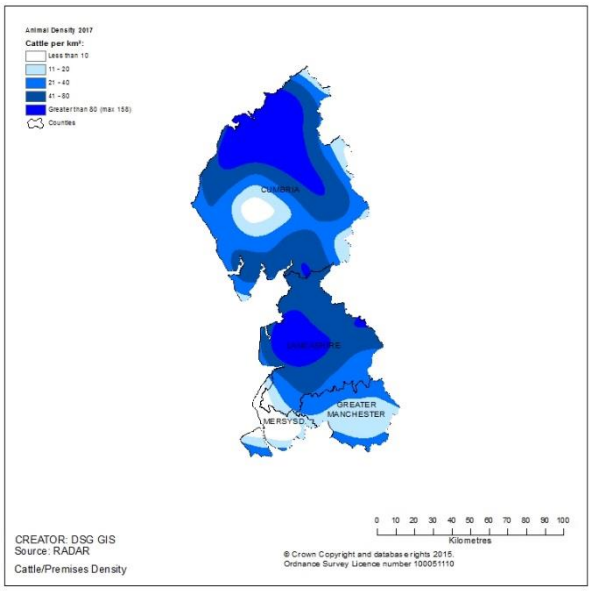
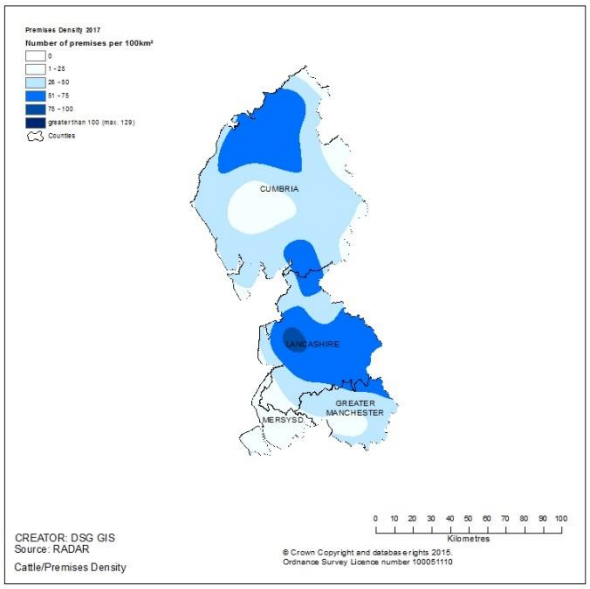
Number of cattle premises by size band in the division at 1 January of the reporting year.

Cattle per premises		0	1 - 50	51 - 100	101 - 200	201 - 350	351 - 500	501+	All	Mean	Median
CUMBRIA	**08**	20	1168	518	611	429	183	150	3079	145	81
LANCASHIRE	**21**	29	845	261	293	203	98	84	1813	128	56
MERSEYSIDE	**25**	0	33	12	6	3	2	3	59	98	42
GREATER MANCHESTER	**44**	7	306	57	46	18	4	1	439	53	22

