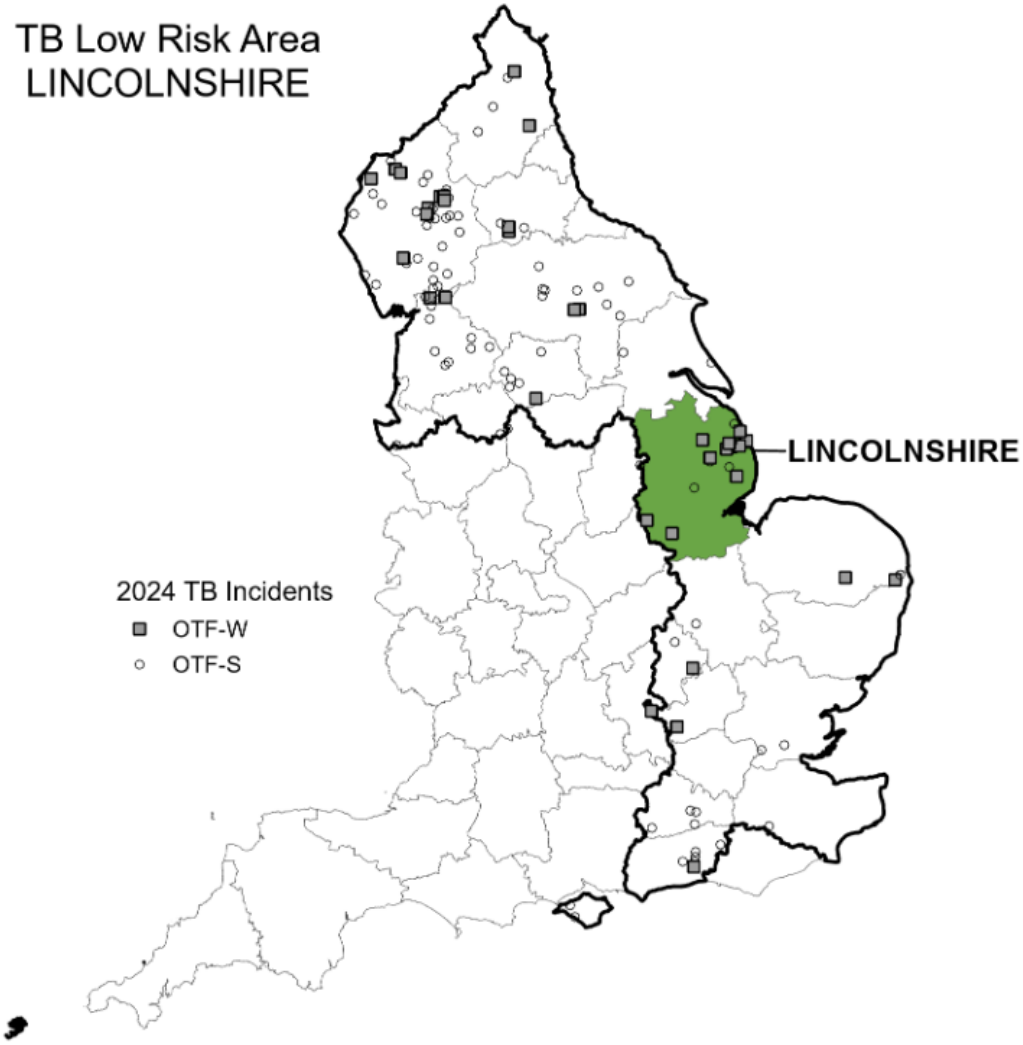
Animal & Plant Health Agency

Year End Descriptive Epidemiology Report of Bovine TB in the Low Risk Area of England 2024: Lincolnshire



Contents

Introduction

The Low Risk Area (LRA) was established in 2013, along with the Edge and High Risk Areas of England. In 2014 the 3 bovine tuberculosis (TB) risk areas were incorporated into the UK government's strategy to achieve Officially TB 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 adjust the approaches to TB surveillance and control in each risk area accordingly. Overall, the LRA has a very low and stable incidence of TB infected herds. The current strategy for the LRA seeks to mitigate the risk of TB incursions via cattle movements and rapidly contain and eradicate any new foci of infection through:

- mandatory pre- and post- movement testing of cattle entering the LRA from higher risk areas of the UK
- more sensitive testing of infected herds
- temporarily enhanced TB surveillance (radial and hotspot testing) in the vicinity of herds experiencing lesion and/or PCR (Polymerase Chain Reaction) test (or culture) positive incidents of TB

The aim of this combination of measures is to preserve the favourable disease status of this area of England so that its constituent counties can be declared OTF as soon as possible.

This report describes the frequency and geographical distribution of TB in 2024 in cattle herds in Lincolnshire, which is part of the LRA. In 2024, 15% of all new TB incidents in the LRA were detected in Lincolnshire.

TB in cattle and other mammals is primarily caused by infection with the bacterium Mycobacterium bovis (M. bovis), and the disease is subsequently referred to as 'TB' in this report. Although other sources may refer to TB 'breakdowns', this report will use the term 'incidents' throughout. This report is intended for those involved in the control of TB, both locally and nationally. This includes, but it is not limited to:

- cattle farmers
- private veterinarians
- government
- policy makers
- the scientific community

Details of the data handling methodology used in this report, a glossary of terms, and the TB control measures adopted in the LRA, can be found in the explanatory supplement for the annual reports 2024.

Classification of TB incidents

Unless otherwise specified, this report includes all new TB incidents detected during the reporting period (1 January to 31 December 2024). This includes both 'Officially Tuberculosis-Free Status Withdrawn' (OTF-W) and 'Officially Tuberculosis-Free Status Suspended' (OTF-S) incidents.

OTF-W incidents are those involving the detection in the affected herd of at least:

- one reactor (positive animal) to the Single Intradermal Comparative Cervical Tuberculin (SICCT) test, or a positive animal to the supplementary interferon gamma (IFN-γ) blood test, with typical lesions of TB identified at post-mortem (PM) meat inspection, or
- one animal (such as a skin test reactor, IFN-γ test-positive animal, or slaughterhouse case) with M. bovis-positive polymerase chain reaction (PCR) test (or bacteriological culture) results in tissue samples collected from carcases during the PM inspection

OTF-S incidents are triggered by reactors to the skin test (or IFN-γ test-positive animals), but without subsequent detection of TB lesions or positive PCR test (or culture) results in any of those animals.

