



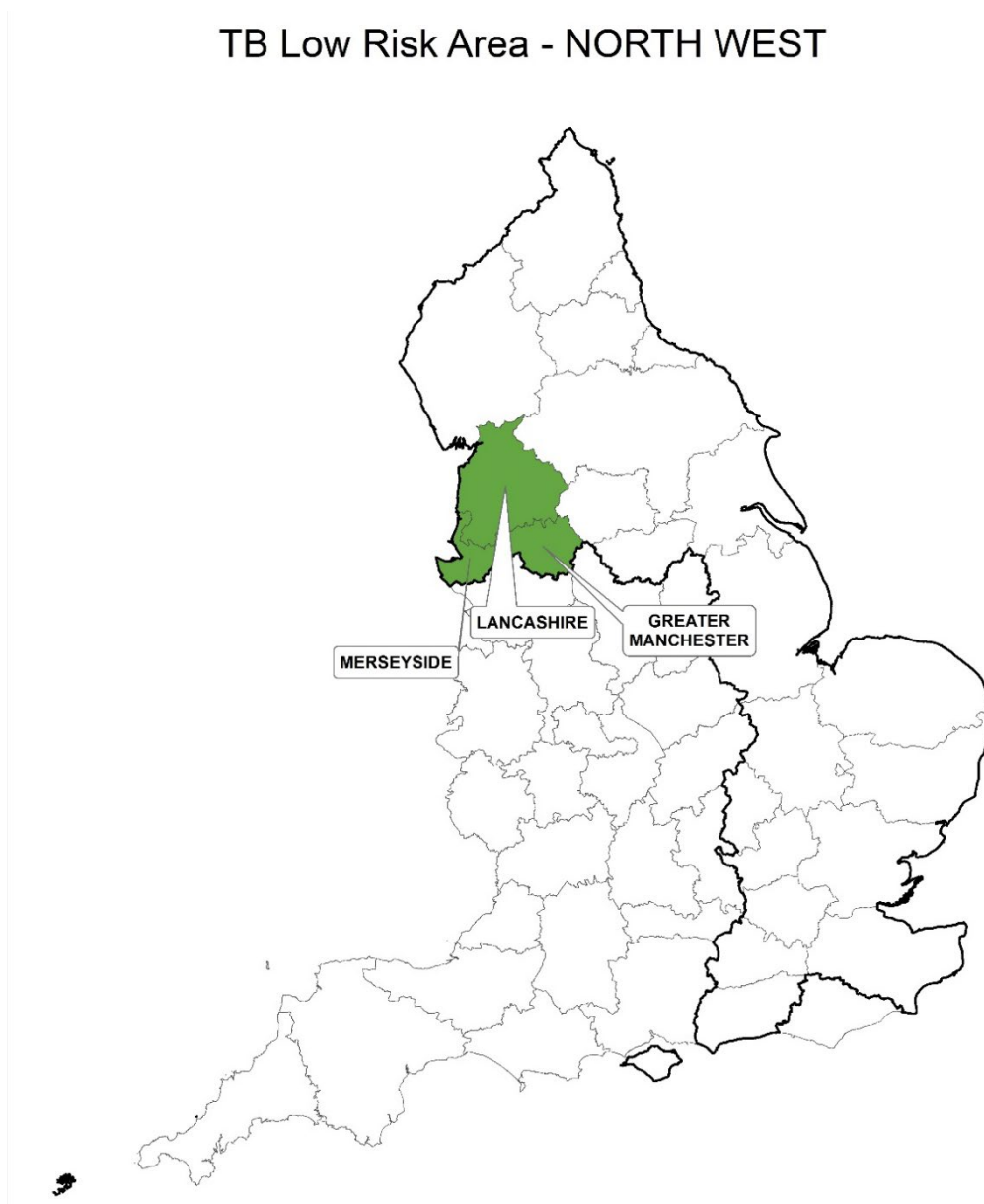
Animal &
Plant Health
Agency

Year-end descriptive epidemiology report: Bovine TB in the Low Risk Area of England

County coverage: North West of England (including
Lancashire, Merseyside, and Greater Manchester)

Year-end report for: 2020

TB Low Risk Area - NORTH WEST



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Executive summary

Reporting area

The North West of England (including the counties of Lancashire, Merseyside, and Greater Manchester) is part of the Low Risk Area (LRA) that was established in 2013. This area was later incorporated into the Government's strategy to achieve Officially Tuberculosis Free (OTF) status for England by 2038. Overall, the LRA has a very low and stable incidence of infected herds. This end of year report describes bovine TB (bTB) in the specified reporting area only.

Local cattle industry

Most of the cattle herds are found in Lancashire with relatively few herds in Merseyside and Greater Manchester. Larger dairy herds predominate in west and central Lancashire whilst smaller beef herds form the majority in Merseyside and Greater Manchester.

New incidents of TB

In the region during the reporting year, there were a total of 13 incidents.

In Lancashire there were two Officially Tuberculosis Free Withdrawn incidents (OTF-W) and six Officially Tuberculosis Free Suspended (OTF-S) incidents. This was a decrease from 2019 when there were a total 13 TB incidents in Lancashire, of which only one was OTF-W.

There were five OTF-W incidents in Greater Manchester during the reporting year. In 2019, there was the same total number of incidents, but comprising four OTF-W incidents and one OTF-S incident.

Merseyside recorded no incidents in either 2019 or 2020.

The COVID-19 epidemic had little effect on the total number of incidents recorded in the region in 2020, as most testing was undertaken with little delay and no incidents were disclosed following an overdue TB test.

Potential or confirmed TB hotspot areas

There are no active or potential TB Hotspot areas in Merseyside or Greater Manchester. There is an active TB Hotspot currently in North Yorkshire (HS27), which encroaches slightly into East Lancashire. This Hotspot is described in the Yorkshire & Humberside epidemiological report.

Unusual TB incidents

In 2019 and 2020, there was an apparent small cluster of three OTF-W incidents in central Lancashire, all with the genotype 25.a of *M. bovis*. The affected farms were within 3 km of each other, but each is separated by a large river or motorway with no other common factors identified.

Suspected sources and risk pathways for TB infection

Ongoing risk pathways have been identified which would explain the introduction of infection as a result of purchasing animals from higher risk areas. This is of particular concern in Greater Manchester due to the sourcing of animals from the higher risk areas to the south via easily accessible livestock markets. In addition, it is common for farms in Greater Manchester to have other land/buildings in the HRA, for example, Cheshire, with the resultant movement of stock between the two areas.

In recent years there has been an increase in TB incidents in Greater Manchester concentrated in the Stockport area to the south-east of the city of Manchester. This area borders the Edge Area of Cheshire and Derbyshire and it is very likely that there has been local spread of *M. bovis* from this part of the Edge Area into the LRA. However, in 2020 there was just one OTF-W incident. All the OTF-W incidents identified in this area have been caused by the common genotype 25.a.

Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents can be found in the main body of the report and in the [Explanatory Supplement](#).

Disclosing tests

In Lancashire of the eight new TB incidents in 2020, both OTF-W incidents were disclosed by radial testing surveillance, one at the initial radial test (RAD) and the other at the six-month radial test (RAD6). Of the remaining six OTF-S incidents, one was disclosed at a routine herd test (RHT), two were disclosed during RAD testing, one from a pre-movement test (PRMT), one from a post-movement test (POSTMT) and one from a check test (CT) following private slaughter of an unresolved inconclusive reactor.

In Greater Manchester, from the five new OTF-W TB incidents disclosed in 2020, two were disclosed at a POSTMT, two through slaughterhouse surveillance, and one due to RAD6 testing.

Reactor numbers

In the period 2015-2020 in Lancashire, there were a total of 196 reactors removed of which 105 (54%) were skin test reactors and 91 (46%) were identified by the interferon gamma (IFN- γ) blood test. In 2020, there were 20 (100%) skin test reactors and no IFN- γ test reactors disclosed.

In the same six-year period in Merseyside, 15 reactors were removed, of which 11 (73%) were skin test reactors and four (27%) were identified by the IFN- γ blood test. There were no reactors disclosed in 2020.

In Greater Manchester in the period 2015-2020, there were a total of 63 reactors disclosed of which 47 (75%) were skin test reactors and 16 (25%) were identified by the IFN- γ blood test. In 2020, there were eight (57%) skin test reactors and six (43%) reactors identified by the IFN- γ blood test.