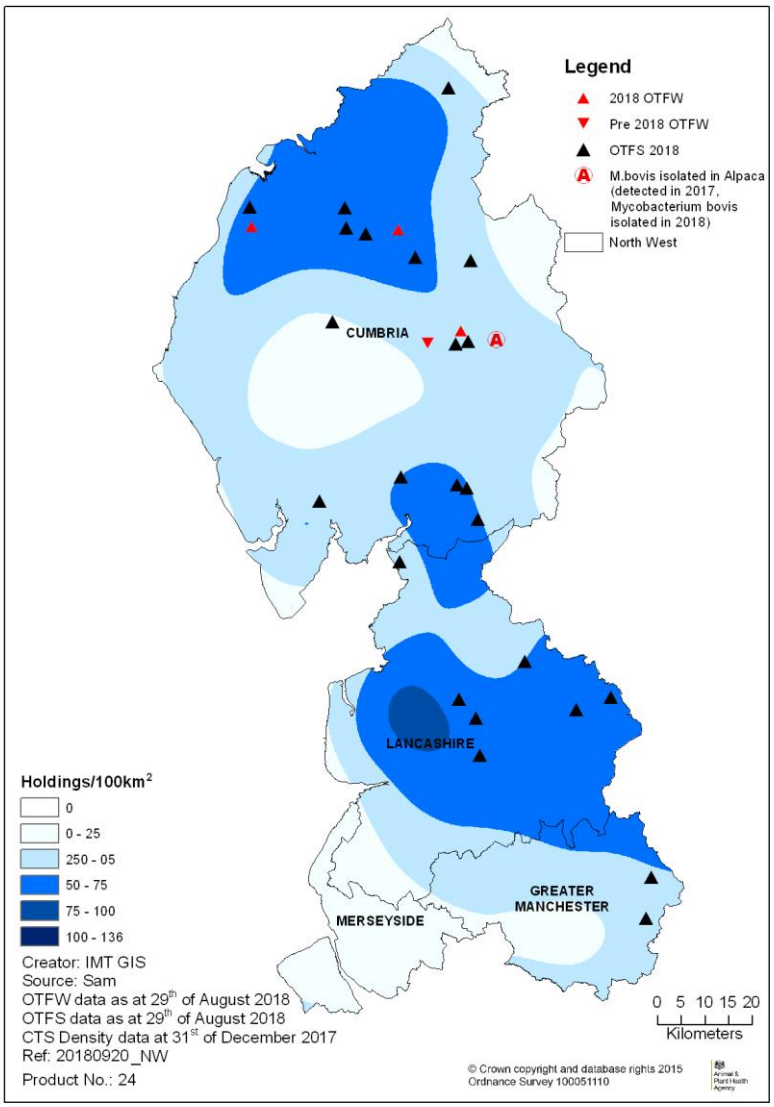
Cattle breed purpose - numbers and percentages at 1 January of the reporting year.

County		**Beef**	**Dairy**	**Dual Breed**	**Unknown**	**Total**
CUMBRIA	**08**	213076 (47.7%)	220004 (49.2%)	13941 (3.1%)	39 (0.0%)	447060
LANCASHIRE	**21**	75848 (32.7%)	143976 (62.0%)	12426 (5.4%)	5 (0.0%)	232255
MERSEYSIDE	**25**	2739 (47.4%)	2890 (50.0%)	153 (2.6%)	0 (0.0%)	5782
GREATER MANCHESTER	**44**	14082 (60.9%)	8471 (36.6%)	548 (2.4%)	21 (0.1%)	23122

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

Map - Cattle per square km	Map - Number of premises per 100 square km
	

2. Geographical Distribution of Bovine TB Breakdowns in the Region



3. Summary of the Regional Headline Cattle TB Statistics

There have been three OTFW cases disclosed in Cumbria during this reporting period, which compares favourably with the same period in 2017, when six OTFW cases had been disclosed.