Cattle herds can also have their OTF status suspended without necessarily experiencing a TB incident if, for instance, a TB test becomes overdue, or pending laboratory tests of suspected cases of TB reported at routine post-mortem meat inspection during commercial slaughter of cattle.

In Lincolnshire there were 10 Licensed Finishing Units (LFUs) active during 2024. There were no new TB incidents, and no incidents which closed in LFUs in 2024. These have been excluded from the numbers presented in this report due to the limited epidemiological impact of these incidents.

Cattle industry

There were 644 active cattle herds in Lincolnshire in 2024, a 3% decrease from 2023 (663 herds). The cattle industry is predominantly beef herds, which provide an outlet for the abundance of arable crop products and by-products grown in the county. Almost half of all herds were small (between 1 to 50 cattle), with only 4% of herds having more than 500 cattle. The number of cattle herds and sizes remain largely consistent with 2023 (Appendix 1).

There was one livestock market in Lincolnshire, located in Louth, which provided an outlet for store, breeding and fat cattle. A total of 10 LFUs were operating in the county in 2024, with no new units approved during the year.

Number of new TB incidents

A total of 18 new TB incidents were disclosed across Lincolnshire during 2024 (12 OTF-W and 6 OTF-S) (Figure 1). This was a marginal decrease in the overall number of new incidents compared to the previous year (19), and a reduction in the number of OTF-S incidents (13 in 2023), however there were double the number of OTF-W incidents disclosed in 2024 (6 in 2023).

Overall, the number of new incidents in 2024 was below the peak of 22 incidents detected in 2021, but represented the third highest annual number of new TB incidents recorded in the previous decade.

The number of new OTF-W incidents in 2024 (12) was the highest number recorded in the past decade in this county, where numbers have fluctuated between 1 and 11 OTF-W incidents per year until 2023. The number of OTF-S incidents have generally increased from 2015 (5 incidents), reaching a peak of 16 in 2021.

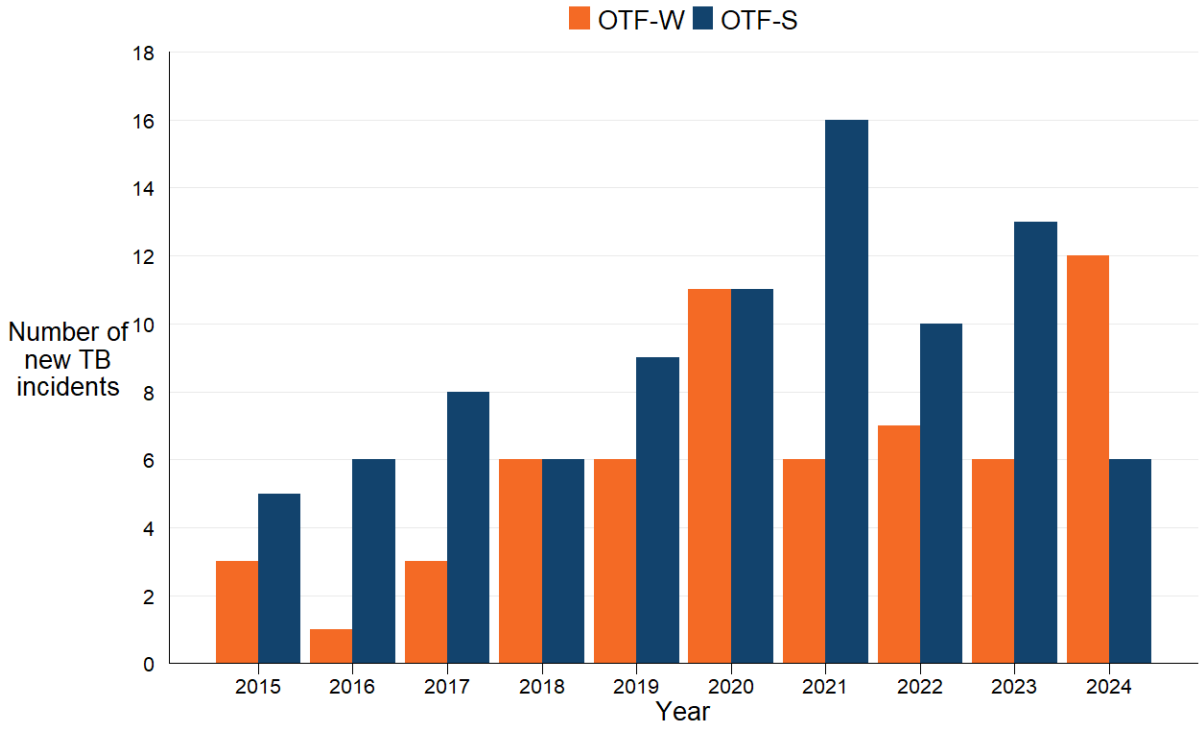


Figure 1: Annual number of new TB incidents in Lincolnshire, from 2015 to 2024.

Appendix 2 provides a summary of the headline cattle TB statistics in Lincolnshire in 2024, 2023 and 2022.

Disclosing TB surveillance method

In 2024, the majority of incidents (11, 61%) were disclosed by targeted surveillance tests conducted around holdings affected by OTF-W incidents, commonly known as radial surveillance or radial (RAD) tests, followed by tracing tests (2) (Figure 2).

Slaughterhouse surveillance, post-movement skin testing, enhanced surveillance testing of herds in TB hotspots every 6 or 12 months ('Hotspot testing' in Figure 2), 6-monthly (post-incident) herd testing, and routine herd testing (every 4 years in the LRA) each disclosed one incident.

The number of incidents detected through radial testing was higher than 2023, when 8 of the 19 (42%) were detected using this surveillance method. The number of incidents disclosed by hotspot testing in 2024 (one incident) was lower than in 2023 (5).