Risks to the reporting area

The OTF-W incident in the area south-east of Manchester and on the boundary with Cheshire, shares a common genotype with those OTF-W incidents in recent years, namely 25:a. Historically, the majority of TB incidents in Lancashire and Merseyside can be attributed to inward movements of infected animals. Many farms in Merseyside in particular, have links to Cheshire, with cattle moving regularly between the two counties.

Risks posed by the reporting area

As the level of TB infection is both very low in Lancashire and Merseyside, the risk to the surrounding areas is considered to be low. Greater Manchester is more likely to be at risk from disease spreading northwards from the adjoining Edge Area counties than the reverse situation.

Forward look

To preserve the low incidence of disease in these three counties, it is vital that farmers source cattle carefully by considering the history of TB in the herds of origin and their surrounding area.

Introduction

This report describes the level of bovine tuberculosis in cattle herds in the North West of England (including the counties of Lancashire, Merseyside, and Greater Manchester) in 2020. Bovine tuberculosis is caused by the bacterium *Mycobacterium bovis* (*M. bovis*) and will subsequently be referred to as TB. This report explores the spatial and temporal distribution of TB in cattle herds. It examines what is likely to be driving TB in this area, and the risks the disease in this area may pose to neighbouring cattle. Although other sources may refer to TB 'breakdown(s)', this report will use the term 'incident(s)' throughout. This report is intended for individuals involved in the control of TB, both in the local area and nationally. This includes, but is not limited to: farmers, veterinarians, policy makers and the scientific community.

In 2014 the Government published its Strategy to achieve Officially Bovine Tuberculosis Free (OTF) status for England by 2038. A key action was to recognise the different levels of TB in different parts of the country and to vary the approach to control accordingly. To this end three management areas were established (see Appendix 1). The North West of England forms part of the Low Risk Area (LRA). Overall, the LRA has a very low and stable incidence of infected herds. The current strategy seeks to rapidly control infection when it arises through high sensitivity testing of affected herds and temporarily enhanced local surveillance (radial and hotspot testing). Mandatory pre- and post-movement testing of cattle entering the LRA from higher risk areas of the UK is also performed to reduce the risk of TB introduction. The aim is to preserve the favourable disease status of this area so that its counties can be declared OTF as soon as possible.

Changes due to COVID-19

During 2020, public health measures adopted by the government to contain the COVID-19 outbreak impacted the ability to carry out some TB testing due to social distancing and self-isolation guidelines, affecting both veterinarians and farmers. In particular, from 23 March 2020, routine or targeted TB skin tests were not mandatory for cattle under 180 days old where, in the official veterinarian's judgement, the young stock could not be tested safely in line with social distancing guidelines. The temporary amendment allowing calves under 180 days old to be excluded from TB testing did not apply to short interval tests in TB incident herds (required to restore a herds OTF status) or pre- and post-movement testing.

Routine TB skin tests are required within a pre-defined window of time to maintain a herds OTF status. From 23 March 2020, for tests that were allocated until 30 June 2020, the Animal and Plant Health Agency (APHA) permitted an extension to the TB skin testing windows on a case-by-case basis, where testing had not been completed due to valid reasons associated with COVID-19. The testing window for short interval tests was also extended by up to 30 days, where tests were unable to be completed due to COVID-19.

Furthermore, on-farm epidemiological assessments carried out to establish the route of infection for a TB incident herd were carried out remotely, by telephone, for the majority of 2020

Cattle industry

Herd types

Approximately two thirds of cattle herds in the area contain less than 100 animals (Figure 1), with the smaller herds tending to be beef enterprises. Most farms are traditional family run businesses with winter housing and summer grazing. There are several salt marshes located on the west coast of Lancashire where limited numbers of cattle graze during the spring and summer from a few local farms.

Lancashire has mainly dairy cattle accounting for 58% of the total number of cattle in the county. Merseyside and Greater Manchester have a higher percentage of beef cattle than dairy with 58% and 62% respectively of their total number of cattle.



Figure 1: Proportion of cattle holdings in the North West of England, by herd size and county in 2020. Note herds with an undetermined size are not shown.

Markets and abattoirs

There are currently four livestock markets operating in the region, all of which are located in the northern part of Lancashire. As a result, farmers in Merseyside and Greater Manchester tend to purchase stock from livestock markets in the south of this area, potentially exposing themselves to a higher risk of TB. There are two collection centres, both situated in Lancashire, which handle slaughter cattle.

Licensed Finishing Units

There is one Licensed Finishing Unit (LFU) in the reporting area, again located in Lancashire. This unit had a suspected slaughterhouse case in May 2020 which was negative on culture.

Common Land

There are several salt marshes located on the west coast of Lancashire that graze limited numbers of cattle during the spring and summer from a few local farms. The cattle run together over the salt marshes but are colour-tagged to identify them to their farm of origin. There are TB testing facilities available at these marshes should the need arise to test the stock whilst they are there, but this has remained unused to date.

Temporal TB trends

Unless otherwise specified, this report includes all new TB incidents detected during the reporting period. This includes 'officially tuberculosis free status withdrawn' (OTF-W) incidents and 'officially tuberculosis free status suspended' (OTF-S) incidents. OTF-W incidents are those involving one or more test reactors with typical lesions of TB identified at post-mortem, and/or one or more animals with *M. bovis*-positive culture results from tissue samples. OTF-S incidents are triggered by reactors to the Single Intradermal Comparative Cervical Tuberculin (SICCT) skin test, but without subsequent detection of lesions or positive culture results in any of those animals.

As shown in Figure 2, Greater Manchester has had a similar number (five) of new TB incidents disclosed each year since 2015. The majority have been attributed to the introduction of TB-infected cattle.

The incidence in Lancashire remains very low with purchased animals from out with the LRA generally being the probable source of infection. Numbers of new incidents (eight) have declined since 2019 (13), although the proportion of those with OTF status withdrawn was slightly higher in 2020.

There have been no new TB incidents in Merseyside for the past two years and historically the previous incidents can be attributed to the movement of animals from other areas of the country, e.g., Cheshire.

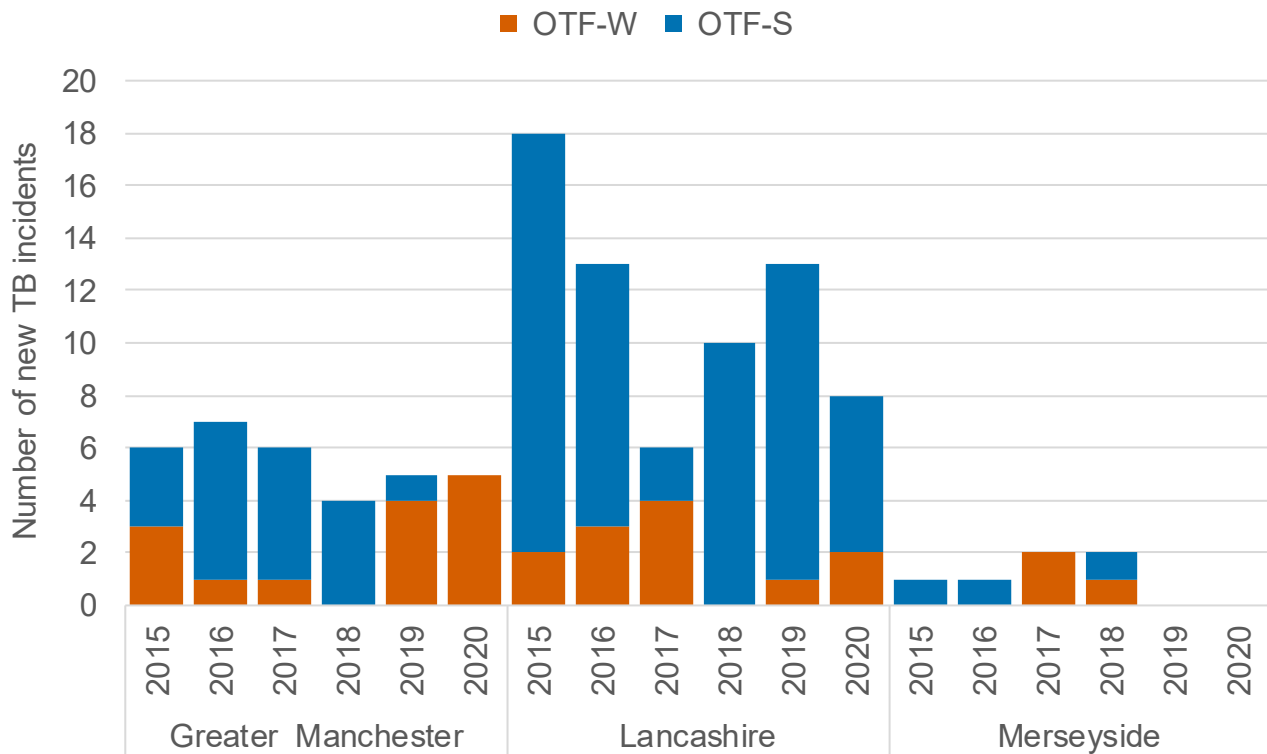


Figure 2: Annual number of new TB incidents in the North West of England, from 2015 to 2020.

