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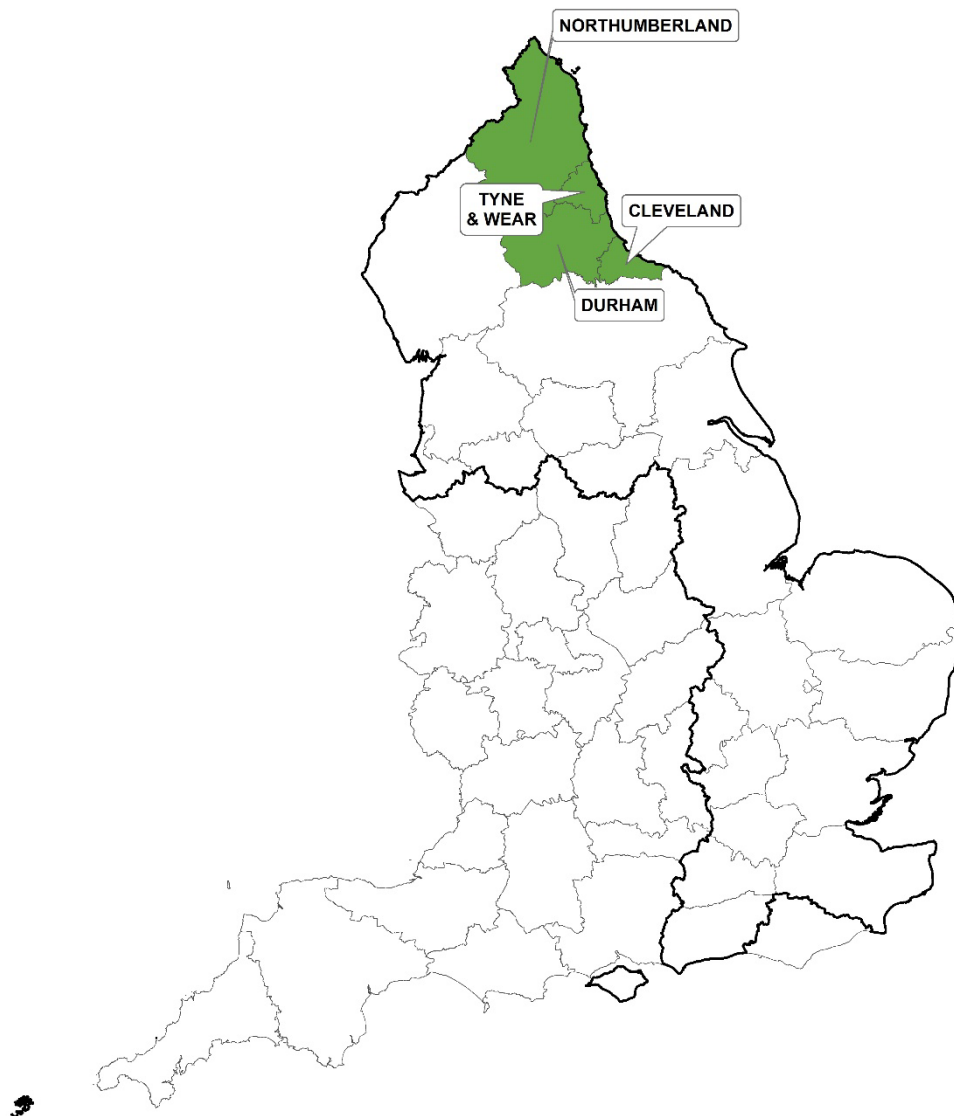
## Year-end descriptive epidemiology report:

# Bovine TB in the Low Risk Area of England

County coverage: North East of England (including Northumberland, Durham, Cleveland, and Tyne & Wear)

Year-end report for: 2020

TB Low Risk Area - NORTH EAST



## Contents

Executive summary .....	1
Reporting area .....	1
Local cattle industry .....	1
New incidents of TB.....	1
Potential or confirmed TB hotspot areas .....	1
Unusual TB incidents.....	1
Suspected sources and risk pathways for TB infection .....	2
Disclosing tests .....	2
Risks to the reporting area .....	2
Risks posed by the reporting area .....	2
Forward look .....	3
Introduction .....	4
Changes due to COVID-19 .....	4
Cattle industry .....	5
Herd types .....	5
Markets and abattoirs .....	6
Licensed Finishing Units .....	7
Common land .....	7
Descriptive epidemiology of TB .....	8
Temporal TB trends.....	8
Geographical distribution of TB incidents .....	9
Potential or confirmed TB hotspot areas .....	12
Other characteristics of TB incidents.....	14
Suspected sources, risk pathways and key drivers for TB infection.....	16
TB in other species .....	19

Detection of incidents .....	19
Skin test reactors and interferon gamma test positive animals removed .....	20
Summary of risks to the North East of England .....	22
Summary of risks from the North East of England to surrounding areas .....	22
Assessment of effectiveness of controls and forward look .....	23
Effectiveness of controls .....	23
Forward look .....	23
Appendices .....	24
Appendix 1: Overview of risk and surveillance areas of England and Low Risk Area objectives and controls .....	24
Appendix 2: Cattle industry in the reporting area .....	26
Appendix 3: Summary of headline cattle TB statistics .....	27
Appendix 4: Suspected sources of <i>M. bovis</i> infection for all of the new OTF-W and OTF-S incidents identified in the report period .....	31
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 .....	33

# Executive summary

## Reporting area

The North East of England (including the counties of Northumberland, Durham, Cleveland, and Tyne & Wear) 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

The North East of England has over 240,000 cattle in approximately 2,000 registered herds, of which 85% are beef production, mainly suckler breeding herds plus fattening units. Over 90% of the cattle in this region are in Northumberland and County Durham.

Local movement of breeding/fattening animals is important, but there are also large numbers of fattening animals brought in from the west of England and Wales. A relatively small number of breeding cattle arrive in the region from Scotland, Northern Ireland, and the Republic of Ireland. Outward trade in cattle of all classes to Scotland is important, particularly slaughter and fattening animals.

## New incidents of TB

Northumberland reported seven new TB incidents in 2020, one OTF-W and six OTF-S. This is almost unchanged from the six new TB incidents reported in 2019. Durham reported one OTF-S incident in 2020, compared with no incidents reported the year before. Cleveland reported two OTF-W incidents in 2020 in comparison with no incidents reported in 2019. Tyne & Wear has reported no incidents since the 1990s.

## Potential or confirmed TB hotspot areas

There were no active TB hotspot areas in any of the counties in the North East of England in 2020.

## Unusual TB incidents

In the OTF-W incident in Northumberland, an incident involving a 300-cattle fattening herd, the statutory interferon gamma (IFN- $\gamma$ ) test disclosed 17 positive animals. No visible lesions of TB were identified in any of them at slaughter. This number of IFN- $\gamma$  positive animals suggested TB spread within the herd. However, the two subsequent short interval skin tests (SIT) disclosed no more reactors among the remaining animals.

## Suspected sources and risk pathways for TB infection

The only OTF-W incident detected in Northumberland in 2020 was attributed to purchase of infected cattle from the Edge Area of England. From the other six OTF-S incidents, in three incidents no clear source of infection could be identified and were classified as undetermined origin. The other three were attributed to cattle movements.

In Durham the only OTF-S incident was classified as undetermined origin. In Cleveland one OTF-W incident in 2020 was attributable to cattle movements and the other had an undetermined origin at the time of compiling this report.

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

Of the ten new incidents in 2020, four were detected by routine herd testing (RHT) and six by enhanced (targeted) TB surveillance testing as follows: one incident was detected by tracing test (TR). Two incidents were detected by post-movement testing (POSTMT), and three incidents by radial surveillance testing (RAD).

In Northumberland there were 11 skin reactors and 17 IFN- $\gamma$  test positive animals removed in 2020. In Durham there was only one skin reactor removed. In Cleveland there were three skin reactors and two IFN- $\gamma$  test positive animals removed in 2020 in the two TB incidents recorded in this county. No reactors were removed in Tyne & Wear as no TB incidents were recorded in 2020.

## Risks to the reporting area

The risk of TB spreading to the North East of England from adjoining areas in the LRA is assessed as low. The most likely risks of TB introduction are movements of undetected infected cattle into the area either directly from farms or via animal gatherings from the higher risk areas of the UK.

## Risks posed by the reporting area

The risk of TB spreading from the North East of England to the adjacent LRA counties and Scotland is currently very low. This is due to the small number of annual incidents in the region, the low number of reactors found annually, the speed with which the few TB herd incidents are resolved and the effectiveness of enhanced surveillance in each incident.