Enhanced TB surveillance testing in hotspots (referred to as 'Hotspot testing' in Figure 2 below) refers to an increased testing frequency to 6 or 12 monthly testing (from the routine 4-yearly testing schedule), based on the epidemiological picture in the hotspot.

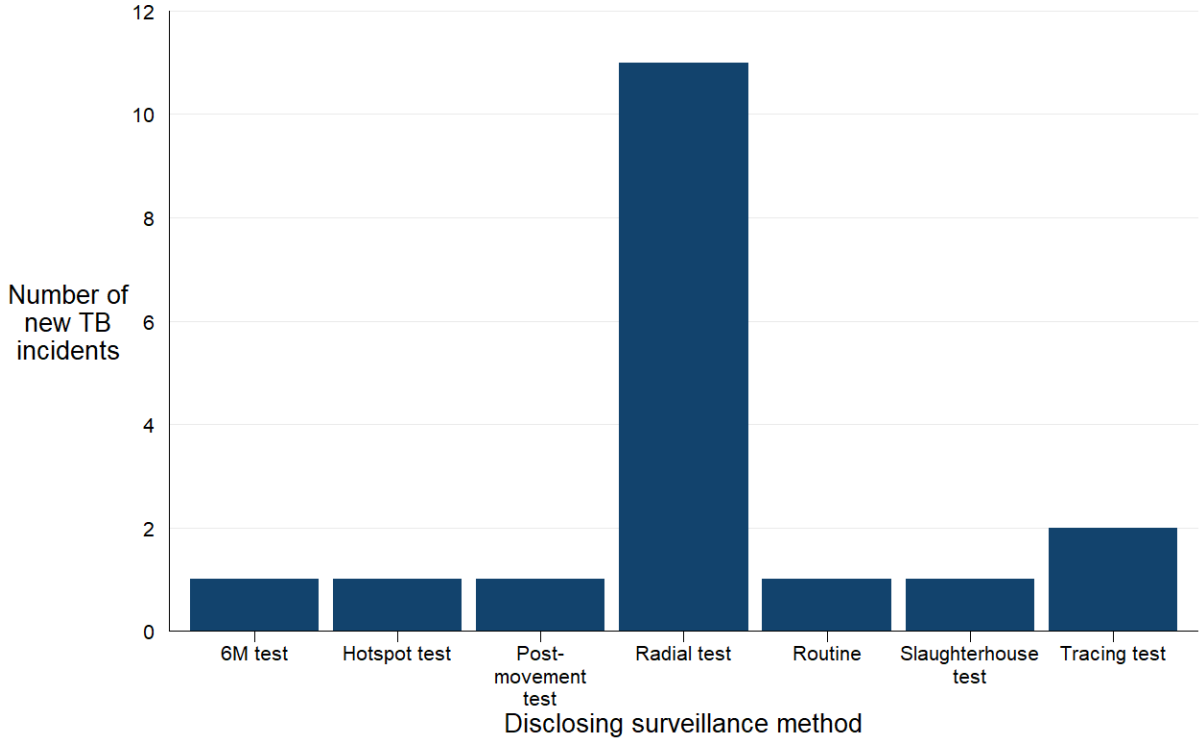


Figure 2: Number of new TB incidents (OTF-W and OTF-S) in Lincolnshire in 2024, according to the surveillance methods that detected them.

Duration of TB incidents

Of the 11 TB incidents that concluded in Lincolnshire in 2024, 4 started in 2024 and 7 in 2023 (Figure 3).

Five out of the 11 were OTF-W incidents, as shown in Figure 3. Two of these incidents were resolved within 151 to 240 days and 3 within 241 to 550 days.

Of the 6 OTF-S incidents that ended in 2024, one was quickly resolved within 100 days, 2 within 101 to 150 days and 3 within 151 to 240 days.

There were 17 TB incidents in this county that were still ongoing at the end of 2024, including one persistent OTF-W incident which was disclosed in December 2022.

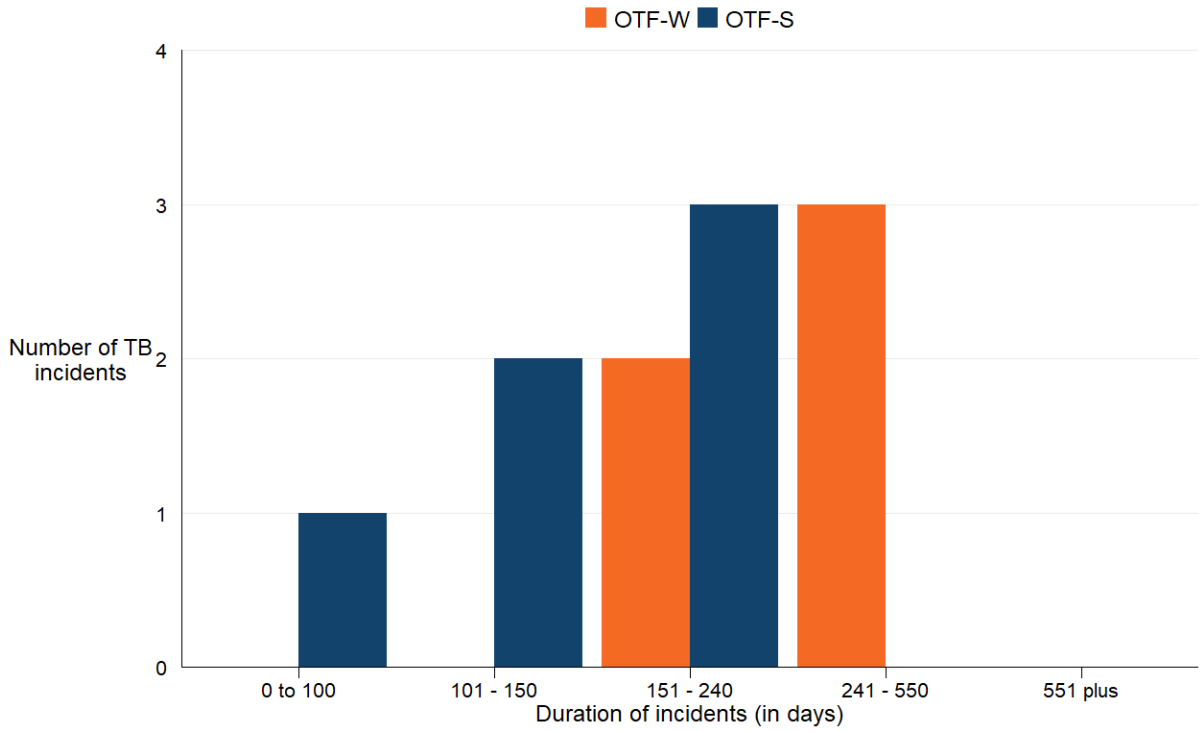


Figure 3: Duration of TB incidents (OTF-W and OTF-S) that closed in Lincolnshire in 2024.