Geographical distribution of TB incidents

In the reporting area, most TB incidents in Lancashire and Greater Manchester occurred in the areas of higher animal density. In Lancashire, the incidents disclosed, in most incidents were singleton reactors and the affected herds regained their OTF status within several months.

Whilst there was just a single OTF-W incident in 2020, the incidence of both OTF-S and OTF-W incidents has increased in the area to the south-east of Manchester in recent years. Genotype 25:a of *M. bovis* has been isolated from all the OTF-W incidents in that area, which is the predominant strain of the bacterium responsible for TB incidents in the bordering Edge Area of Cheshire.

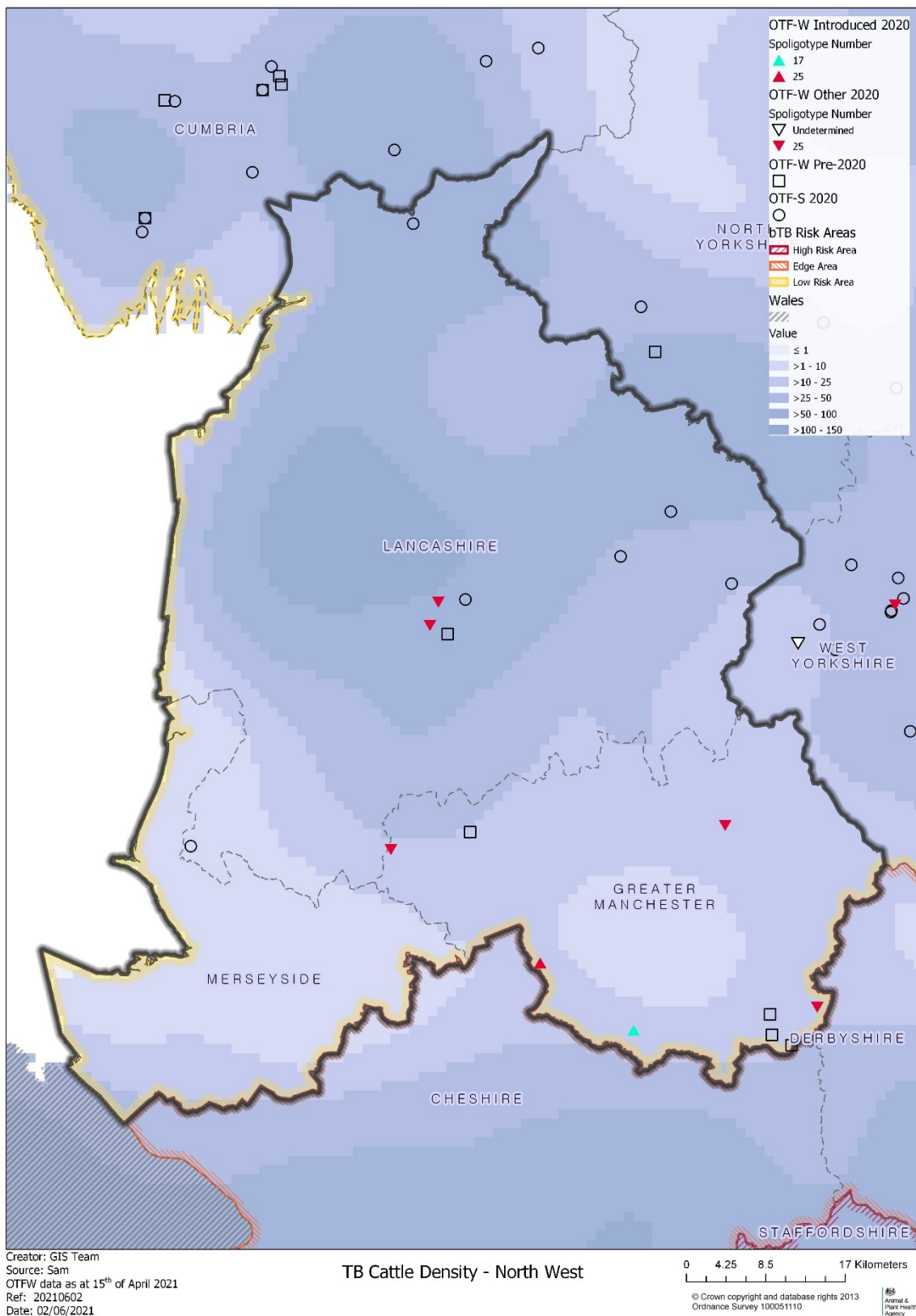


Figure 3: Location of cattle holdings in the North West of England with new TB incidents (OTF-W and OTF-S) in 2020, and cattle holdings with pre-2020 OTF-W incidents still ongoing at the beginning of 2020, overlaid on a cattle density map. Note: 'OTF-W Introduced 2020' refers to OTF-W incidents in which introduction of infection through cattle movements was the most likely source identified.

Potential or confirmed TB hotspot areas

There is a potential TB Hotspot (HS27) currently active in North Yorkshire, which encroaches slightly into Lancashire (Figure 4). This Hotspot is described in the Yorkshire Epidemiological Report.

Two OTF-W radial zones were initiated in Lancashire in 2020 and one remains active from 2019.

Four radial testing zones were initiated in Greater Manchester in 2020 and the four initiated in 2019 were still active during 2020. Some of these zones cross county borders.

There are no active radial TB surveillance zones in Merseyside.