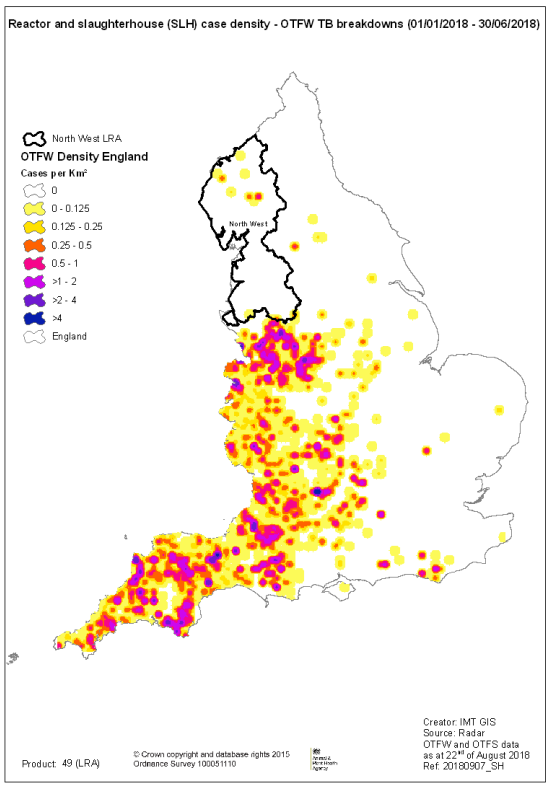
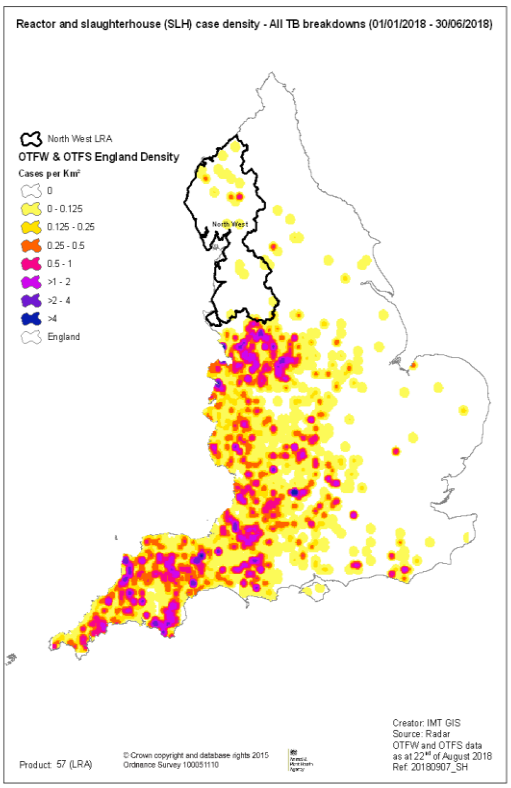
We await the next round of enhanced surveillance testing within the East Cumbrian hotspot area (HS-21) following the 2018 grazing period.

Lancashire, Merseyside and Manchester have had no OTFW cases disclosed during this reporting period. During the same period last year there were two OTFW cases each in Lancashire and Merseyside with one OTFW case in Manchester.

Herd-level statistics	**CUMBRIA**	**LANCASHIRE**	**MERSEYSIDE**	**GTR MANCHESTER**
(a) *Total number of cattle herds live on Sam at the end of the reporting period*	3463	2126	78	490
(b) *Total number of cattle herds subject to annual TB testing at the end of the reporting period (any reason)*	721	226	11	67
(c) *Total number of herd tests carried out in the period*	1042	516	13	171
(d) *Total number of OTF cattle herds TB tested during the period for any reason*	518	340	12	107
(e) *Total number of OTF cattle herds at the end of the report period (i.e. herds not under any type of TB2 restrictions)*	3437	2100	76	477
(f) *Total number of cattle herds that were not under restrictions due to an ongoing TB breakdown at the end of the report period.*	3450	2118	78	488
(g) *Total number of new TB breakdowns detected in cattle herds during the report period*	18	7	0	2
• *OTF status suspended (OTFS)*	15	7	0	2
• *OTF status withdrawn (OTFW)*	3	0	0	0
(h) 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?	0	0	0	0
• were triggered by skin test reactors or 2xIRs at routine herd tests?	1	0	0	0
• were triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, etc.)?	2	0	0	0
• were first detected through routine slaughterhouse TB surveillance?	0	0	0	0
(i) Number of new breakdowns revealed by enhanced TB surveillance (radial testing) conducted around those OTFW herds				