Skin test reactors and interferon gamma test positive animals removed

A total of 174 cattle were removed as test reactors from TB incidents in Lincolnshire during 2024. Of these, 136 were skin test reactors and 38 were positive by the supplementary IFN-γ blood test (Figure 4). Compared to 2023, this was an overall increase of 93% in the total number of reactors removed (90 in 2023: 59 skin test reactors and 31 IFN-γ positive animals). The increase in skin test reactors compared to 2023 was likely driven by the worsening disease picture in Hotspot 28. Within this

hotspot there was an increased number of OTF-W incidents in 2024, including several explosive incidents that contributed to the jump in the overall number of animals removed for TB control reasons in Lincolnshire. Despite annual testing being introduced within HS28 in October 2023 (previously 48 monthly testing), it is thought that the increased number of reactors removed in 2024 was not only a result of increased frequency of cattle herd testing. It also likely reflects a higher underlying prevalence and spread of infection within the cattle population of this active hotspot.

Despite a substantial increase in the number of skin test reactors in 2024, this trend was not reflected to the same extent in the number of IFN-γ test positive cattle. This is likely due to the time of disclosure of new TB incidents rather than a true reduction in the frequency of IFN-γ positive animals in breakdown herds. Several of the new incidents were not disclosed until the autumn/winter of 2024. Therefore, the majority of these herds will not have received a whole herd IFN-γ test within 2024.

The number of skin test reactors removed steadily increased from 8 in 2015 to 49 in 2018, followed by a decrease to 36 in 2019. In 2020, the number of skin test reactors removed was more than double compared to the previous year (83). The numbers fluctuated between 40 and 59 for the subsequent 3 years before substantially increasing in 2024.

Between 2022 and 2024 the number of IFN-γ test positive animals removed has been steadily increasing from 19 to 38. However, this is a decrease from a peak of 56 in 2021. Previously, numbers have fluctuated from 4 to 34 between 2015 and 2020.

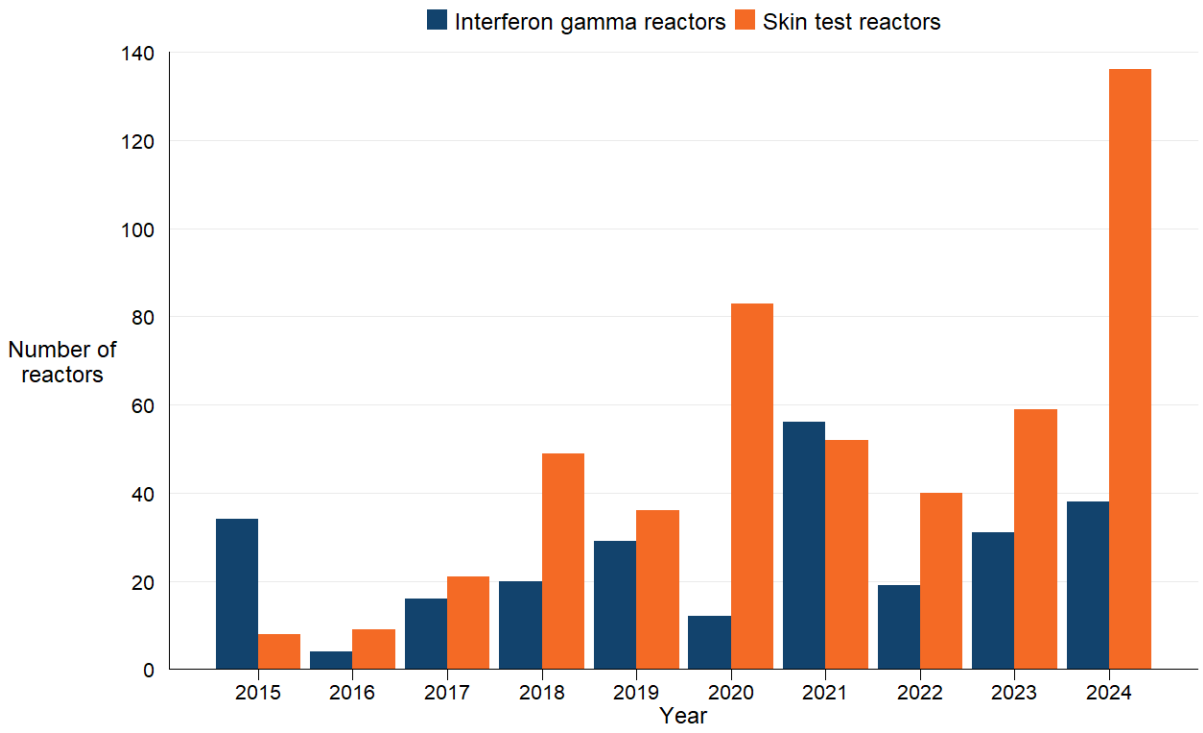


Figure 4: Number of skin test reactors and IFN-γ test positive cattle removed by APHA for TB control reasons in Lincolnshire, from 2015 to 2024.

Recurrent TB incidents

Three-year recurrence

In Lincolnshire, 2 of the 6 (33%) herds with a new OTF-S TB incident and 6 of the 12 (50%) with an OTF-W incident, most of them located within HS28, had experienced another TB incident in the previous 3 years (Figure 5).