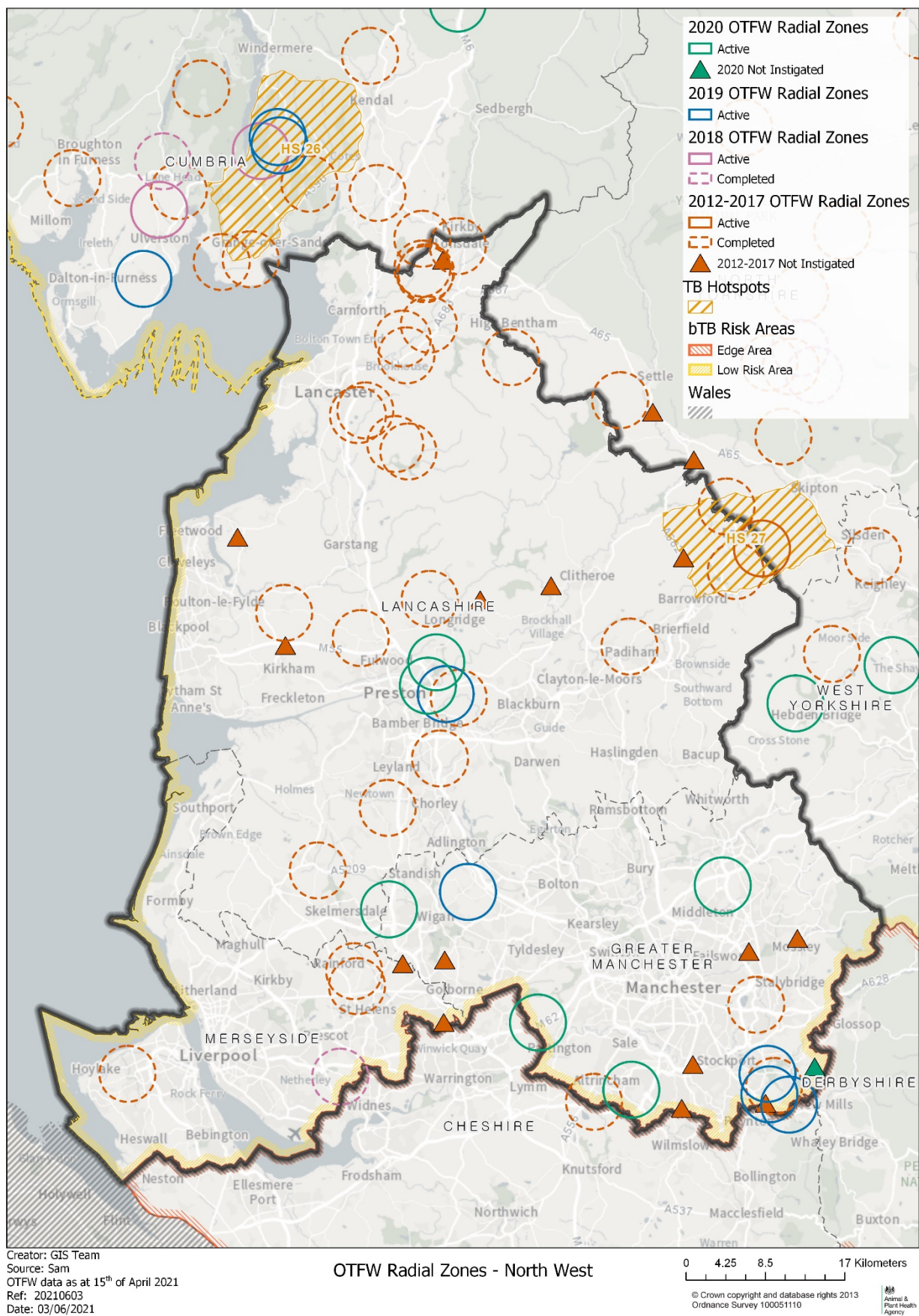


Figure 4: Potential hotspot areas and OTF-W radial surveillance zones that were active, completed or not instigated in the North West of England during 2020, by year of initiation.

Other characteristics of TB incidents

Unusual TB incidents

In 2019 and 2020, there has been an apparent small cluster of three OTF-W incidents in central Lancashire, all linked to infection with genotype 25:a (Figure 3). The farms are within 3 km of each other, but each is separated by a large river or motorway with no other common factors identified.

The first OTF-W incident in January 2019 was in a dealer's herd and was attributed to infected animals purchased from outside the LRA. The next incident in the cluster was in April 2020 in a beef fattening herd and disclosed at a RAD6 test instigated by the dealer's incident. The single reactor in the beef fattening unit was a recently purchased animal from the LRA. Its farm of origin and locality has no prior history of TB.

Whole genome sequencing (WGS) of the *M. bovis* isolates associated with the 2019 incident in the dealer's herd and the 2020 incident in the beef fattening unit did not establish a close genetic link.

The third incident of the cluster was disclosed in October 2020, also at a RAD6 test and was a single homebred reactor. WGS has not yet been undertaken to establish whether any close phylogenetic links exist with the other two incidents in the locality. Both premises regained their OTF status after the second short interval skin test with no IFN- γ test reactors disclosed.

Duration of TB restrictions

Most incident farms regain their OTF status relatively quickly in Lancashire and Greater Manchester, usually within five months of first disclosure. There were no persistent TB incidents among those ending in 2020 (Figure 5).

However, when radial testing is instigated around an OTF-W incident, the impact of TB is felt financially by the surrounding neighbours as they may be required to undertake additional PRMT testing at their own expense as well as receiving lower prices for their stock for the duration of their radial testing regime until they revert back to routine herd testing every 48 months.

In the area to the south-east of Manchester, it is not uncommon for a farm to finish one radial testing regime only to initiate another one in close succession.

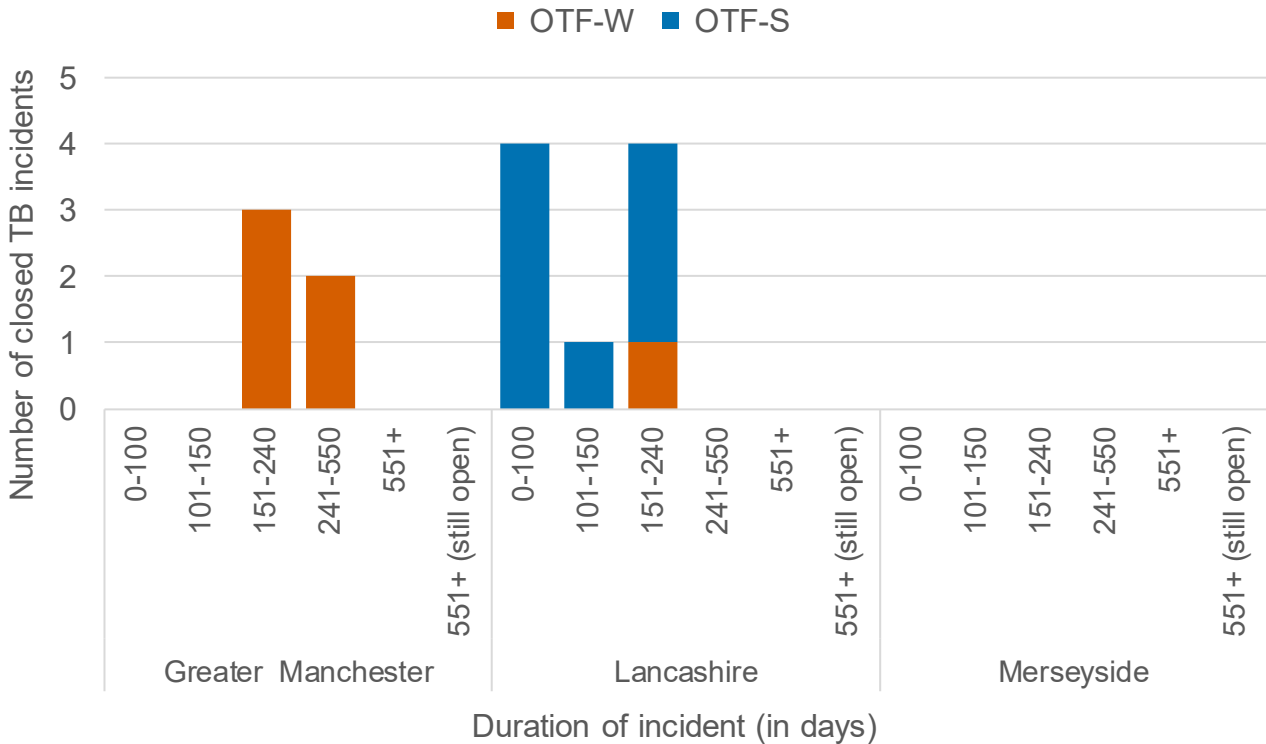


Figure 5: Duration of all TB incidents (OTF-W and OTF-S) that ended in 2020, and the number of persistent TB incidents (551+ days) that were unresolved at the end of 2020 in the North West of England. Note that Licensed Finishing Units (LFUs) have been excluded.

Genotypes associated with TB incidents

Genotyping of *M. bovis* isolates is used to trace the origin of TB infection. It is particularly useful in identifying where spread has occurred through cattle movements. Stable genotype clusters tend to be found in areas where there is a persistent local reservoir of infection. APHA implemented whole genome sequencing (WGS) in place of genotyping in April 2021. During 2020, however, genotyping was still attempted for all OTF-W herds in the LRA.

In Greater Manchester in 2020 there was one OTF-W incident with genotype 25:a that was disclosed in a post movement test on an animal purchased from the HRA four months previously. Whilst a purchased infection source would seem likely, the farm of destination in Greater Manchester has also had three previous OTF-Ws involving the same genotype in recent years which were attributed to locally acquired infection.

A farm to the western edge of Greater Manchester also had a first TB incident with genotype 25:a as a result of a homebred slaughterhouse case. The herd has always been closed with no bovine animals being purchased and double fencing separates neighbouring cattle when at grazing. Following instigation of a radial regime round this premises, to date no further incidents have been disclosed.

The fourth 25:a genotype disclosed in 2020 in Greater Manchester was also a first incident and a result of a homebred slaughterhouse case. Few purchases have been made of bovine animals but there have been several bovines purchased historically from out with the LRA.

The farm lies near to the Edge area of Derbyshire. A radial regime is ongoing from this premises but to date no further incidents have been disclosed.

The 17:a genotype in Greater Manchester was also attributed to a purchased animal originating from out with the LRA.

In Lancashire, the origin of the two incidents with genotype 25:a remains obscure. No definitive link has been found between the two farms and although one of the incidents was disclosed in a purchased animal, the farm of origin and surrounding locality has had a TB clear history to date. There is an abundance of wildlife in the area with frequent sighting of deer and badger tracks through the fields.