• OTFS	0	0	0	0
• OTFW	0	0	0	0
(j) *Number of OTFW herds still open at the end of the period (including any ongoing OTFW breakdowns that began in a previous quarter)*	3	0	0	0
(k) New confirmed (positive *M. bovis* culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	0	0	0
Animal-level statistics (cattle)				
(a) Total number of cattle tested in the period (animal tests)	158570	56439	446	7591
(b) Reactors detected:	115	14	0	1
• tuberculin skin test	28	14	0	1
• additional IFN-gamma blood test reactors (skin-test negative or IR animals)	87	0	0	0
(c) Reactors per breakdown	6	2	0	1
(d) Reactors per 1000 animal tests	0.73	0.25	0	0.13
(e) Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs)	0	0	0	0
(f) SLH cases (tuberculous carcases) reported by FSA	6	5	1	4
(g) SLH cases confirmed by culture of M. bovis	0	0	0	0

Density of TB reactors and slaughterhouse cases in TB breakdowns per km²

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

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

Most likely origin	Provisional	Final
Introduction (e.g. purchase) of infected animal(s)		
Local - lateral spread from neighbouring holdings:		
• exposure to infected wildlife e.g. badgers	1	
• other farmed species		
• recrudescence of residual infection from a previous TB breakdown		
• infected human source		
Undetermined/obscure	2	
Other (explain)		

		Probability of isolated, sporadic ('one-off') breakdown, without secondary local spread from the index case		
		Likely (no secondary breakdowns detected)	**Possible (no secondary breakdowns detected, but dataset incomplete)**	**Not likely (secondary spread from the index case, or exposure to a common wildlife source has occurred)**
Probability of introduced *M. bovis* infection introduced via cattle movements	**Definite**			
	Likely			
	Possible			
	Not likely (indigenous infection in the locality)		2	1

List the CPHs of those herds with OTFW breakdowns categorised as definite or likely introduced cases with no evidence of local spread (greyed-in boxes):

5. Overview of the bTB Eradication Programme in the Region

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

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

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

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

6. Wildlife

There is one active 'hotspot' area with found dead wildlife surveillance in force in this region within the reporting period.

HS-21 East Cumbria (as of end June 2018)

- Badgers 49 submitted: 3 cultured positive 17.z genotype: 43 cultured negative 6 results pending.
- Deer 6 submitted: 6 cultured negative

Summary report on a cluster of TB herd breakdowns in East Cumbria caused by infection with genotype 17:z of *M. bovis* (2014-June 2018)

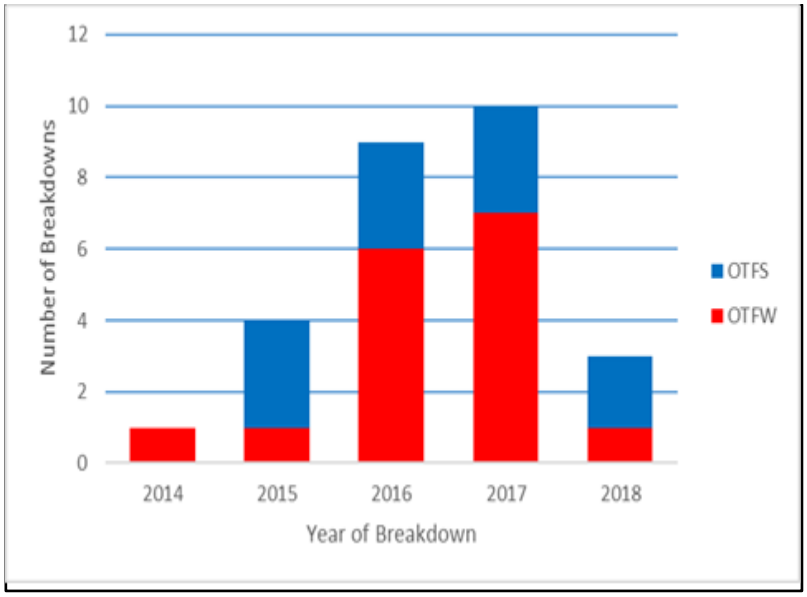
A cluster of TB herd breakdowns due to infection with *M. bovis* genotype 17:z has emerged to the southeast of Penrith in central eastern Cumbria. The evolution of this cluster has been reported upon in previous field epidemiology reports for the LRA of the Northwest of England.