Lincolnshire had the highest overall percentage of recurrent herd incidents in 2024 (44%) of all the LRA counties and subregions, followed by Cumbria (21%), the North West (20%), South East (17%) and Yorkshire and Humberside (16%). The Isles of Scilly and the North East subregion had no recurrent herd incidents in 2024. Lincolnshire had the highest percentage (44%) and the overall figure across the whole of the LRA was 21%

Most of the recurrent incidents were within HS28 (5 OTF-W and 1 OTF-S).

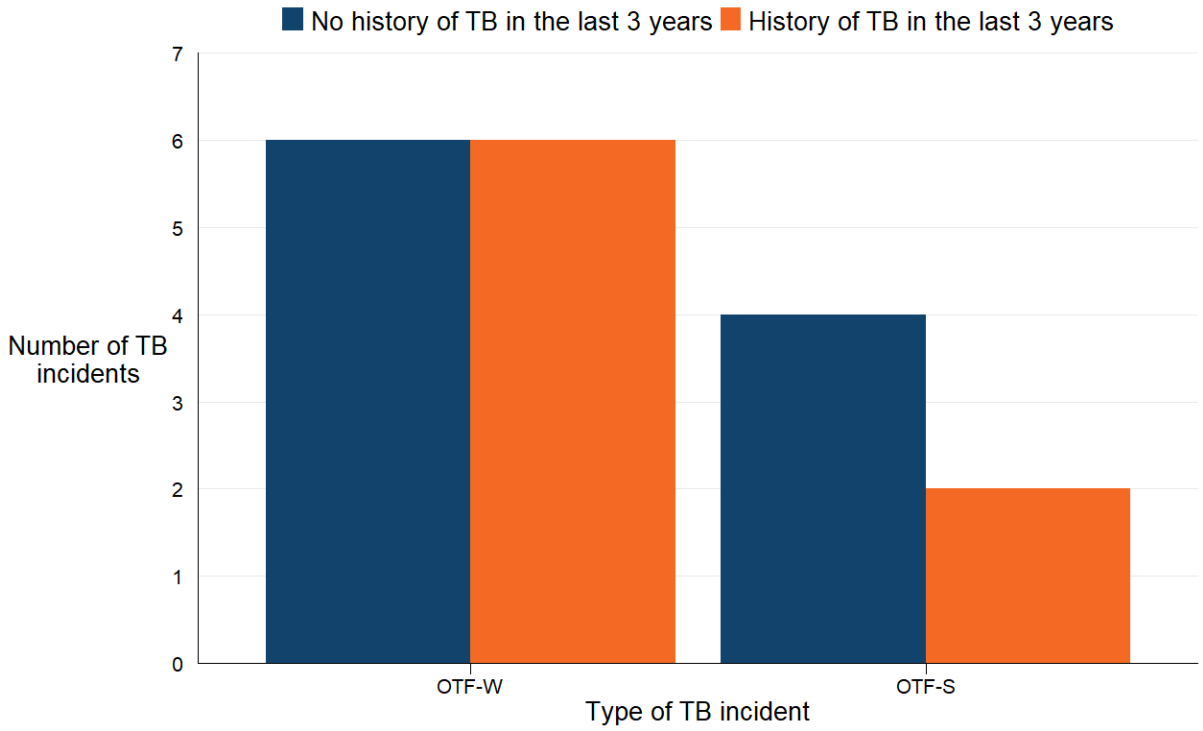


Figure 5: Number of herds with a TB incident (by OTF-W and OTF-S) in Lincolnshire in 2024, with and without a history of any TB incident in the previous 3 years of the disclosing test.

Unusual TB incidents

Within Lincolnshire there was one persistent incident, located within HS28. This incident, which was also recurrent, was disclosed in December 2022 and became persistent in June 2024. The affected herd was a large suckler herd, with a very low number of low-risk cattle purchases and no reported nose-to-nose contact with neighbouring cattle. Clade B3-11, with isolates related to those of both local cattle and wildlife, was isolated from this herd. It is likely that a combination of undisclosed and local infection was driving the ongoing TB incident in this herd. Following further testing this herd remained under restrictions throughout the whole of 2024.

Unusually, within Lincolnshire in 2024 there were 3 new OTF-W incidents (all within HS28) that had a very high proportion of skin test reactors at the disclosing test found to have visible lesions of TB at post-mortem examination (71 to 94%: post-mortem examination (PME)). These incidents also disclosed a proportionally higher number of reactors in comparison to what is normally seen in the LRA (3 to 9% of animals found to be reactors at the disclosing test).

TB incidents in other species

There is no statutory routine TB surveillance of non-bovine species, apart from PME of animals slaughtered for human consumption, or carcases submitted to veterinary laboratories for diagnostic investigation.

Targeted TB testing takes place in non-bovine herds under TB movement restrictions due to laboratory-confirmed incidents of M. bovis infection, and in specific herds of camelids, goats and captive deer at an elevated risk of infection. This testing takes place within Lincolnshire (including HS23 and HS28).

Enhanced voluntary wildlife surveillance takes place in LRA hotspots, but not within the Edge Area. Outside of these initiatives, farmers and deer stalkers are able to submit wild deer carcases for private TB testing and the results of these findings are reported below.

There were no incidents of TB reported in non-bovine species in Lincolnshire in 2024.

Geographical distribution of TB incidents

As in previous years, the new TB incidents in Lincolnshire were predominantly clustered into 2 areas of the county, each with a relatively high cattle density. One cluster was located in the north east and one in the south west of the county (Figure 6). These clusters correspond with Hotspot 23 (HS23) and Hotspot 28 (HS28) and are discussed below. Overall, in 2024 there was a lower number of OTF-W and OTF-

S incidents in HS23 when compared to 2022 and 2023. Conversely, there was a greater number of OTF-W incidents in HS28 when compared to 2022 and 2023.

Of the 12 new OTF-W incidents in Lincolnshire in 2024, 9 were due to infections with the whole genome sequencing (WGS) clade B3-11 (the most common strain of M. bovis in Lincolnshire). Six of these were in HS28 and one in HS23, with a further 2 situated just outside the border of HS28 (Figure 6). The homerange for clade B3-11 spans much of Staffordshire, Derbyshire, Cheshire, north east of Shropshire and parts of Greater Manchester, Leicestershire, Lincolnshire and Nottinghamshire. It is broadly equivalent to genotype 25:a, which was detected in 17 incidents in Lincolnshire since 2017. WGS analysis indicated that this clade has been circulating in both HS23 and HS28. However, despite belonging to the same WGS clade, the cattle and badger M. bovis isolates found in these 2 hotspots are genetically distinct, and the hotspots are therefore not epidemiologically linked.