No further incidents have been disclosed so far in the radial testing zones surrounding these two farms.

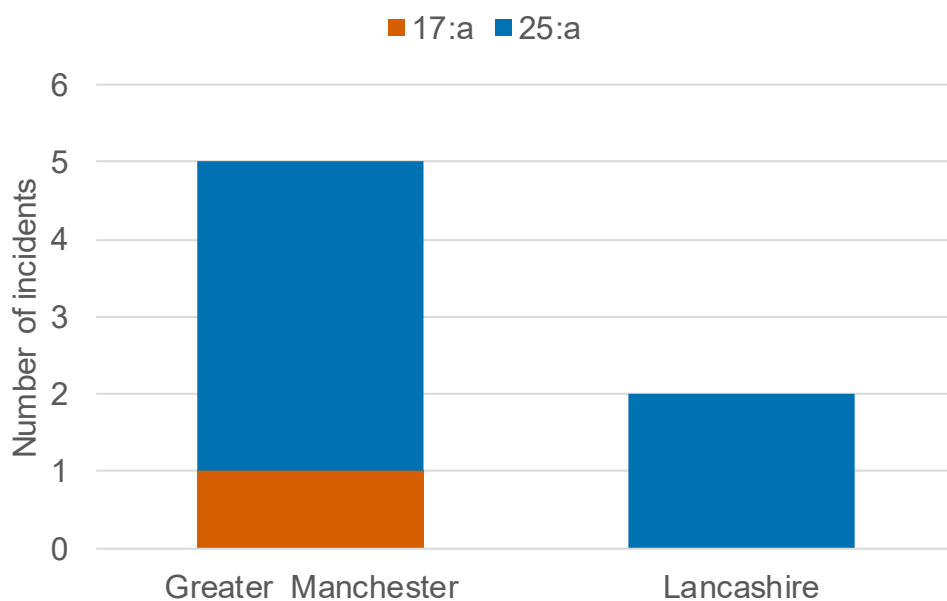


Figure 6: Genotypes of *M. bovis* identified in herds with OTF-W incidents in the North West of England that began in 2020, by county.

Suspected sources, risk pathways and key drivers for TB infection

The key drivers of the TB epidemic within the reporting area were as follows:

- Purchase/movement of cattle from outside the LRA
- Risk of lateral spread from the Edge Area of Cheshire into Greater Manchester
- Use of livestock markets sourcing cattle from the HRA and Edge Area

It can be challenging to retrospectively establish the route of infection for a TB incident herd. APHA aims to complete an epidemiological assessment for all TB incidents in the LRA (both OTF-W and OTF-S). This includes a thorough on-farm investigation and scrutiny of routinely collected data; such as cattle movement records, and the results of molecular analyses where available (OTF-W incidents only).

During the APHA veterinary assessment, up to three risk pathways of infection are selected for each herd. Figure 7 shows the risk pathways identified with the highest level of certainty for OTF-W incidents only. Further details of all the risk pathways identified in both OTF-W and OTF-S incidents can be found in Appendix 4.

The origin of infection for the two OTF-W incidents in Lancashire remains obscure (Figure 7).

In Greater Manchester, two of the OTF-W incidents are likely to be due to purchased infection, whilst the other three may be due to wildlife infection as no other likely sources of infection have been identified at time of writing.

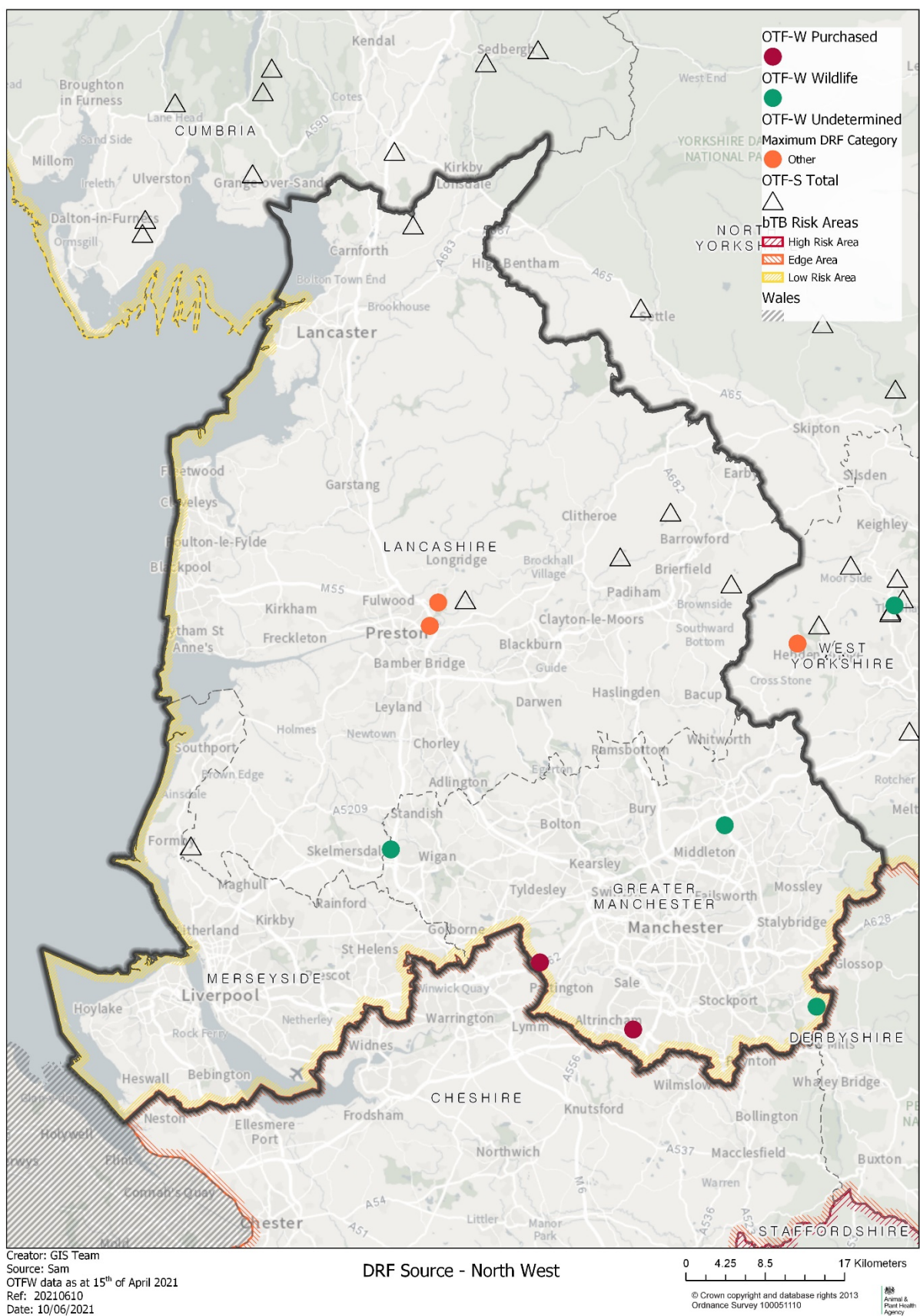


Figure 7: Map of the source of infection pathway recorded with the highest level of certainty, for OTF-W TB incidents, and the location of OTF-S incidents in the North West of England which started in 2020.

TB in other species

There were no confirmed incidents of *M. bovis* infection detected in other species in 2020 in this area.

Detection of incidents

As shown in Figure 8, In Lancashire of the eight new TB incidents in 2020, both OTF-W incidents were disclosed by radial testing surveillance, one at the initial radial test (RAD) and the other at the six-month radial test (RAD6). Of the remaining six OTF-S incidents, one was disclosed at a routine herd test (RHT), two were disclosed during RAD testing, one from a pre-movement test (PRMT), one from a post-movement test (POSTMT) and one from a check test (CT) following private slaughter of an unresolved inconclusive reactor.

In Greater Manchester, from the five new OTF-W TB incidents disclosed in 2020, two OTF-W incidents were disclosed at a POSTMT, two disclosed at slaughterhouse surveillance, and one due to RAD6 testing.

All the herds in the reported area whose incident started before October 2020, have since regained their OTF status. Ongoing post incident and radial testing over the next 12 months will help to determine whether there has been any spread of infection from these farms.