Since September 2016 this localised bTB outbreak has being managed within a defined area known as 'Hotspot 21' (HS21). Herds of cattle and certain non-bovine livestock species within this area HS21 have been subjected to exceptional surveillance and control measures over and above the standard response applicable to OTFW breakdowns in the LRA. The additional TB surveillance was also extended to include carcases of badgers and wild deer found dead (and in the case of deer, also shot) within the designated area.

The index case was detected in November 2014 and further breakdowns have occurred on holdings with cattle herds within the defined area HS21, or holdings within their 3km radial testing zones, since then until the present time. In the three-and a half year period from November 2014 to the end of June 2018, this geographic cluster of bTB included 27 breakdowns on 22 separate cattle holdings (Figure 1):

- 13 of the 22 affected holdings have had at least one OTFW breakdown (i.e. infection confirmed by culture of *M. bovis* and/or evidence of visible lesions indicative of TB at post mortem examination of test reactors).
- All 14 herds with OTFW breakdowns have been infected with genotype 17:z of *M. bovis*.
- Recurrent breakdowns have occurred on three of the 22 affected holdings.
- One breakdown herd, primarily located approximately 20km distant from the HS21 area, had historically grazed cattle on a single field within the HS21 area.

Figure 1: Temporal distribution of the 24 TB herd breakdowns identified in the East Cumbria cluster between 2014 and the first half of 2018.



In addition to the 27 cattle herd breakdowns within area HS21, APHA has identified three other cattle herd breakdowns due to the same *M. bovis* genotype (17:z) as a result of reported cattle movements out of this area (ie. spread tracings): one just outside HS21 in Cumbria and two in LRA counties of the North of England (Lancashire and North Yorkshire). In these three cases the infection was contained in the herds of destination with no evidence of secondary spread of bTB to other herds.

Cattle TB breakdowns in HS21/'17z' cluster area during 2018

During the first half of 2018 three cattle holdings in HS21 were placed under movement restrictions as a result of new TB breakdowns. All three breakdowns were disclosed at HS21 enhanced (six-monthly) surveillance tests. The OTF status of one of the affected herds was withdrawn (OTFW) due to the identification of at least one test reactor animal with visible lesions and positive culture results (local genotype 17:z of *M. bovis* was isolated in bacteriological culture). By the end of the resporting period this herd had regained its OTF status

following the usual programme of skin and interferon gamma parallel testing. The status of the other two breakdown herds remained suspended (OTFS) at the end of June, but these herds have since regained OTF status (see Table 1). At the time of writing this report there are no herds under restrictions within the HS21

Table 1: S*ummary of TB breakdowns related to the East Cumbria cluster (area HS21) that were detected or active during the first half of 2018.*

Case ref.	Breakdown start date	Breakdown end date	Disclosing test type	Number of skin reactors/SLH cases (as of 17/04/18)	Number of additional gIFN reactors or DCs removed (as of 17/04/18)	OTF herd status	Genotype	*M. bovis* source assessment
	11/01/2018	14/06/2018	Enhanced surveillance (6 mo) test in HS-21	1	23	OTFW	17.z	local
	19/01/2018	10/07/2018	Enhanced surveillance (6 mo) test in HS-21	1	NA	OTFS	NA	Unknown
	16/02/2018	29/08/2018	Enhanced surveillance (6 mo) test in HS-21	1	NA	OTFS	NA	Unknown