There were 3 OTF-W incidents with undetermined clades, 2 of which were in HS28.

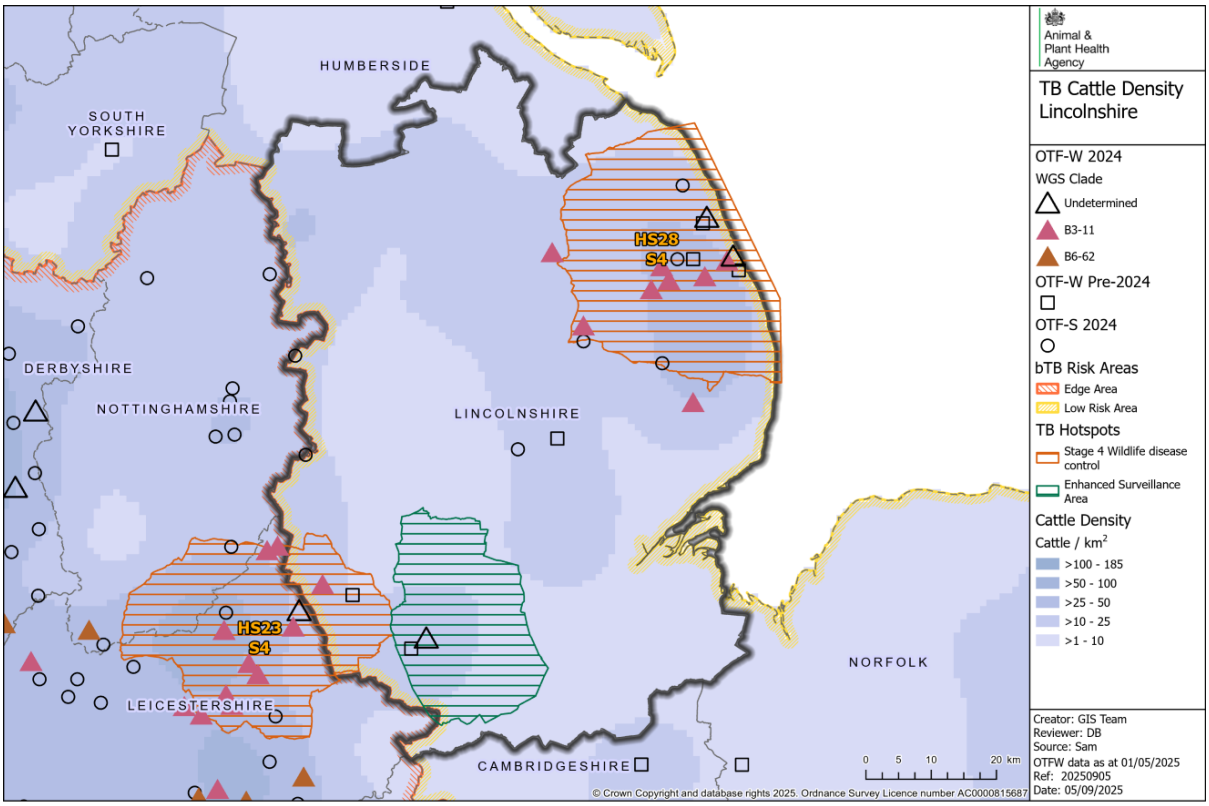


Figure 6: Location of cattle holdings in Lincolnshire with new TB incidents (OTF-W and OTF-S) in 2024, and cattle incident holdings with OTF-W incidents still ongoing at the beginning of 2024, overlaid on a cattle density map.

Figure 6 description: A map of Lincolnshire and adjoining areas showing the cattle density, the geographical location of cattle holdings with new TB incidents (OTF-W and OTF-S) in 2024, and cattle incident holdings with OTF-W incidents still ongoing at the beginning of 2024. Dark blue areas represent a higher cattle density and light blue represent a lower cattle density. New OTF-W incidents detected in 2024 are shown as triangles and colour-coded based on the WGS clade that was detected in

the incident**.** Pink triangles represent clade B3-11, and transparent triangles represent incidents where the WGS clade was undetermined, and it was not possible to obtain WGS information or it was pending. OTF-S incidents in 2024 are shown as circles. Cattle incident holdings with OTF-W incidents still ongoing at the beginning of 2024 are shown as squares. The geographical location of TB hotspots is shown with hashed lines. The colour of the hotspot, along with the suffixes S3, S4 and S5, indicates the stage of controls in place in 2024: dark orange is stage 4 (S4 is wildlife disease control). Enhanced Surveillance Areas are shown with green hashed lines. The location of new TB incidents is described in the main text.

As can be seen from Figure 7 and Appendix 3 Table 5, OTF-W incidents in Lincolnshire in 2024 were attributed to different likely sources of infection. Spread to and from wildlife reservoirs of infection (both badgers and deer) remains a concern in the southwest of the county (such as HS23).

In 2024, wildlife reservoirs of infection were recorded as the most likely source of infection for cattle in 4 incidents in the north east of the county, 3 within HS28 and 1 just outside the western boundary. There was a further incident most-likely linked to wildlife reservoirs of infection just outside HS23.

Four OTF-W incidents were most likely attributed to introductions of undetected M. bovis-infected cattle. Two incidents were found in the northwest of Lincolnshire in HS28. A further incident was found just south of HS28, towards the western region of the country. This was an increase when compared to 2022 and 2023, where there were no OTF-W incidents likely attributed to introductions of undetected M. bovis-infected cattle recorded in HS28. One incident was found south west of Lincolnshire in HS23.

One OTF-W incident in HS28 was most likely attributed to local cattle infected with undetected M. bovis.