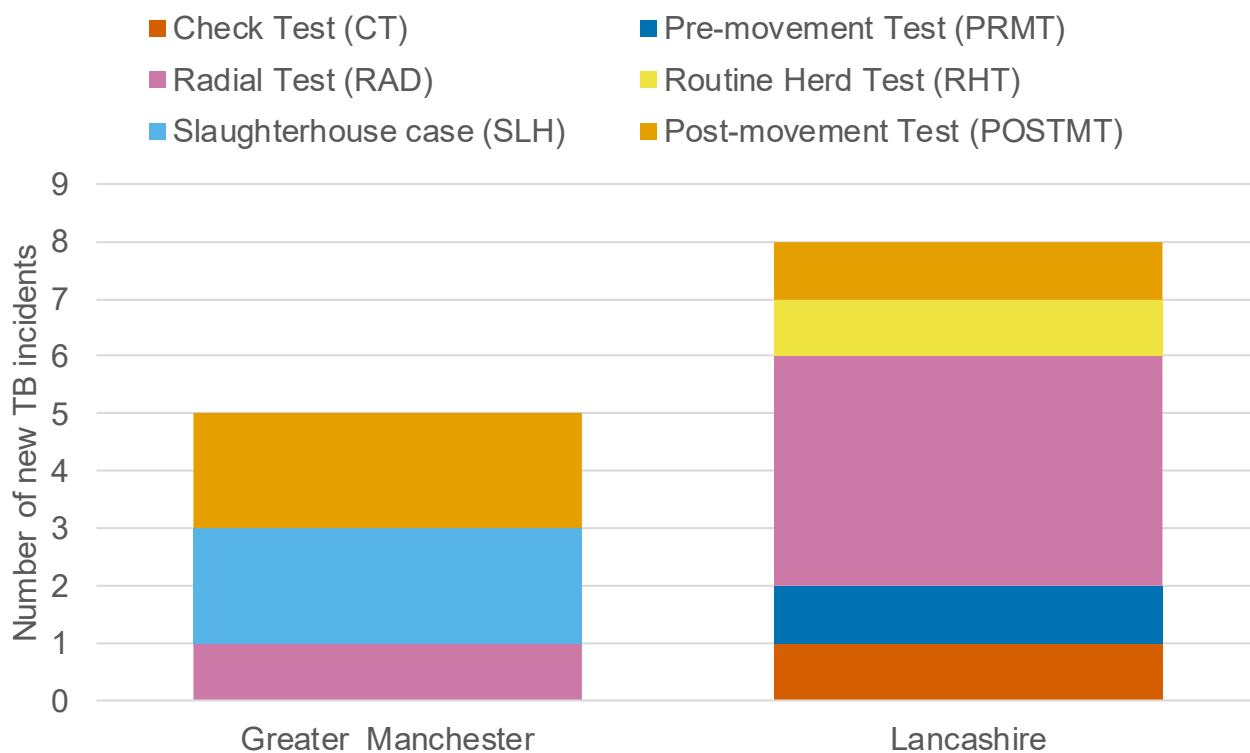


Figure 8: Number of TB incidents (OTF-W and OTF-S) in the North West of England in 2020, disclosed by different surveillance methods in each county.

Skin test reactors and interferon gamma test positive animals removed

In Lancashire the continuing low number of incidents indicates that the level of infection is stable. There have been no confirmed incidents disclosed in the radial testing around the two OTF-W incident farms disclosed in 2020 to date.

The level of TB infection in Greater Manchester has remained stable during the last six years from 2015 until 2020. There was one OTF-W incident in the south-east of Manchester during the reporting year.

This area will continue to be monitored closely as there is known infection in the wildlife from surveys undertaken in previous years.

Reactor numbers remain low probably due to the small size of many of the affected farms (Figure 9).

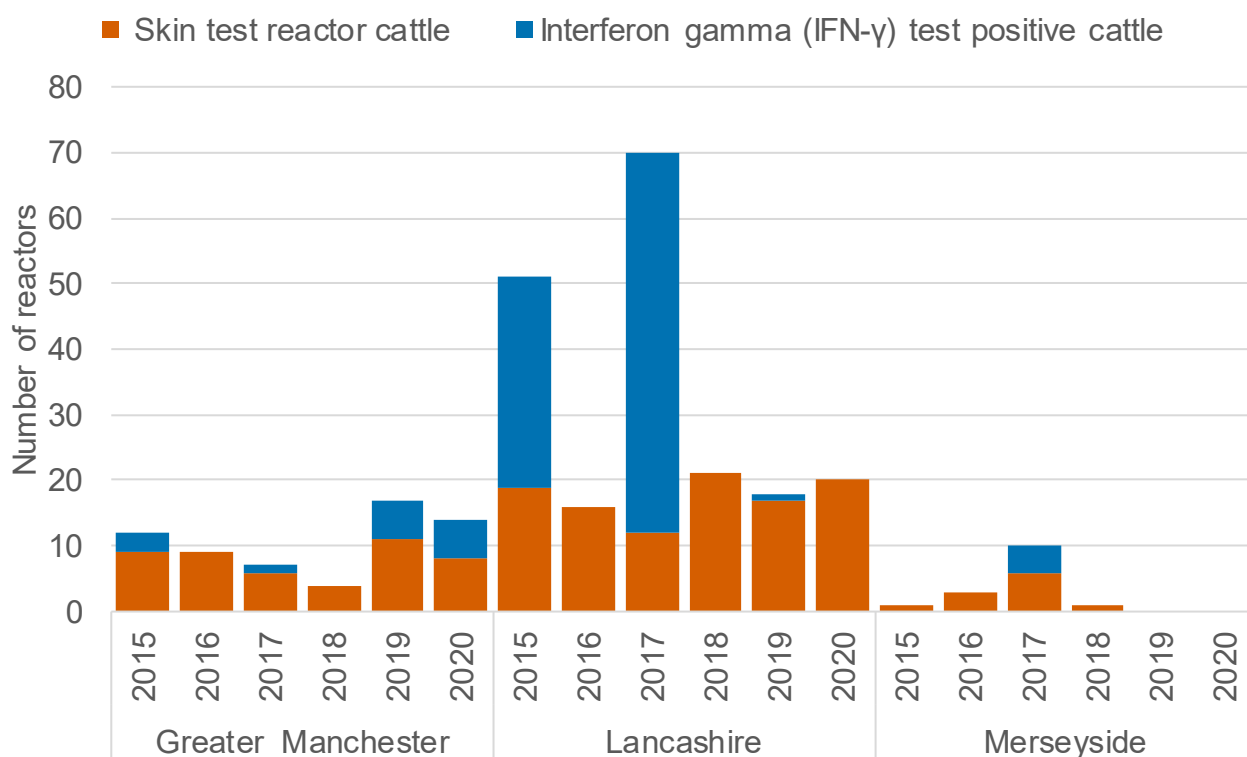


Figure 9: Number of skin test reactors and interferon gamma (IFN-γ) test positive cattle removed by APHA for TB control reasons in the North West of England, 2015 to 2020, by county.

Summary of risks to the North West of England

The incidence of TB infection in Lancashire is low and stable. Recent incidents in this county, have in the main, been attributed to purchased animals. The radial testing regime that has been instigated around the OTF-W farms has not demonstrated, to date, any spread of infection to neighbouring premises. Towards the Fylde coast in the West, the high-water table and the flat non-forested land does not lend itself to a large badger population.

In Merseyside, where there is a small number of cattle farms, there have been very few incidents in recent years. Of those, again the majority are due to purchased or moved animals, in particular, from Cheshire. It is common for cattle to be housed over the winter in Merseyside and move to Cheshire for the grazing period where pasture is more abundant, before returning to Merseyside in the autumn. The majority of farms in Merseyside are arable, growing potatoes and root vegetables for example and often surround a cattle unit, which greatly reduces the risk of cattle to cattle infection between premises.

Livestock farms in Merseyside and in the south of Greater Manchester often purchase stock from markets out of the LRA, traveling southwards to Shropshire for example, rather than attending the markets in Lancashire. This appears to be for their own convenience as well as a perceived price difference of the stock on sale.

Greater Manchester borders the Edge areas of Derbyshire to the south-east and Cheshire to the south-west. Studies of road killed badgers since 2014 collected from the south-eastern area around Stockport into Cheshire, demonstrated that a significant number of them were infected with *M. bovis*. There is the potential for transmission of infection from such an infected badger to any cattle it may come into contact with, either directly at grazing or indirectly, by accessing a cattle feed store, for example.