## Forward look

Due to the slightly higher number of TB incidents detected in Northumberland in 2020 relative to previous years, the National Farmers' Union (NFU) organised online meetings to comply with the National COVID-19 restrictions. The meetings involved local Official Veterinarians (OVs), the county TB Eradication Group and APHA representatives. The aim was to raise general awareness of TB and to encourage careful sourcing of cattle to prevent more TB incidents in this area. To further reduce TB incidence and maintain LRA status, enhanced surveillance measures need to be continued, together with the adoption of safer cattle purchasing practices.

# Introduction

This report describes the level of bovine tuberculosis in cattle herds in the North East of England (including the counties of Northumberland, Durham, Cleveland, and Tyne & Wear) 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 East 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

This area is highly diverse, from the urban centres at the coast, with arable production on lower ground, to extensive hill ground in the western boundaries. There are around 2,000 registered cattle herds in the North East of England Region:

- 47% of cattle are in Northumberland,
- 44% in Durham,
- 6% in Cleveland,
- 3% in Tyne & Wear.

The number of herds in the region is stable in comparison with previous years.

As illustrated in Figure 1, there is a wide range of cattle herd sizes ranging from small herds under 50 head to large herds of over 500 cattle and there is some variation between counties:

- Northumberland has a mean herd size of 143; 33% of herds were under 50 cattle, and 9 % of herds were over 350 cattle
- Durham has a mean herd size of 96; 50% of herds were under 50 cattle, and 4.7% of herds were over 350 cattle
- Cleveland has a mean herd size of 112; 48% of herds were under 50 cattle, and 7.2% of herds were over 350 cattle
- Tyne & Wear has a mean herd size of 86; 51% of herds were under 50, and 1.7% of herds were over 350

Most of this population is beef by breed production (85% on average) and are usually breeding suckler herds. However, there are also many finishing herds which rely on the continuous supply of store cattle sourced both locally and from outside the region.

Dairy units account for a very small percentage of the total with 15% on average. The highest percentage is in Cleveland with 23%, which probably accounts for the higher-than-expected mean herd size.

Local movements of breeding and fattening animals are important, but there are also large numbers of fattening animals brought in from the higher risk areas in the West of England, Wales, and Northern Ireland. A relatively small number of breeding cattle are also brought in from Scotland, Northern Ireland, and the Republic of Ireland.

Outward trade in cattle of all classes to Scotland is important, particularly slaughter and fattening animals. These move relatively freely due to the whole region being on background four-yearly TB testing.



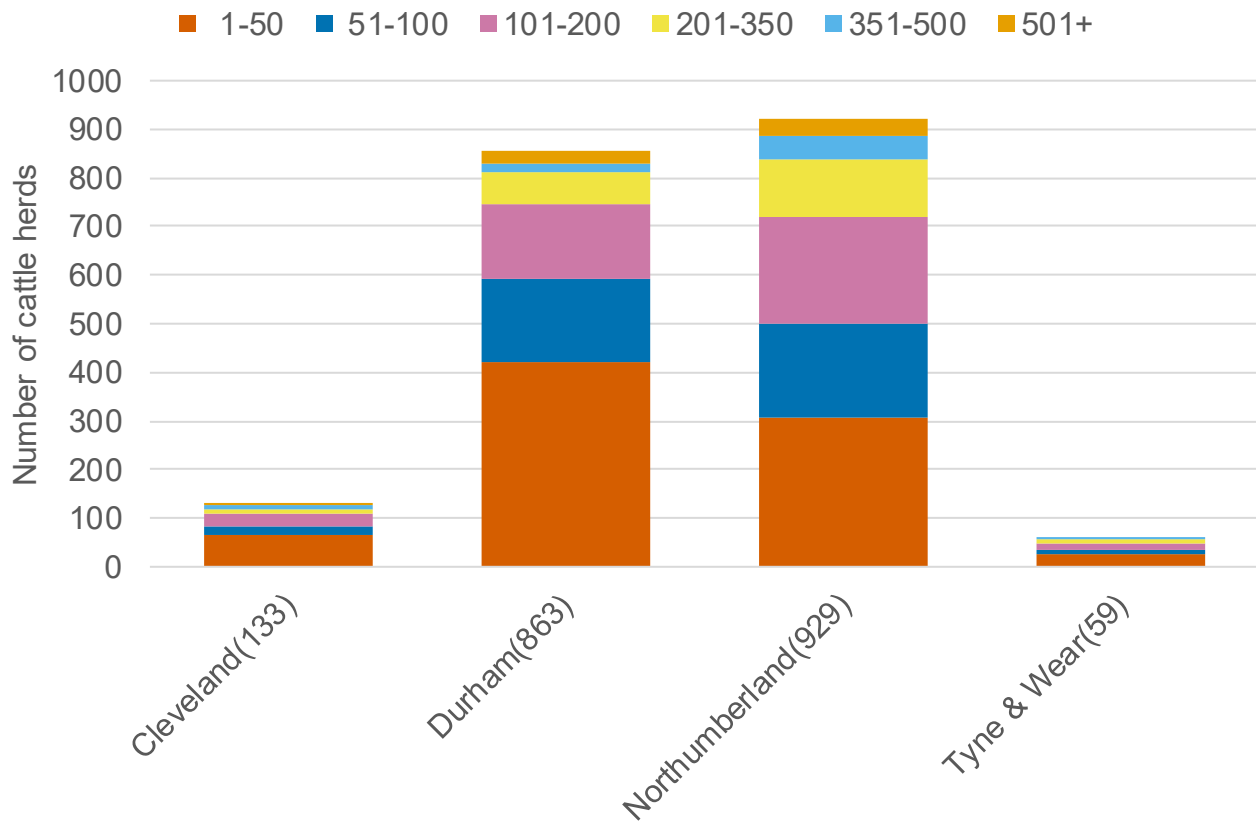


Figure 1: Proportion of cattle holdings in the North East of England, by herd size and county in 2020. Note herds with an undetermined size are not shown.

## Markets and abattoirs

Although there are eight small markets in the region, two of them are mixed and seasonal markets. The biggest livestock market in the North East of England is Darlington Market in County Durham and has both green (regular) and red (TB dedicated slaughter gathering) status sales. It is the main slaughter market for fattening herds and holds slaughter gatherings accepting cattle from TB restricted holdings destined for slaughterhouses. The main market in Northumberland is Hexham Market and it only holds green sales, which includes slaughter cattle.

The regulations around TB Approved Slaughter Gatherings in the LRA were amended on 31 August 2020 to gain better control over the movement of TB-restricted animals into markets in the LRA. This means that since this change took place, TB Approved Slaughter Gatherings in the LRA are now only permitted to accept animals from Licenced Finishing Units (LFUs) and can no longer accept animals from Approved Finishing Units (AFUs) or from TB incident herds, irrespective of their location in GB. This amendment should help to minimise the risk of these markets acting as a potential route of TB introduction and spread in the region, as LFUs are only permitted to exist within the LRA and must only source animals from OTF herds.

There are four abattoirs in the region, three in County Durham and the other one in Burradon, Tyne & Wear.

## Licensed Finishing Units

There are seven Licensed Finishing Units (LFUs) in the region, which provide an outlet for finishing cattle from OTF herds, all of them are in County Durham. These units are licensed by APHA and require their cattle to be housed all the time. In addition, strict biosecurity conditions and wildlife proofing measures must be met and adhered to. Cattle must be sourced from unrestricted herds and be subject to pre-movement testing when required, but there is no requirement for post-movement testing or tracing testing of cattle in LFUs.

## Common land

Traditional farming practice in the North East of England region is for cattle to graze from April until late October and then to be housed for the remainder of the year.

There are 227 parcels of common land located across the region. These parcels of land can present a risk to the spread of TB as they often receive cattle from several different holdings and the animals mix freely on the land. Due to their location in the LRA, usually there is not a requirement for animals to be pre-movement tested prior to going to the common land. This, combined with the routine testing interval of 48 months across the region, means that the current TB infection status of the animals going to common grazing is often not known when they enter the common land. This can be a significant challenge and requires substantial additional tracing of animals and extra testing if reactors are detected after grazing on common land.

# Descriptive epidemiology of TB

## 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 illustrated in Figure 2, Northumberland reported seven new TB incidents in 2020, one OTF-W and six OTF-S. This is an increasing trend from the three OTF-S incidents reported in 2018 and six incidents, one OTF-W and five OTF-S, reported in 2019. Durham reported only one OTF-S incident in 2020 with a decreasing trend from 2016. Cleveland has reported two OTF-W incidents in 2020, an increasing trend as this area has reported no incidents since 2017. Tyne & Wear has reported no incidents since the 1990s.