Wildlife surveillance in HS21

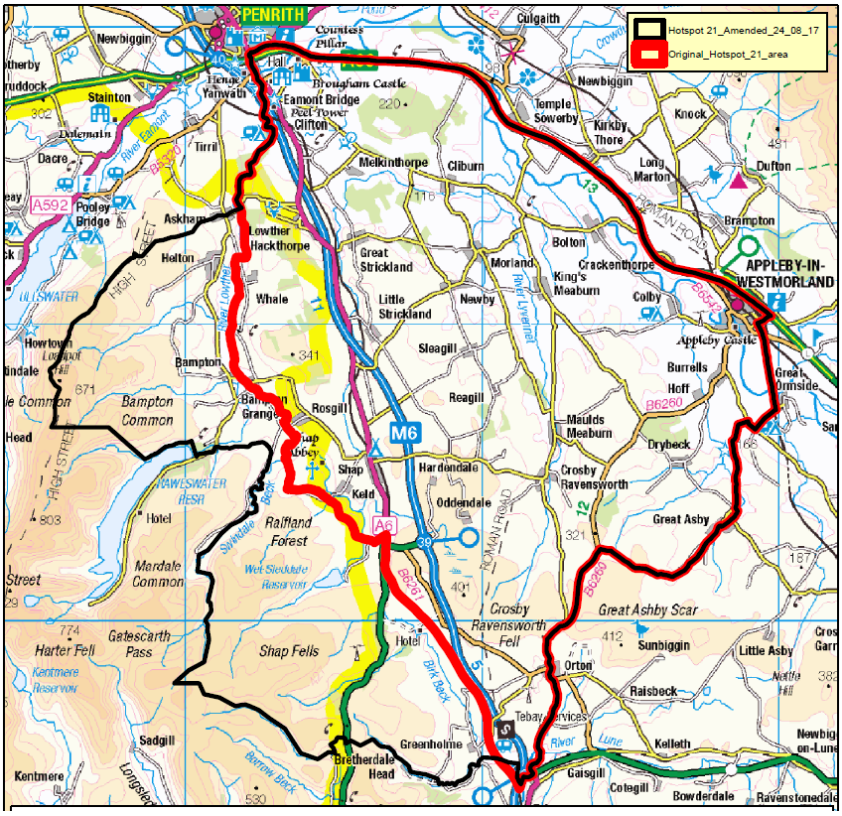
In September 2016, an ad-hoc TB survey of 'found-dead' badgers and wild deer was rolled out across the affected area (HS21). In June and July 2017, three badger carcases that had been collected from the central area within HS21 and submitted to APHA earlier in the year, were reported as culture positive for *M. bovis*. The isolates were all subsequently confirmed as genotype 17:z. No further *M. bovis* positive badger carcases have been identified since then.

Table 2: Results of carcase submissions from area HS21 up to 30 June 2018

***M. bovis* culture**	**Badgers**	**Deer**
positive	3	0
negative	43	6
pending	3	0
Total	**49**	**6**

In September 2017 the HS21 area was extended on the western side following a re-assessment of the OTFW cases within the cluster. – see map below.

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



Molecular epidemiology of the TB cluster in HS21

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

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

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

One of the badger isolate (2017) WGS matches the ancestral WGS isolate from the index cattle case (2014). On the assumption that it was most likely a bovine which carried the *M bovis* 17z into Cumbria, this would appear to confirm that *M. bovis* has been transmitted from cattle to badgers within HS21. Despite extensive and frequent cattle herd testing across the area, this ancestral WGS of *M bovis* 17z was not detected again in cattle cases from 2014 until 2017, when several isolates were detected in spatially close grazed cattle herds. The epidemiology suggests it highly likely that these specific cattle herd infections occurred either directly or indirectly from infected badgers to cattle at this location. The sequences of the remaining two badger isolates do not identically match those from any cattle cases.