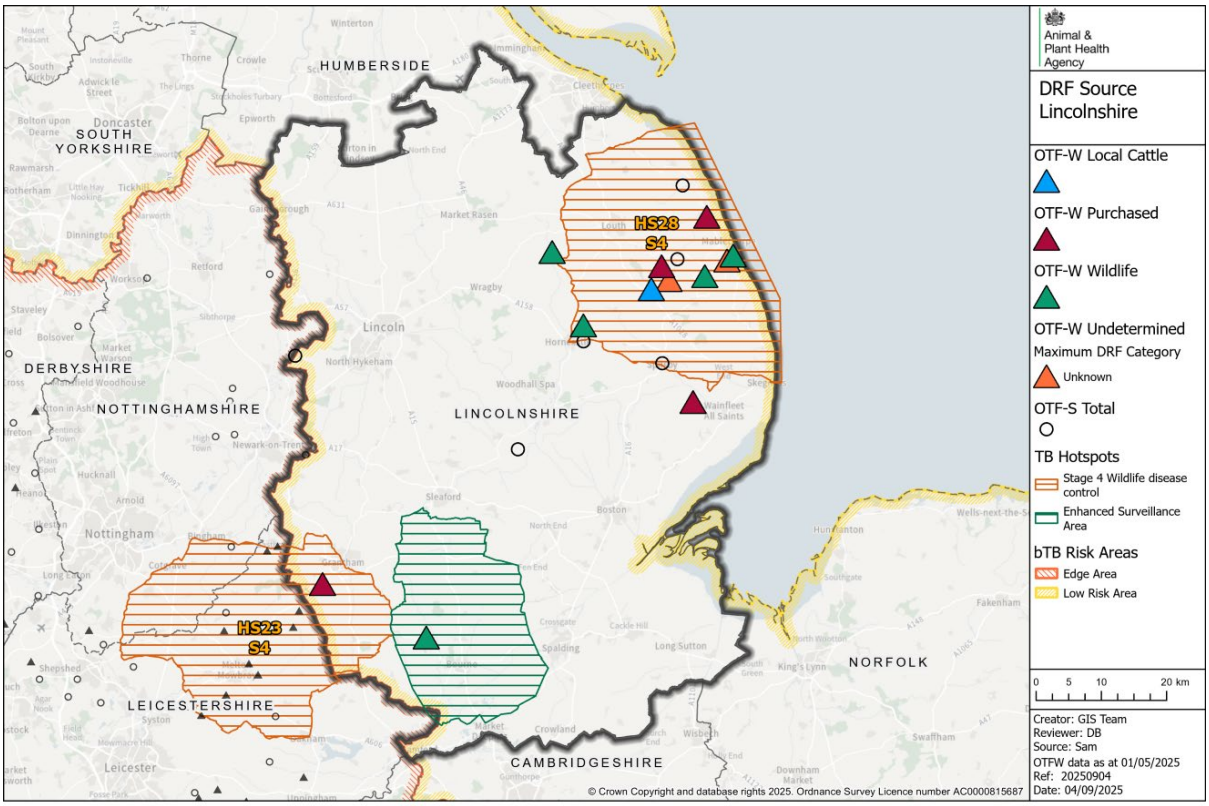


Figure 7: Map of the source of infection pathway recorded with the highest level of certainty, for OTF-W incidents, and the location of OTF-S incidents in Lincolnshire which started in 2024.

Figure 7 description: A map of Lincolnshire and adjoining areas showing the geographical location of cattle holdings with new OTF-W incidents in 2024 and the most likely source of infection. OTF-W incidents are shown as triangles in different colours which represent the source of infection with the highest level of certainty. Blue represents local cattle, brown represents purchased cattle, green represents wildlife, and orange represents unknown. Unknown sources of infection reference where there is insufficient evidence to attribute the source of infection to a particular risk pathway, alternatively multiple risk pathways may be plausible, and the investigating veterinary officer may be unable to discern the most likely source. Local cattle refer to residual infection and contiguous cattle risk pathways. Purchased refers to cattle movement risk pathways. Wildlife refers to both badger and other wildlife risk pathways. New OTF-S incidents in 2024 are shown as circles. The geographical location of TB hotspots is shown with hashed lines. The colour of the hotspot, along with the suffixes S3 and S4, indicates the stage of controls in place in 2024: red is stage 4 (S4 is wildlife disease control). Enhanced Surveillance Areas are shown with green hashed lines. The location of new TB incidents is described in the main text.

Figure 8 provides an overview of the radial surveillance zones (both active and completed) set up by APHA around OTF-W incidents in Lincolnshire. Most radial zones still active in 2024 were located within HS23 and HS28, similarly to 2023. There was an increased number of active radial zones just outside the hotspot areas when compared to 2023.