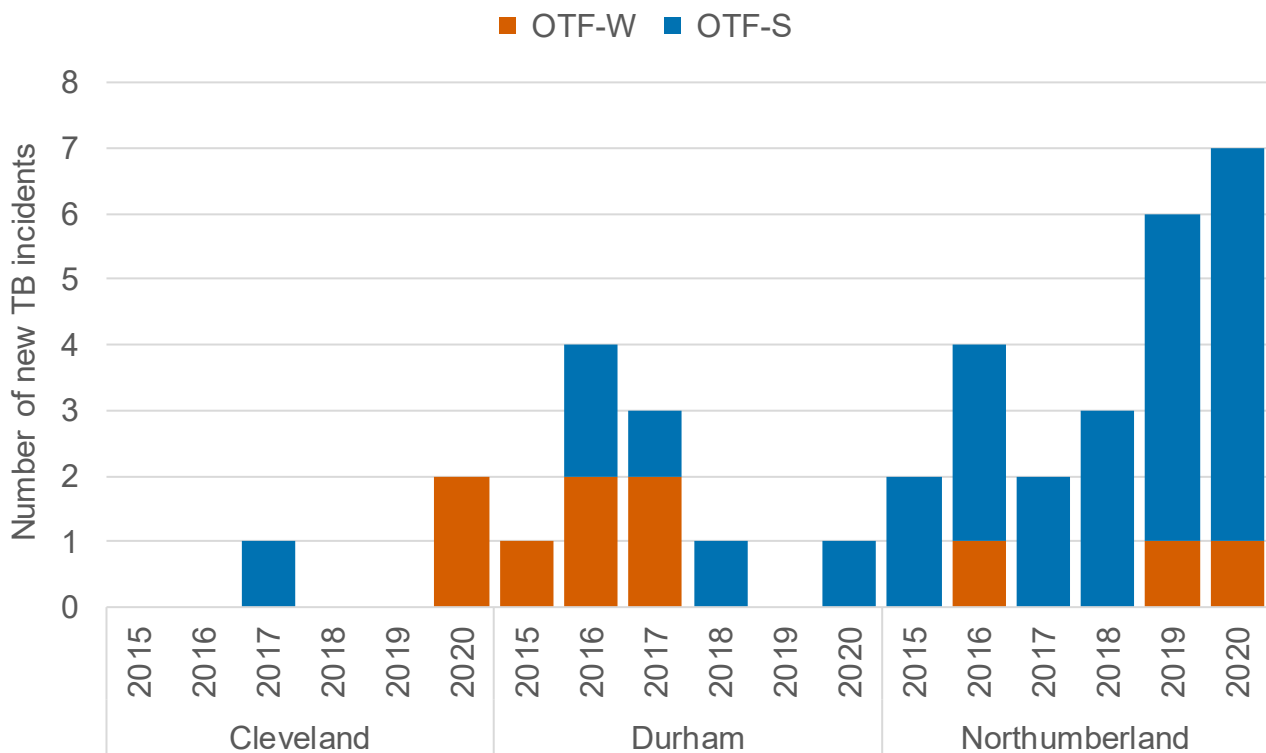


Figure 2: Annual number of new TB incidents in the North East of England, from 2015 to 2020. Note Tyne & Wear is not shown as there are no data to display (no incidents since the 1990s).

## Geographical distribution of TB incidents

### Northumberland

There were seven TB incidents in Northumberland in 2020, one OTF-W and six OTF-S (Figure 3).

The single OTF-W incident was located in the east of the county and involved a 300-cattle fattening herd that routinely buys three/four-month-old calves from the Edge Area in Cheshire and fattens them up until slaughter. A statutory post-movement skin test on the farm identified as a reactor a bovine that had been purchased from Cheshire three months earlier. This reactor had visible lesions of TB at slaughter and was also culture positive for *M. bovis*. The enhanced TB surveillance programme established in the statutory radial zone around the affected farm has identified no further TB incidents in the reporting period.

Two OTF-S incidents were disclosed at a radial test in the Bellingham area of central-west Northumberland. This radial testing was instigated by a previous OTF-W incident in that area in 2019. In both OTF-S incidents a single reactor was disclosed, with no visible lesions at slaughter and culture negative results. In both incidents, the post-incident short interval skin test disclosed a further reactor, with no visible lesions and culture negative results. A further short interval skin test was negative in both herds, allowing them to regain their OTF status.

One OTF-S incident was disclosed south-west of Northumberland, close to neighbouring Cumbria, in a 250 cattle suckler herd. An animal imported from the High Risk Area (HRA) was disclosed as an inconclusive reactor (IR) at a post-movement skin test and became a reactor at the IR retest. There were no visible lesions at slaughter and culture results were negative. No more test reactors were disclosed at the short interval skin test of the destination herd.

One OTF-S incident was disclosed further east in Northumberland in a 400-cattle dairy herd. Six IRs were disclosed at a routine herd test and two of them became skin test reactors upon re-testing 60 days later, both with no visible lesions at slaughter and culture negative results. The origin of this incident is undetermined. No more reactors were found through short-interval skin testing and the herd regained its OTF status.

One OTF-S incident was disclosed in the centre of Northumberland in a 180-cattle indoor beef finishing herd. All animals are bought at 16 weeks old and fattened up until they are sent directly to a local slaughterhouse. The calves are sometimes purchased from HRA, so there were additional tracing and post-movement skin tests carried out in this holding. A single skin test reactor, born in North Wales, was disclosed at a tracing skin test (TR) with no visible lesions identified at slaughter and culture negative results. A further check test (CT) and short interval skin test were carried out without disclosing any skin reactor. The herd regained its OTF status.

One OTF-S incident involved a traditional 200-cattle suckler herd that buys bulls from local livestock markets and occasionally in-calf cows and heifers from four yearly tested herds via local markets. A single skin test reactor was disclosed at a routine skin test with no TB

lesions identified at slaughter and culture negative results. A further short interval skin test was clear, and the herd regained its OTF status.

## **Durham**

There was one OTF-S incident in Durham (Figure 3) comprising a traditional closed 60-cattle suckler herd with a single skin test inconclusive reactor (IR) disclosed at a routine herd test. This animal became a skin test reactor at the IR retest 60 days later. No visible lesions were identified at slaughter and it was culture negative. A further check test, short interval skin test and a 12-month skin test were carried out in this holding all with negative results. The origin of this incident is undetermined.

## **Cleveland**

There were two OTF-W incidents in Cleveland in 2020. (Figure 3).

One of those two incidents was disclosed in the southeast of the county in a 60-cattle suckler herd comprising a single skin test reactor originally detected as an IR in a routine herd test. The animal presented no visible lesions of TB at post-mortem meat inspection, but genotype 21:a of *M. bovis* was isolated from the NVL lymph node pool sample taken. The homerange of genotype 21:a is in the South West of England HRA. The reactor had been bought in 2016 from a farm in the LRA with no TB history before or after the movement. Two positive animals were disclosed in the compulsory IFN- $\gamma$  herd test, both displaying no visible lesions at post-mortem examination. Following two short interval skin tests with negative results, the herd regained OTF status.

The other OTF-W incident in this county was found in the radial testing area of the first OTF-W incident. It involved a 260-cattle dairy herd that disclosed two inconclusive reactors that became reactors at a subsequent IR skin retest. One of the two reactors disclosed visible lesions of TB at post-mortem inspection but was culture negative. The other skin reactor displayed no visible lesions and was also culture negative. Five positive animals were disclosed in the compulsory IFN- $\gamma$  herd test, with one of them with visible lesions at slaughter. The two subsequent short interval skin tests disclosed no skin reactors and the herd consequently regained its OTF status. In the last five years this herd had been sourcing cattle from the LRA.

## **Tyne & Wear:**

No reported TB incidents in this county since the 1990s.