The presence of infection in badgers indicates that they are a potential source of infection for the local cattle herds and represent a risk of bTB persistence in this area. Local stakeholder engagement has taken place,

and APHA processes reviewed, in an attempt to increase the number of badger and wild deer carcases examined within this area. As a result of these activities, the number of badger carcases reported and tested rose from seven in the first six months of 2017 to an additional 28 in the latter six months of the year.

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

Additional bTB controls rolled out in HS21 during 2017

Since September 2017, additional surveillance and breakdown control measures have been implemented across area HS21 to increase the detection of infection at an early stage. The enhanced control measures continued in the first six months of 2018 and consisted of:

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

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

At the beginning of this reporting period, consideration was being given to instigate another enhanced surveillance area in East Penrith, which would border HS21 to the north, but was epidemiologically distinct from the existing HS-21 (different genotypes of *M. bovis* involved). There have been no further breakdowns in this area since 2017, so this action is currently on hold but will be reviewed as necessary.

7. Other Susceptible Species

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One alpaca within a herd at the periphery of HS21 gave a positive result to a TB antibody test at the end of 2017. The animal presented with suspicious lesions of TB at post-mortem examination and *M. bovis* genotype 17:a was subsequently cultured at the beginning of 2018 (ie. not the local genotype 17:z). The field epidemiology assessment concluded that it most likely this alpaca had picked up this infection during its earlier life within the HRA of England.

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 from 2017 was still outstanding at the end of H1 2018, but the herd subsequently regained its OTF status in August 2018:

Ref: Askham PENRITH CA:

In the period of 1 January 2018 to 30th June 2018, there were three new OTFW breakdowns in Cumbria.

Ref: Greengill, Penrith, CA

This is a medium-sized beef suckler herd comprising 110 animals which are mostly homebred. It is located within the East Cumbrian hotspot (HS-21) and prior to losing its OTF status in October 2017 it had a clear TB history.

OTFS herd status was lost due to the disclosure of a single inconclusive reactor (IR) at the first 'hotspot' skin check test in October 2017, which when retested became a reactor with VL on post-mortem meat inspection, thus triggering a new (OTFW) breakdown on this holding. The reactor subsequently proved culture positive, genotype 17:z, the strain of *M. bovis* associated with this particular bTB cluster. This animal was a 14 month-old homebred male that had previously been tested with negative results in March 2017.

The first short interval test (SIT) in March 2018 was negative, but the parallel gamma test disclosed 23 reactors which were all NVL on PME. The results of the second SIT in June 2018 were negative and , therefore, the herd regained its OTF status before the end of the reporting period.

Infection is likely to have occurred during this animal's first grazing season within the locality. Badgers are common sightings in the vicinity of the farm's grazing.

Ref: Stubbsgill, Wigton CA

This is a family-run medium-sized suckler herd comprising a 140 animals, the vast majority of which are homebred. Purchases are very limited and consist of pedigree bulls from specialist sales with clear TB histories. The holding is not located within the TB hotspot area of East Cumbria.

Stubbsgill is located within the radial zone of **Ref 16/** and had a clear TB history until April 2018, when OTFS was lost due to a homebred reactor being disclosed at a pre movement test. A previous radial test in March 2017 and Rad 6 test in September 2017 were clear. This reactor was tested and clear in both these tests. The reactor was a homebred, 23m male, and VL on PM meat inspection with subsequent culture positive, genotype 9.d. This matches the genotype of Ref 16/ (the index breakdown detected in 2016 that triggered the radial TB surveillance in the locality).

An immediate skin check test at Stubbsgill of the remaining animals gave negative results, but a parallel interferon-gamma test undertaken in June 2018, disclosed three positive animals, one of which was VL. with culture pending at time of writing.The first SIT in August 2018 was clear with the second SIT pending.

Origin of infection is obscure at present**.** Farmer states that there is no direct contact between neighbouring cattle and the reactor grazed close to the home farm. The land grazed by **Ref 16/** is approximately 5 km distant.

A radial testing regime is being instigated around this holding.