The city of Manchester, the extensive motorway network and the Manchester ship canal form an effective barrier to any environmental spread of *M. bovis* infection from this area further north and west into Lancashire.

In summary, the greatest risks are from inward cattle movements to all three counties, and from wildlife spread along the Cheshire and Derbyshire borders into Greater Manchester.

Summary of risks from the North West of England to surrounding areas

As the level of TB infection is very low in both Lancashire and Merseyside, the risk to the surrounding areas is considered to be low.

As mentioned previously, motorway networks and the heavily populated city of Manchester act as an effective barrier to the spread of infection from these two counties.

Greater Manchester also has a low level of infection and is more likely to be at risk from disease spreading northwards from the Edge counties rather than the reverse situation.

Assessment of effectiveness of controls and forward look

Effectiveness of controls

Historically, the number of TB incidents is very low in Lancashire and Merseyside. The source of infection in the majority of recent incidents has been identified as being caused by the purchase or movement of cattle and the farming community should be encouraged to source their stock responsibly both for their own benefit and that of their farming neighbours to prevent jeopardising this current situation.

The introduction in April 2016 of compulsory post movement testing of cattle moving into the LRA from higher risk areas of GB has been an important factor in encouraging locally sourced cattle as this test cost is borne by the farmer. It additionally serves as an obvious indication of the potential origin risk.

The importance of implementing biosecurity measures to prevent transmission of TB between farming neighbours and preventing contact with wildlife cannot be overstated. These measures need not be prohibitively expensive to be effective e.g., the raising of feed and water troughs off the ground, ensuring cattle feed store doors are kept shut and the fencing off of known badger sets and latrines. This is of especial value where there are known infected wildlife in the vicinity.

Forward look

With the continued low levels of TB in Lancashire and Merseyside there is a high likelihood that these two counties will achieve OTF status.

Greater Manchester too has a historically low level of TB, but as mentioned previously, the south-east area around Stockport and Manchester Airport is of concern due to its proximity to the Cheshire Edge Area. This may affect the likelihood of achieving OTF status for Greater Manchester if the situation deteriorates here.

Appendices

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

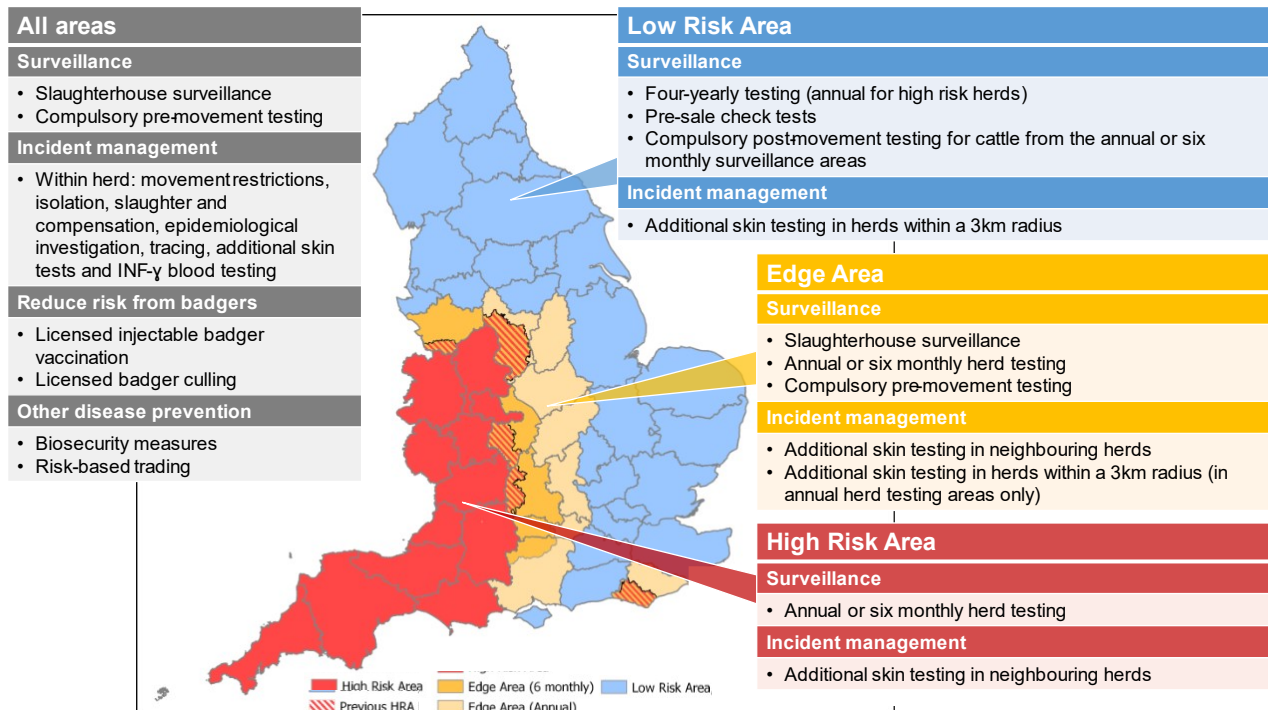


Figure A1: TB risk and surveillance areas of England effective since January 2018, as set out in the Government’s Strategy for Achieving Officially Tuberculosis-Free Status for England. The map is described in more detail in the Explanatory Supplement for England 2020 (<https://www.gov.uk/government/publications/bovine-tb-epidemiology-and-surveillance-in-great-britain-2020>).

Policy objectives for the LRA

Progressive attainment of OTF status for individual counties (or groups of counties) within the current LRA, with the declaration of OTF status for all LRA counties by 2025. For more information about the government’s strategy for achieving Officially Bovine Tuberculosis Free status for England, published in 2014 and independently reviewed in 2018, see:

<https://www.gov.uk/government/publications/a-strategy-for-achieving-officially-bovine-tuberculosis-free-status-for-england>

<https://www.gov.uk/government/news/government-sets-out-next-phase-of-strategy-to-combat-bovine-tuberculosis>

Key Control Measures in the Low Risk Area

Surveillance:

- default four-yearly routine surveillance (skin) testing of cattle herds, with annual testing for a small proportion of high-risk herds
- voluntary pre-sale skin check tests
- compulsory pre- and post-movement testing for cattle entering farms in the LRA (to live) from the annual or six-monthly surveillance areas of England and Wales
- additional targeted surveillance (radial testing) of cattle herds located within a 3km radius of new incident herds with OTF status withdrawn (OTF-W) following the detection of lesion-positive test reactors and/or culture-positive animals
- slaughterhouse (SLH) surveillance (through PM meat inspection) of all cattle slaughtered for human consumption

Management of incidents:

- herd movement restrictions, isolation and rapid slaughter of TB test reactors and any direct contacts with statutory compensation payments to farmers, epidemiological investigation, tracing tests (at severe interpretation), and short interval skin testing supplemented in all herds affected by OTF-W incidents with mandatory interferon gamma (IFN- γ) blood testing

TB controls in the wildlife reservoir (badgers):

- licensed injectable badger vaccination
- licensed badger culling in exceptional circumstances, where *M. bovis* infection has been confirmed in badgers and it has a clear epidemiologically link with a local cluster of TB in cattle (e.g., East Cumbria TB hotspot)

Other measures:

- biosecurity measures
- promotion of responsible sourcing of cattle (e.g., through the use of the ibTB online (www.ibtb.co.uk) mapping application)

Summary of enhanced TB control measures in this reporting area

The COVID-19 pandemic has curtailed regional meetings with farmers and National Farmers' Union during the reporting year. However, these are expected to resume later in 2021.

Appendix 2: Cattle industry in the reporting area

Table A2.1 Number of cattle premises by size band in each county at 1 January 2020.
(RADAR data)

Size of herds	Un*	1-50	51-100	101-200	201-350	351-500	501+	Total number of herds	Mean herd size	Median herd size
Number of herds in Greater Manchester	5	268	57	43	15	2	1	391	55	25
Number of herds in Lancashire	25	803	280	267	180	97	84	1,736	129	56
Number of herds in Merseyside	2	26	13	5	2	2	3	53	98	42

*The number of herds with an undetermined size.

Table A2.2 Number of animals by breed purpose in each county at 1 January 2020.