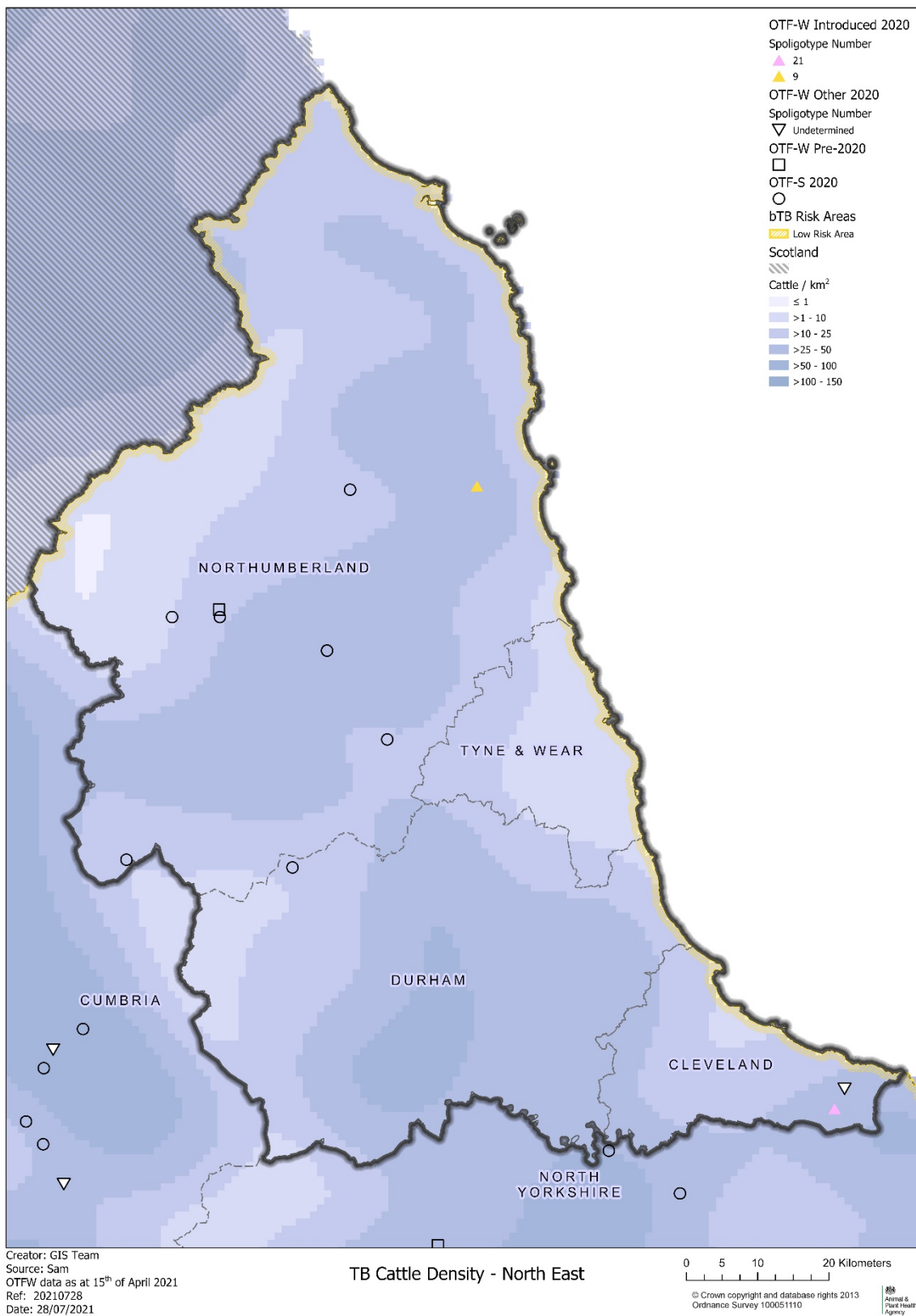


Figure 3: Location of cattle holdings in the North East of England with new TB incidents (OTF-W and OTF-S) in 2020, and cattle holdings with pre-2020 OTF-W incidents still ongoing at the beginning of 2020, overlaid on a cattle density map. Note: 'OTF-W Introduced 2020' refers to OTF-W incidents in which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

## Potential or confirmed TB hotspot areas

Radial zones were established around all three OTF-W incidents in the region during 2020. These zones involve additional surveillance of all eligible cattle premises within 3km of the holding where the confirmed incident has been detected. The radial testing is vital to detect any potential lateral spread of disease and to gain control of TB spread following a confirmed incident. In most parts of the region no new incidents have been detected from RAD zones put in place in 2020. RAD testing initiated in 2019 led to the disclosure of incidents this reporting year.

There are no potential or confirmed TB hotspot areas in the region (Figure 4).

Following disclosure of a cluster of TB incidents in Cumbria, a TB hotspot (HS21) was established in 2016, which lies to the west of Northumberland and Durham. This hotspot is geographically separated from the North East of England by the Pennine Mountains. Enhanced cattle and wildlife surveillance have been established and no epidemiological links between this hotspot and the incidents in Northumberland and Durham have been identified.

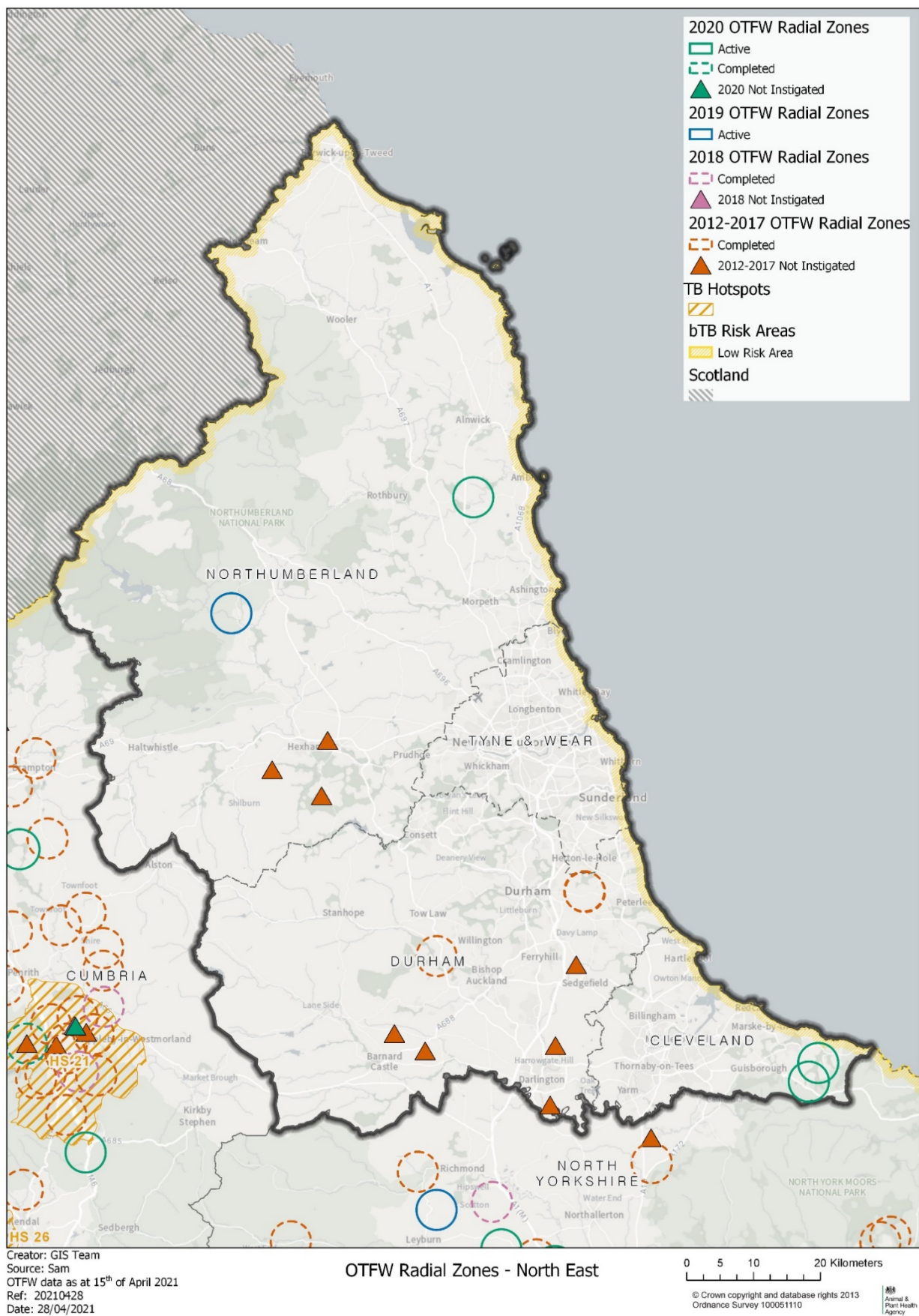


Figure 4: Potential hotspot areas and OTF-W radial surveillance zones that were active, completed or not instigated in the North East of England during 2020, by year of initiation.