Ref: Petterill Bank, Southwaite CA

This is a small family-run beef suckler unit which has converted from the existing dairy herd. It has had a clear TB history to date. OTFS status was lost due to two homebred reactors (7yr HO Female and 2yr BRB Female) being disclosed at the RHT in May 2018.

The Holstein reactor cow had VL and was subsequently culture positive, spoligotype 25, genotype pending.

An immediate skin check test of the remaining animals not tested in the disclosing RHT was negative. The interferon-gamma test in July 2018 was also negative, as was the first SIT undertaken in August. The second SIT is pending at time of writing.Origin of infection is obscure at time of writing, the herd has been closed for three years and prior to that purchases were very limited and from 4-yearly tested holdings. The same grazing land has been used for the past twenty years and there is no sharing of equipment with neighbours etc.

A group of 15 animals from another near farm overwintered at Petterill in 2017/18 before returning home in April 2018. Their farm of origin has a clear TB history to date and all 15 tested clear when trace tested.

Nose to nose contact is possible with neighbouring cattle at various locations, but to date these neighbours have clear TB histories. A radial regime is being implemented.

Lancashire

There were no new OTFW breakdowns in the reporting period

Merseyside

There were no new OTFW breakdowns in the reporting period

Greater Manchester

There were no new OTFW breakdowns in the reporting period

Glossary

- bTB – (bovine) Tuberculosis (infection of cattle with *M. bovis*)
- Edge Area (EA) – the annual TB testing area of England situated between the High and Low Risk Areas
- Epidemiology – the science that studies the patterns, causes, and effects of health and disease conditions in defined populations
- Genotype – the genetic makeup of a cell, an organism, or an individual usually with reference to a specific characteristic under consideration
- High Risk Area (HRA) – the annual testing area of England comprising the South West, West Midlands and part of East Sussex, in which *M. bovis* infection is endemic in cattle herds and in badgers
- IFN-γ – interferon-gamma test. A supplementary in vitro blood test for TB used by APHA in conjunction with the tuberculin skin test in some situations, usually to improve the overall diagnostic sensitivity in infected herds with OTF status withdrawn
- Low Risk Area (LRA) – the four-yearly TB testing area of the North and East of England in which *M. bovis* infection occurs only sporadically in cattle and is not considered endemic in wildlife. Although the default testing interval for routine TB surveillance is four years, some higher risk herds in the LRA are subjected to annual testing. There is also more intensive surveillance testing (radial testing) around any herds in the LRA (and parts of the Edge Area) that have their officially TB free status withdrawn due to a TB breakdown
- OTF – Officially Tuberculosis Free status. Herds that are not subjected to TB movement restrictions of any type are classified as OTF
- OTF-S – Officially Tuberculosis Free Suspended status. In England, an OTFS breakdown is a herd in which all the reactors removed had no visible lesions (NVL) on post-mortem examination and had negative culture results for *M. bovis*
- OTF-W – Officially Tuberculosis Free Withdrawn status. In England, an OTFW breakdown is a herd in which at least one test reactor with visible lesions (VL) and/or an animal with *M. bovis*-positive culture result have been disclosed
- Persistent herd breakdown – a herd that has been under TB movement restrictions for 18 months or longer due to infection with *M. bovis*
- Potential ‘Hotspots’ – a temporary area of enhanced TB cattle and wildlife surveillance that may be declared around some OTFW TB breakdowns of uncertain origin detected in a Region of historically low TB incidence
- SIT – short-interval test. A tuberculin skin test of all bovines in a TB breakdown herd, carried out 60 days after the removal of the last test reactor (or laboratory confirmation of a TB slaughterhouse case) in order to restore the OTF herd status. In the majority of cases, two successive SITs with negative results are necessary. The results can be read using standard or severe interpretation of the skin test. Calves under 42 days old are usually exempted.
- VRA – Veterinary Risk Assessment.