Breed purpose	Beef	Dairy	Dual purpose	Unknown	Total
Number of cattle in Greater Manchester	13,289 (62%)	7,656 (35%)	434 (2%)	17 (>0.1%)	21,396
Number of cattle in Lancashire	79,131 (35%)	131,966 (58%)	12,936 (5%)	4 (>0.01%)	224,037
Number of cattle in Merseyside	3,037 (58%)	2,026 (39%)	114 (2%)	0 (0%)	5,177

Appendix 3: Summary of headline cattle TB statistics

Table A3.1 Herd-level summary statistics for TB in cattle in 2020.

Herd-level statistics	Greater Manchester	Lancashire	Merseyside
(a) Total number of cattle herds live on Sam at the end of the reporting period	491	2108	66
(b) Total number of cattle herds subject to annual TB testing (or more frequent) at the end of the reporting period (any reason)	98	121	8
(c) Total number of whole herd skin tests carried out at any time in the period	170	440	17
(d) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	129	411	16
(e) Total number of OTF cattle herds at the end of the report period (i.e., herds not under any type of TB2 restrictions)	471	2081	65
(f) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period.	488	2105	66
(g) Total number of new TB incidents detected in cattle herds during the report period	5	8	0
<ul style="list-style-type: none"> OTF status suspended (OTF-S) 	0	6	0
<ul style="list-style-type: none"> OTF status withdrawn (OTF-W) 	5	2	0
(h) Of the new OTF-W herd incidents, how many:			
<ul style="list-style-type: none"> occurred in a holding affected by another OTF-W incident in the previous three years? 	0	0	0

Herd-level statistics	Greater Manchester	Lancashire	Merseyside
<ul style="list-style-type: none"> could be considered secondary to a primary incident based on current evidence? 	0	0	0
<ul style="list-style-type: none"> were triggered by skin test reactors or 2xIRs at routine herd tests? 	0	0	0
<ul style="list-style-type: none"> were triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, post-movement, etc.)? 	3	2	0
<ul style="list-style-type: none"> were first detected through routine slaughterhouse TB surveillance? 	2	0	0
(i) Number of new incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds			
<ul style="list-style-type: none"> OTF-S 	0	2	0
<ul style="list-style-type: none"> OTF-W 	1	2	0
(j) Number of OTF-W herds still open at the end of the period (including any ongoing OTF-W incidents that began in a previous reporting period)	3	1	0
(k) Number of OTF-W herds still open at the end of the period that are within a finishing unit	0	0	0
(l) New confirmed (positive <i>M. bovis</i> culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	0	0

Table A3.2 Animal-level summary statistics for TB in cattle in 2020.

Animal-level statistics (cattle)	Greater Manchester	Lancashire	Merseyside
(a) Total number of cattle tested in the period (animal tests, blood, and skin)	11,321	59,827	2,167
(b) Reactors detected in tests during the year:			
• tuberculin skin test	8	20	0
• additional IFN- γ blood test reactors (skin-test negative or IR animals)	6	0	0
(c) Reactors detected during year per incidents disclosed during year	2.80	2.50	0.00
(d) Reactors per 1000 animal tests	1.24	0.33	0.00
(e) Additional animals identified for slaughter for TB control reasons (DCs, including any first-time IRs)			
• DCs, including any first-time IRs	0	0	0
• Private slaughters	0	1	0
(f) SLH cases (tuberculous carcasses) reported by the Food Standards Agency (FSA) during routine meat inspection.	2	4	0
(g) SLH cases confirmed by culture of <i>M. bovis</i>	2	0	0

Note: (c) Reactors detected during year per incidents disclosed during year, reactors may be from incidents disclosed in earlier years, as any found through testing during the report year count here.

Note: (g) SLH cases confirmed by culture of *M. bovis*, not all cases reported are submitted for culture analysis. All cases reported are from any period prior to or during restrictions.

Appendix 4: Suspected sources of *M. bovis* infection for all of the new OTF-W and OTF-S incidents identified in the report period

Each TB incident could have up to three potential risk pathways identified. Each risk pathway is given a score that reflects the likelihood of that pathway bringing TB into the herd. The score is recorded as either definite (score 8), most likely (score 6), likely (score 4) or possible (score 1). The source(s) for each incident are weighted by the certainty ascribed. Any combination of definite, most likely, likely, or possible can contribute towards the overall picture for possible routes of introduction into a herd. If the overall score for a herd is less than six, then the score is made up to six using the 'Other/Unknown Source' option. Buffering up to six in this way helps to reflect the uncertainty in assessments where only 'likely' or 'possible' sources are identified.

Table A4.1 combines the data from multiple herds and provides the proportion of pathways in which each source was identified, weighted by the certainty that each source caused the introduction of TB. The output does not show the proportion of herds where each pathway was identified (this is skewed by the certainty calculation). Genotyping of *M. bovis* isolates can be a powerful tool in identifying a likely source of infection, however genotypes are not determined for OTF-S herds. As a result of varying levels of uncertainty, only broad generalisations should be made from these data. A more detailed description of this methodology is provided in the Explanatory Supplement to the 2020 bovine TB epidemiology report for England (<https://www.gov.uk/government/publications/bovine-tb-epidemiology-and-surveillance-in-great-britain-2020>).

Table A4.1 Suspected sources of *M. bovis* infection for all the new OTF-W and OTF-S incidents identified in 2020.

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	2	1	0	0	6.0%
Cattle Movements	4	0	2	2	35.5%
Contiguous	1	0	0	0	1.3%
Residual Infection	1	0	0	0	1.3%
Domestic Animals	0	0	0	0	0.0%
Non-specific Reactor	0	0	0	0	0.0%
Fomites	0	0	0	0	0.0%
Other Wildlife	2	3	0	0	16.2%
Other or Unknown Source	2	0	0	0	39.7%

Please note that each TB incident could have up to three potential pathways so totals may not equate to the number of actual incidents that have occurred. Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents can be found in the main body of the report and in the Explanatory Supplement for England 2020 (<https://www.gov.uk/government/publications/bovine-tb-epidemiology-and-surveillance-in-great-britain-2020>).

Appendix 5: Assessment of the origin of (and potential for spread of infection from) all the new OTF-W incidents identified in the report period

A risk matrix was used to identify isolated incidents that were likely to have been introduced to the LRA by cattle movements, while not causing any onward local spread. The following two questions were considered for each incident, and a score attributed. TB incidents with a score of 1A, 1B or 2A may be removed from the county TB incidence calculations during an application for OTF status (but remain in the incidence calculations in this report).

What is the probability of *M. bovis* infection being introduced to the LRA via infected cattle movements?

1. Definite - for example, traced reactors found in the LRA OTF-W incident herd in question as a result of spread tracings from another TB incident herd, genotype/WGS linked.
2. Likely - for example, a Reactor or IR originated from a previous incident herd (and the genotype does not suggest otherwise), other cattle were moved into the herd from previous incident herd (but were subsequently slaughtered without testing), or the trading practice of herd provides likely evidence (purchasing large numbers of cattle from High Risk Area (HRA), or Edge Area, High and Intermediate TB areas of Wales, or from the island of Ireland).
3. Possible - not a closed herd, but cattle are purchased from the LRA, Scotland and/or EU Member States.
4. Not likely - indigenous infection is known in the locality, closed herd, genotype/WGS has been identified in local wildlife.

What is the probability of this being an isolated, sporadic ('one-off') incident, without secondary local spread from the index case?

- A. Likely - no secondary incidents have been detected. There are **no** further incidents as a result of spread tracings anywhere and **no** genotype/WGS linked OTF-W incidents within 3km radial zone around the LRA OTF-W incident herd in question (or the 3km radial surveillance zone was not triggered).
- B. Possible - no secondary incidents have been detected, but the dataset is incomplete. For example, incidents have occurred in the 3km radial zone, but only OTF-S ones, or, if OTF-W, they were of an unknown/different genotype.
- C. Not likely - secondary spread from the index case, or exposure to a common wildlife source has occurred. For example, OTF-W incidents have occurred in the 3km zone linked by genotype or WGS, or there is known wildlife infection in the area with this genotype/close WGS.

Table A5.1 Risk matrix of the veterinary assessment of the origin of, and potential for spread of infection from, all the new OTF-W incidents identified in 2020.

		Probability of isolated, sporadic ('one-off') incident, without secondary local spread from the index case (A, B, C)		
Probability of <i>M. bovis</i> infection introduced through cattle movements (1, 2, 3, 4)		A. Likely	B. Possible	C. Not likely
1. Definite		2		
2. Likely				
3. Possible			1	
4. Not likely			4	



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