## Other characteristics of TB incidents

### Unusual TB incidents

In the OTF-W incident in Northumberland involving a 300-cattle fattening herd, the statutory IFN- $\gamma$  test disclosed 17 positive animals, none of which had visible lesions at slaughter. This number of IFN- $\gamma$  positive animals, above the expected average proportion of false positive test results, suggested, in principle, spread of infection within the herd. The two follow-up short interval tests disclosed no more reactors afterwards. This herd regained its OTF status, and the restrictions were consequently lifted. There have been no more TB incidents disclosed in the compulsory radial testing around this OTF-W herd at the time of writing this report.

### Duration of TB restrictions

The majority of OTF-S incidents lasted less than 150 days (Figure 5). This accounts for the mandatory standard short interval test (SIT) required in most herds with OTF-S incidents in the LRA, plus any time elapsing for IR retests and the removal of reactors.

The two OTF-W incidents shown in Figure 5 lasted between 151-240 days, which is attributed to the compulsory post-incident testing comprising two successive short interval tests (SIT) with negative results, supplemented by the mandatory IFN- $\gamma$  test normally carried out in such herds.

The duration of the incidents was short due to the small number of reactors found and little/no cattle-to-cattle spread of infection within herds, resulting in the minimum possible number of tests required to regain OTF herd status.

There were no persistent incidents (those lasting 551+ days) in any county for this reporting period.

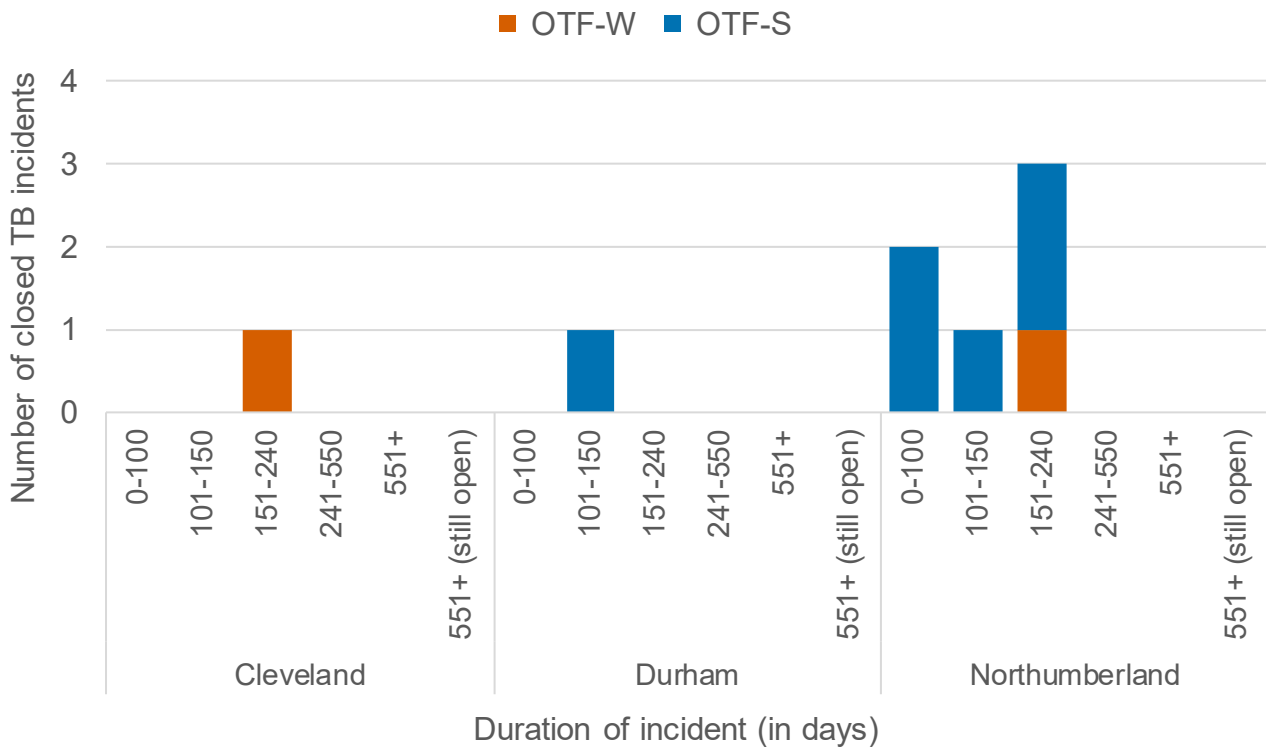


Figure 5: Duration of all TB incidents (OTF-W and OTF-S) that ended in 2020, and the number of persistent TB incidents (551+ days) that were unresolved at the end of 2020 in the North East of England. Note that Licensed Finishing Units (LFUs) have been excluded. Note Tyne & Wear not shown as there are no data to display (no incidents since the 1990s).

## 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 Cleveland a genotype 21:a was isolated. The homerange of genotype 21:a is South West of England (HRA). Whole genome sequencing (WGS) analysis has identified no *M. bovis* isolates in this area to date that were close genetic relatives of that found in the infected animal. The closest genetically related isolates in the database (up to ten SNP) were from herds located over 200 miles away. The reactor had been bought in 2016 from a farm in the LRA with no TB history before or after the movement, therefore the origin of this incident is obscure.

In Northumberland a genotype 9:d was isolated. The genotype of this isolate has a home-range spanning parts of Cheshire, which gives reassurance that the reactor animal was infected on its holding of origin before it was moved to Northumberland.

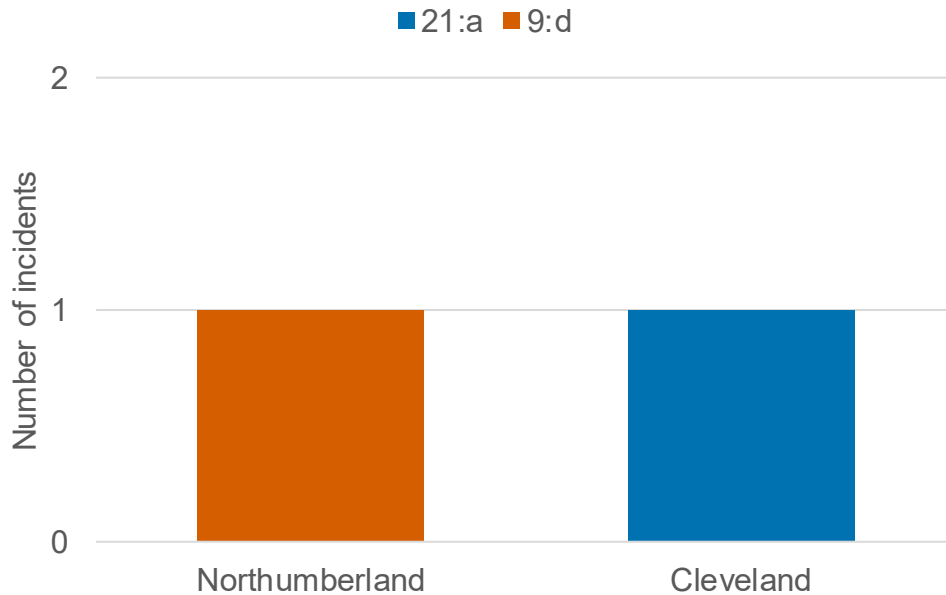


Figure 6: Genotypes of *M. bovis* identified in herds with OTF-W incidents in the North East of England that began in 2020, by county. Note Durham, and Tyne & Wear not shown as there are no data to display.

## 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 undetected infected cattle within LRA and from the Edge Area and HRA.

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 in the Disease Report Form (DRF) 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.

Figure 7 shows the results of the DRF assessment on the likely origin of infection for each new OTF-W TB incident in 2020. The risk pathway with the highest likelihood score is reported in the map.

The only OTF-W incident detected in Northumberland in 2020 was attributed to purchase of infected cattle from the Edge Area of England. From the other six OTF-S incidents, in half of them (three) no clear source of infection could be identified and were classified as

undetermined origin. The other half of OTF-S incidents (three) were attributed to cattle movements.

In Durham the only OTF-S incident was classified as undetermined origin.

In Cleveland one OTF-W incident was classified as undetermined and the other OTF-W incident was attributed to cattle movements.

There is a higher level of uncertainty in the sources of infection for the OTF-S incident herds, whereby definition, the genotype of *M. bovis* could not be determined and where very small number of reactors were identified. Most of the incidents presented no more reactors at subsequent testing. It is reassuring that there appears to be minimal spread of infection within herds and there is no evidence of wildlife involvement in the area, but this risk cannot be fully dismissed.

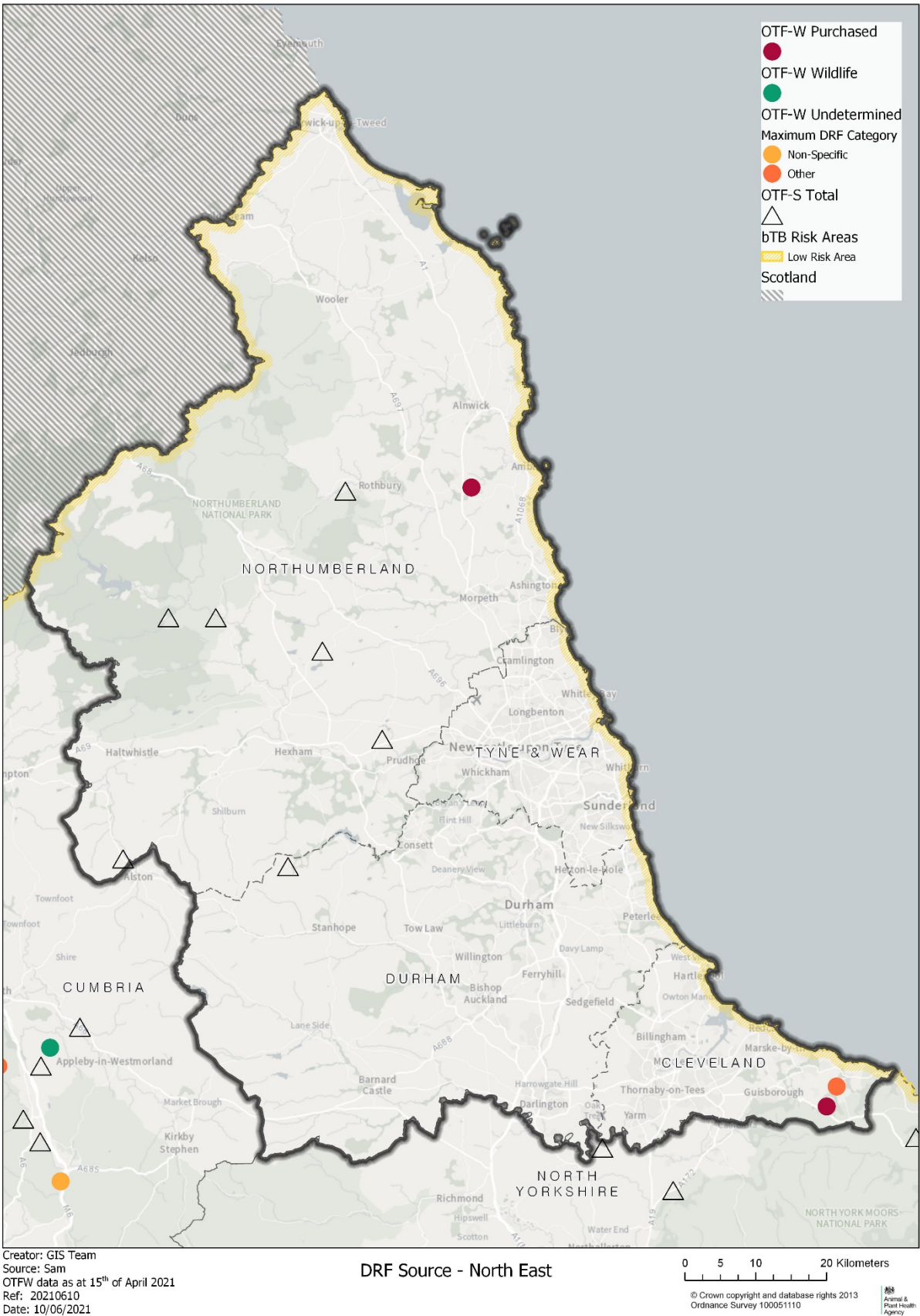


Figure 7: Map of the source of infection pathway recorded with the highest level of certainty, for OTF-W TB incidents, and the location of OTF-S incidents in the North East of England which started in 2020.

## TB in other species

Within the region there were no reported incidents of TB (*M. Bovis* infection) in any other species, including domestic non-bovine farm animals (camelids, goats, sheep, pigs), pets, zoo animal collections, captive (farmed/park) deer holdings and captive wild boar farms within the reporting period. Additionally, there were no known incidents of suspected or confirmed zoonotic infections due to *M. bovis*.

## Detection of incidents

Figure 8 shows that 60% of the incidents in 2020 were detected by enhanced TB surveillance testing.

In Northumberland, of the seven new TB incidents in 2020:

- Two OTF-S incidents were disclosed by radial testing (RAD) from an OTF-W incident that occurred in 2019
- One OTF-S was disclosed by tracing test (TR) due calves purchased from HRA
- Two TB incidents were disclosed by post-movement test (POSTMT). This includes the only OTF-W in this county in a fattening herd caused by a purchase from the Edge Area
- The rest of the TB incidents, (two) were disclosed by routine herd test (RHT)

In Durham, the only OTF-S incident was disclosed by routine herd testing.

In Cleveland, one OTF-W incident was disclosed at a routine herd test and the second OTF-W was disclosed in a radial testing from the first incident.

This is strong evidence of the efficacy of the additional control measures applied, addressing specifically more timely detection of residual and recently introduced infection.

All incidents in 2020 occurred in herds with no previous history of TB. This is a particular concern and highlights that the LRA remains under threat of disease incursion. Additionally, a significant proportion of all incidents were a result of infected cattle movements, which could be an early indication of disease ingress within the LRA. It also highlights the need to raise awareness within the industry of the TB risk associated with the purchase of cattle and the importance of careful sourcing of cattle replacements.

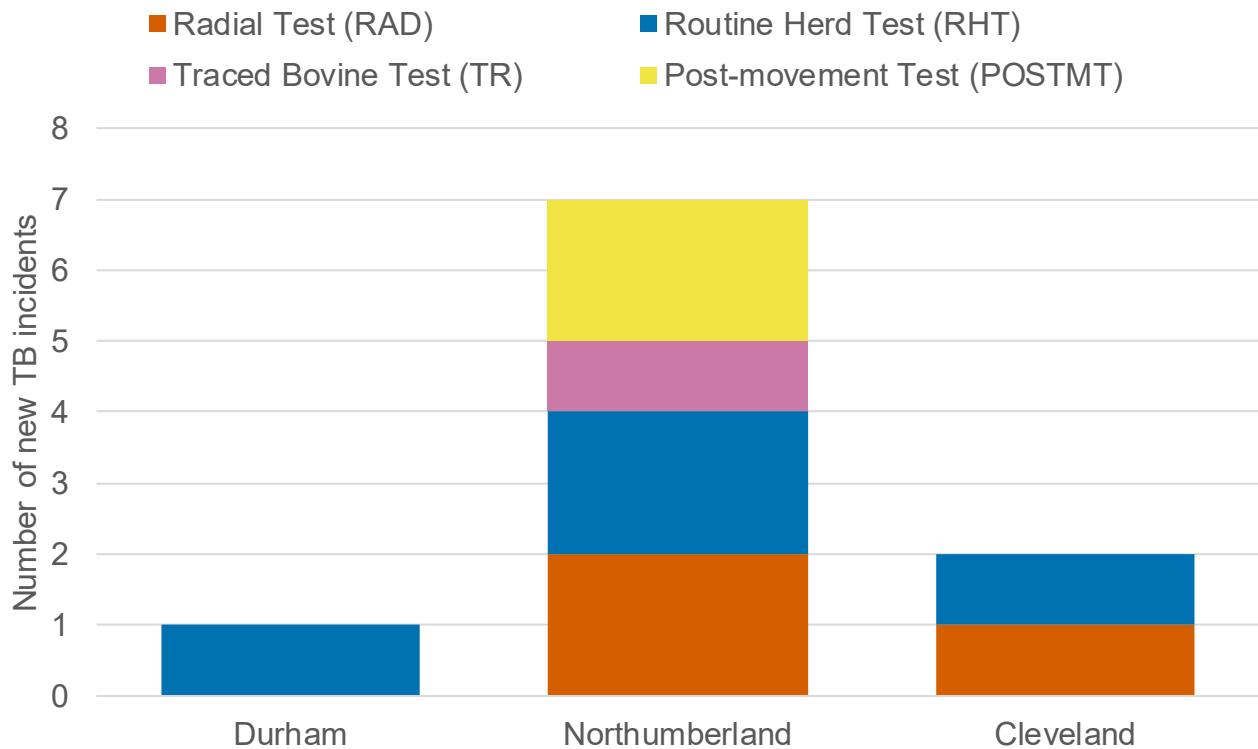


Figure 8: Number of TB incidents (OTF-W and OTF-S) in the North East of England in 2020, disclosed by different surveillance methods in each county. Note Tyne & Wear not shown as there are no data to display (no incidents since the 1990s).

## Skin test reactors and interferon gamma test positive animals removed

As shown in Figure 9, in Northumberland there were 11 skin reactors and 17 IFN- $\gamma$  test positive animals removed in 2020. This is an increase from 2019 when nine reactors were removed. This difference is caused by the only OTF-W incident in this county that disclosed 17 IFN- $\gamma$  test positive animals, all displaying no visible lesions at post-mortem examination.

In Durham there was only one skin reactor removed in 2020. Durham had no reactors removed in 2019 because there was no incident recorded.

In Cleveland there were three skin reactors and two IFN- $\gamma$  test positive animals removed in 2020 in the two TB incidents recorded in this county.

No reactors were removed in Tyne & Wear as no TB incidents were recorded in 2020.

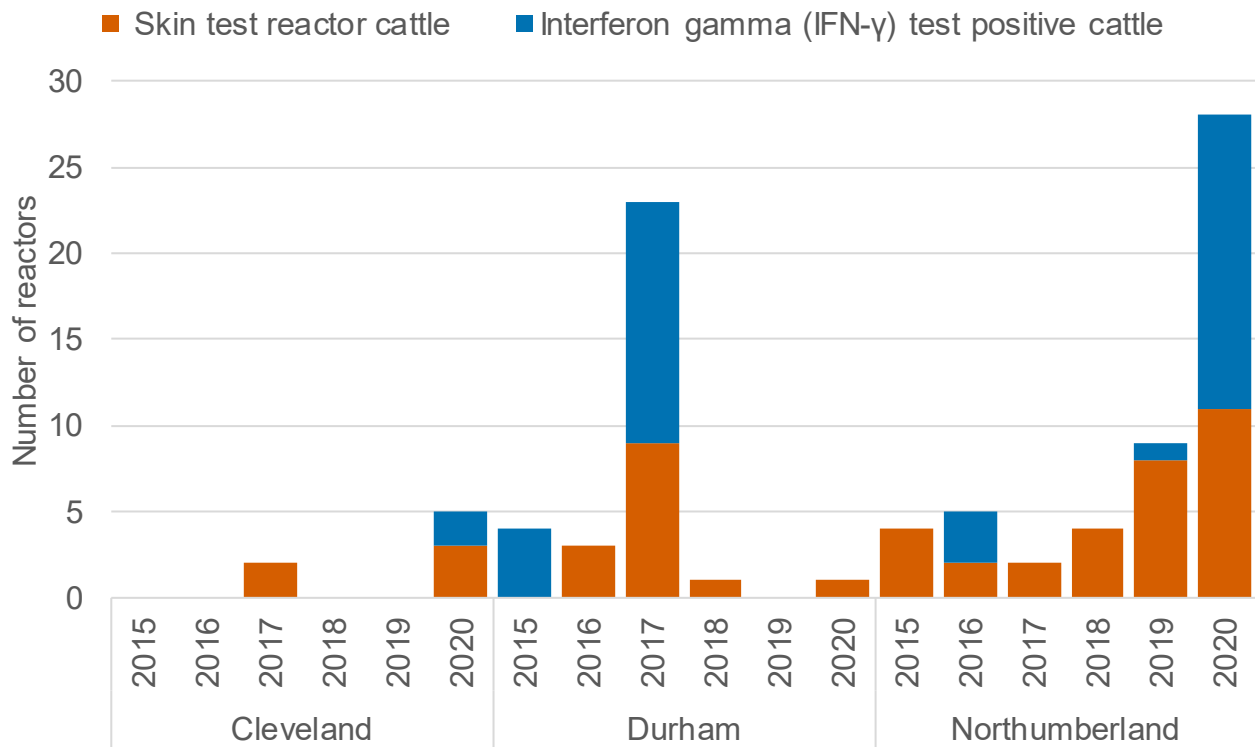


Figure 9: Number of skin test reactors and interferon gamma (IFN-γ) test positive cattle removed by APHA for TB control reasons in the North East of England, 2015 to 2020, by county. Note Tyne & Wear not shown as there are no data to display (no incidents since the 1990s).

The number of reactors removed, and the number of incidents detected gives an indication of the relative impact to the taxpayer in an area. The cost to the taxpayer is mainly due to the cost of additional government-funded testing to control the TB incident and payment of compensation for reactors removed.

There are also both direct and hidden costs and impacts to the farmers when an incident is detected. One of the main impacts of TB incidents is the restriction on the movement of stock off the affected premises, which can have adverse consequences on the numbers of breeding animals, weaned beef calves, store cattle, etc. The same applies to sourcing stock to replace the TB reactors removed, or other replacements. This proves even more difficult for pedigree animals. Acquiring stock is not permitted until after the first incident test has been completed and it must be carried out under licence, which is only granted after an APHA veterinary risk assessment to ensure that mitigation measures are followed, and the disease has not spread. Another important consideration is that if cattle purchased during an incident become reactors at subsequent tests, there is a 50% reduction in the compensation paid to the farmer. All these constraints affect the farmer's normal trading practices and increases labour costs related to the increased testing requirements. Farms located within a radial surveillance zone are burdened by need to undertake pre-movement testing.

Due to the low number of reactors disclosed in every incident in the region and the relative short duration of each incident, the impact of TB controls for farmers and the taxpayer was relatively low in comparison with other areas of the country where more reactors are removed, and persistent TB incidents are more frequent.



## Summary of risks to the North East of England

All the incidents in 2020 occurred in herds without previous TB history, often finding farmers relatively unaware of the risk of disease, the possible ways of controlling the risk and the consequences of an incident within their herd.

APHA farm visits at the time of a TB incident and their involvement with the local TB eradication group have provided an extremely good source of information for farmers. Local farmers meetings were held to raise awareness of TB and provide advice on safe sourcing of cattle during 2020.

Local movements of breeding and fattening animals are important for the cattle industry in this area, but there are also many fattening animals bought in from the West of England and parts of Wales where TB is endemic. These posing a potential risk to the favourable TB status of this area through movements of undetected infected cattle. These movements may be farm-to-farm or via local livestock markets where farmers may unwittingly buy these animals without being fully aware of their true origin and potential risk.

All the TB incidents in the region were resolved relatively quickly. Enhanced surveillance through radial testing in every OTF-W incident provides reassurance that any potential lateral spread of TB infection or wildlife involvement would be identified rapidly.

Although there is a TB hotspot (HS21) in neighbouring Cumbria on the western boundary of Northumberland and Durham, it is geographically separated by the Pennine Mountains, and it is seen as low risk to the reporting area. This area is not seen as a major source of cattle for the region and with the enhanced TB testing measures in place, including pre-movement testing, the risk of infected cattle leaving HS21 is seen as very low.

## Summary of risks from the North East of England to surrounding areas

The LRA counties adjacent to the North East of England are North Yorkshire to the south and Cumbria to the west.

The TB risk from the North East of England to adjacent LRA counties is currently very low due to the very low incident of TB in the region, the short duration of incidents and the effectiveness of enhanced surveillance in each incident. The compulsory pre-movement tests implemented in all herds with TB incidents after the restrictions are lifted and in all the holdings within the radial areas (until they revert to four-yearly routine herd testing) also helps to protect other surrounding areas.

# Assessment of effectiveness of controls and forward look

## Effectiveness of controls

Even though the overall number of incidents increased marginally in 2020 relative to 2019, the North East of England is still one of the LRA regions with the lowest number of incidents in England.

Timely detection of infected animals and subsequent removal is one of the key steps in infection control. This is very likely to have played a significant role in the protection of the remaining susceptible cattle population and keeping the region relatively free of TB.

It is therefore vital to maintain the passive and active TB surveillance within the LRA.

## Forward look

The consensus is that more local farmer meetings organised by the National Farmers' Union (NFU), with the involvement of the TB Eradication group, local Official Veterinarians and APHA could help to increase awareness of TB. This should encourage careful sourcing of cattle and reduce the risk of introducing TB into the region by movement of infected cattle from the HRA, Edge Area, the endemic TB areas of Wales, and from the Republic of Ireland and Northern Ireland. To further reduce TB incidence and maintain LRA status, enhanced TB surveillance measures need to be continued, together with the implementation of safer cattle purchasing policies.

Given the recent history and the effectiveness of controls, it is very likely that the North East of England will continue to enjoy a very low incident of TB over the next two years. Considering the objective of achieving TB OTF status by 2025 in each county, a focus is needed on the farming community's attitude towards TB control and sourcing of cattle to this area.

# Appendices

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

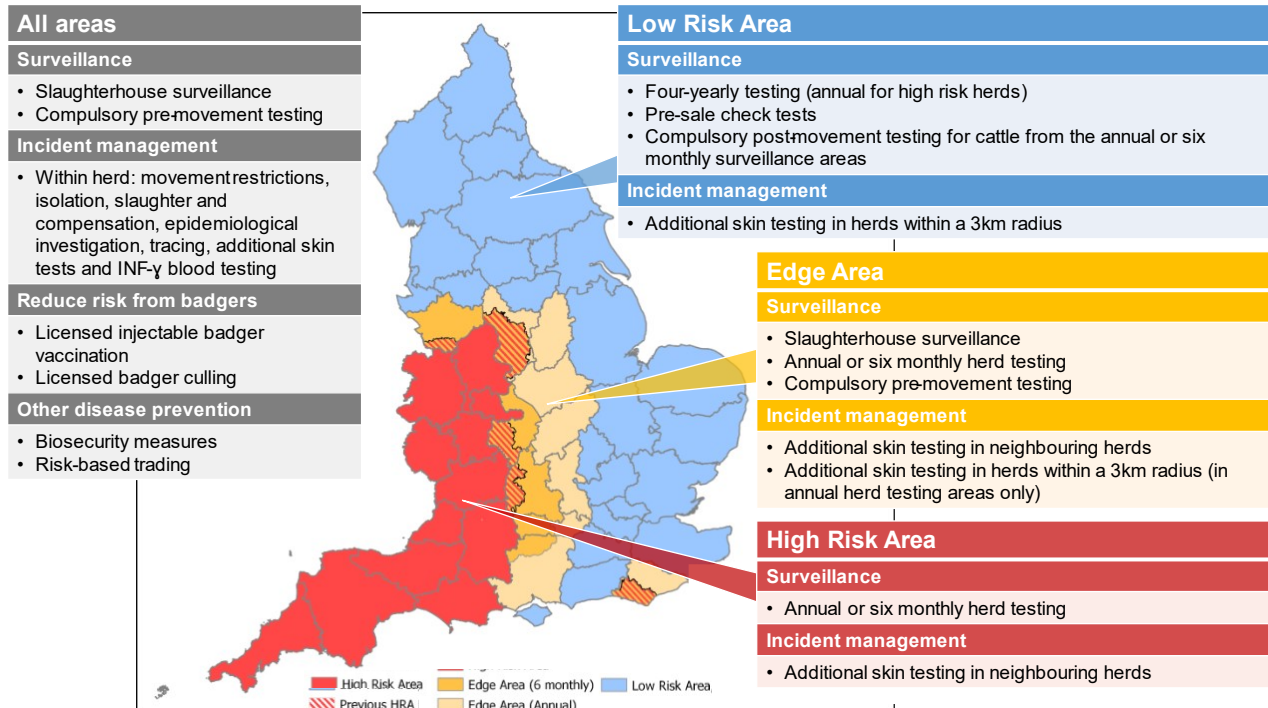


Figure A1: TB risk and surveillance areas of England effective since January 2018, as set out in the Government’s Strategy for Achieving Officially Tuberculosis-Free Status for England. The map is described in more detail in the Explanatory Supplement for England 2020 (<https://www.gov.uk/government/publications/bovine-tb-epidemiology-and-surveillance-in-great-b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

## Summary of enhanced TB control measures in this reporting area

Radial surveillance zones were applied around the three OTF-W incidents declared in the region. One in Northumberland and two in Cleveland.

No exemptions from the mandatory deployment of the IFN- $\gamma$  blood test in all OTF-W incidents.

Regional meetings held online, due to COVID-19 restrictions, with farmers NFU, TB Eradication Group, Official Veterinarians (OVs) and APHA, to raise awareness of TB in Northumberland.

Local liaison with Local Authorities.

## Appendix 2: Cattle industry in the reporting area

Table A2.1 Number of cattle premises by size range 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
<b>Cleveland</b>	2	65	20	25	10	7	4	133	112	47
<b>Durham</b>	9	422	170	153	66	20	23	863	96	51
<b>Northumberland</b>	9	309	193	217	119	47	35	929	143	87
<b>Tyne &amp; Wear</b>	2	26	9	15	6	1	0	59	86	53

\*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
<b>Cleveland</b>	11,198 (75%)	3,555 (23%)	116 (0%)	1 (>0.01%)	14,870
<b>Durham</b>	69,937 (84%)	11,235 (13%)	1,695 (2%)	7 (>0.01%)	82,874
<b>Northumberland</b>	120,789 (90%)	10,992 (8%)	1,382 (1%)	5 (>0.01%)	133,168
<b>Tyne &amp; Wear</b>	4,570 (90%)	291 (5%)	187 (3%)	0 (0%)	5,048

## Appendix 3: Summary of headline cattle TB statistics

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

Herd-level statistics	Cleveland	Durham	Northumberland	Tyne & Wear
(a) Total number of cattle herds live on Sam at the end of the reporting period	160	1,046	1,137	81
(b) Total number of cattle herds subject to annual TB testing (or more frequent) at the end of the reporting period (any reason)	23	10	87	3
(c) Total number of whole herd skin tests carried out at any time in the period	50	195	256	16
(d) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	39	192	236	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)	156	1,032	1,125	79
(f) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period.	159	1,046	1,134	81
(g) Total number of new TB incidents detected in cattle herds during the report period	2	1	7	0
• OTF status suspended (OTF-S)	0	1	6	0
• OTF status withdrawn (OTF-W)	2	0	1	0
(h) Of the new OTF-W herd incidents, how many:				

<b>Herd-level statistics</b>	<b>Cleveland</b>	<b>Durham</b>	<b>Northumberland</b>	<b>Tyne &amp; Wear</b>
<ul style="list-style-type: none"> <li>occurred in a holding affected by another OTF-W incident in the previous three years?</li> </ul>	0	0	0	0
<ul style="list-style-type: none"> <li>could be considered secondary to a primary incident based on current evidence?</li> </ul>	0	0	0	0
<ul style="list-style-type: none"> <li>were triggered by skin test reactors or 2xIRs at routine herd tests?</li> </ul>	1	0	0	0
<ul style="list-style-type: none"> <li>were triggered by skin test reactors or 2xIRs at other TB test types (forward and back-tracings, contiguous, check tests, post-movement, etc.)?</li> </ul>	1	0	1	0
<ul style="list-style-type: none"> <li>were first detected through routine slaughterhouse TB surveillance?</li> </ul>	0	0	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"> <li>OTF-S</li> </ul>	0	0	2	0
<ul style="list-style-type: none"> <li>OTF-W</li> </ul>	1	0	0	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)	1	0	0	0
(k) Number of OTF-W herds still open at the end of the period that are within a finishing unit	0	0	0	0

Herd-level statistics	Cleveland	Durham	Northumberland	Tyne & Wear
(I) 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	0



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

<b>Animal-level statistics (cattle)</b>	<b>Cleveland</b>	<b>Durham</b>	<b>Northumberland</b>	<b>Tyne &amp; Wear</b>
(a) Total number of cattle tested in the period (animal tests, blood, and skin)	5,987	11,069	39,453	590
(b) Reactors detected in tests during the year:				
• tuberculin skin test	3	1	11	0
• additional IFN- $\gamma$ blood test reactors (skin-test negative or IR animals)	2	0	17	0
(c) Reactors detected during year per incidents disclosed during year	2.50	1.00	4.00	0.00
(d) Reactors per 1000 animal tests	0.84	0.09	0.71	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	0
• Private slaughters	0	0	0	0
(f) SLH cases (tuberculous carcasses) reported by the Food Standards Agency (FSA) during routine meat inspection.	0	0	1	0
(g) SLH cases confirmed by culture of <i>M. bovis</i>	0	0	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	1	0	0	0	1.9%
Cattle Movements	0	3	3	0	51.2%
Contiguous	0	0	0	0	0.0%
Residual Infection	0	0	0	0	0.0%
Domestic Animals	0	0	0	0	0.0%
Non-specific Reactor	0	0	0	0	0.0%
Fomites	2	0	0	0	3.2%
Other Wildlife	0	0	0	0	0.0%
Other or Unknown Source	5	1	0	0	43.7%

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		1		
2. Likely				
3. Possible			1	
4. Not likely			1	



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Any enquiries regarding this publication should be sent to us at

[National.TBEpi@apha.gov.uk](mailto:National.TBEpi@apha.gov.uk)

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