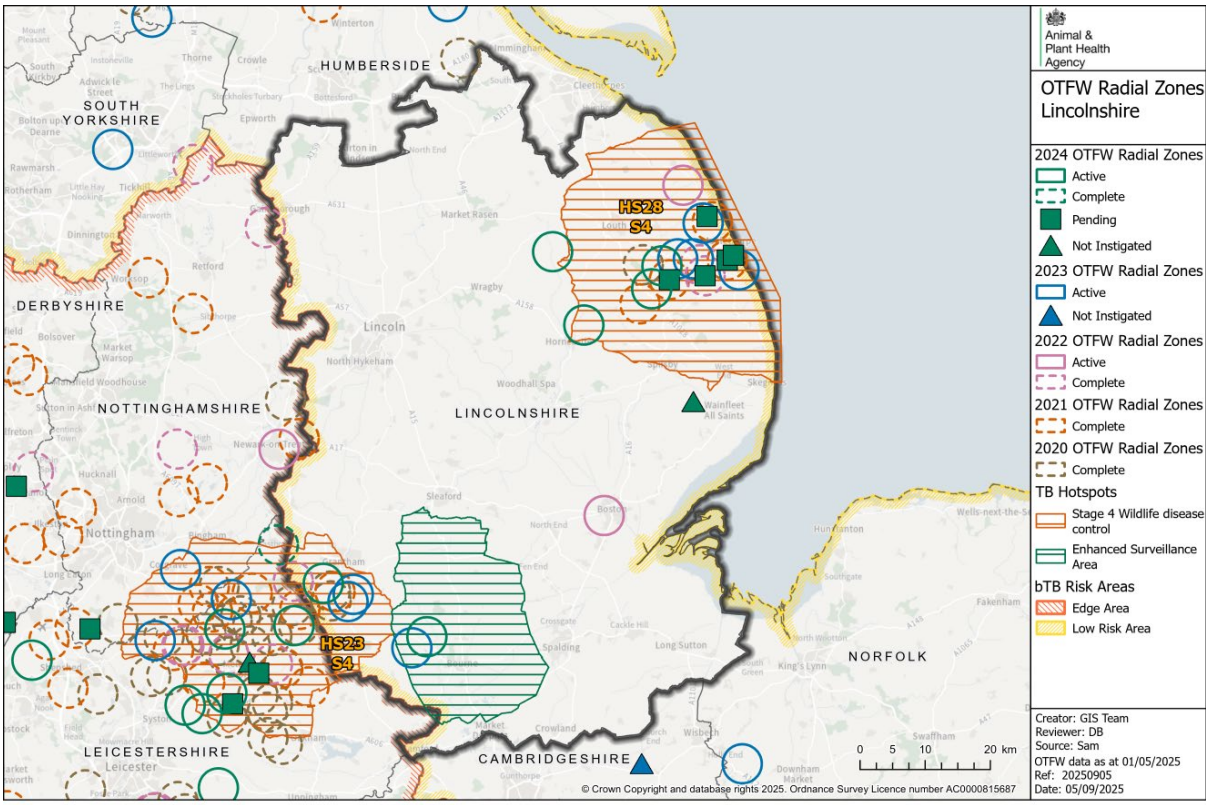


Figure 8: Hotspot areas and radial surveillance zones around OTF-W incidents that were active, completed or not instigated in Lincolnshire during 2024, by year of initiation.

Figure 8 description: A map of Lincolnshire and adjoining areas showing the geographical location of hotspots and radial surveillance zones around OTF-W incidents in 2024. The active radial zones are shown as solid line circles, completed radial zones are shown as dotted line circles, and radial zones that were not instigated are shown as triangles. The colour of the circles represents the year in which the radial zone was instigated: 2024 is green, 2023 is blue, 2022 is pink, 2021 is orange and 2020 is brown. The geographical location of TB hotspots is shown with hashed lines. The colour of the hotspot, along with the suffixes S3 and S4, indicates the stage of controls in place in 2024: red is stage 4 (S4 is wildlife disease control). Enhanced Surveillance Areas are shown with green hashed lines. The location of new TB incidents is described in the main text.

TB hotspots

There are 2 hotspots either wholly or partially within Lincolnshire, HS23 and HS28.

The total number of incidents in each of the TB hotspots described in this report does not include suspected slaughterhouse cases of TB that proved negative on PCR testing and/or bacteriological culture. The number of incidents presented in this section may not reflect those shown on the maps in these reports. Incidents shown on the maps are located at the centre of their County Parish Holding number (CPH).

Incidents reported in this section include any holdings with land inside of the hotspot boundary.

In this report the number of incidents per year in each Hotspot has been gathered using field veterinarian data. Previously, spatial Geographic Information System (GIS) data was used to inform whether a holding was inside of a designated Hotspot. This change may create discrepancies between the number of incidents per year reported here, compared to previous reports.

Hotspots were previously referred to as ‘potential’ or ‘confirmed’, depending upon identification, or not, of infection in wildlife populations. This has now changed, and hotspots are managed in ‘stages’ covering cattle, and where relevant, wildlife. Further details can be found on April 2025: TB hotspots in the Low Risk Area of England.

Hotspot 23

HS23 was launched in 2018 in west Lincolnshire and north-east Leicestershire (WGS clade B3-11, genotype 25:a).

In 2020, there was a boundary change to HS23 to include Nottinghamshire. In 2024 the boundary of the hotspot was changed again to account for the lack of evidence of infection in certain areas. It continued to straddle Leicestershire, Lincolnshire, and Nottinghamshire, but included a larger area of Leicestershire than in the previous years. The frequency of cattle herd testing was also increased from 12 monthly to 6 monthly in September 2024.

Since the establishment of HS23, there have been 97 OTF-W and 71 OTF-S incidents. Within the new boundary, in 2024, there were 16 new TB incidents over the 3 counties. Of these, 11 were OTF-W (9 WGS clade B3-11, one WGS clade B6-62, one culture negative) and 5 of these were OTF-S. Only one of these incidents occurred in the Lincolnshire area of the hotspot (one OTF-W, WGS clade B3-11). The remaining 10 OTF-W incidents occurred in the Leicestershire area of HS23 as well as 4 OTF-S incidents. Only one OTF-S incident occurred within the Nottinghamshire area of this hotspot (Figure 9).

Each year, most incidents occurred in the Leicestershire portion of HS23, except for 2023 where the total number of incidents was the same as in Lincolnshire. In the Lincolnshire portion of HS23, there was one OTF-W incident in 2024 and no OTF-S incidents. The number of OTF-W incidents has fluctuated between 2 and 3 between 2018 and 2023. Between 2018 and 2022, the number of OTF-S incidents also fluctuated between 2 and 3, followed by a peak of 5 incidents in 2023.

In 2024, there were 10 OTF-W incidents in the Leicestershire area of HS23, which was double compared to the previous year (5). The number of OTF-W incidents fluctuated between 5 and 16 between 2018 and 2023. There were 4 OTF-S incidents in 2024. The number of OTF-S incidents ranged between 3 in both 2019 and 2022, and a peak of 9 in 2021.

There were no OTF-W incidents and one OTF-S incident in the Nottinghamshire portion of HS23 in 2024. In 2018, there were 4 OTF-W incidents and thereafter, the numbers ranged between one and 3. The number of OTF-S incidents increased from one in 2018 to 3 in 2020. Three OTF-S incidents were detected each year until the single incident in 2024.

Since establishing HS23 to 31 December 2024, there have been 163 incidents, of which 93 were OTF-W and 70 OTF-S (there were also 7 OTF-W incidents with a different WGS clade associated).

Three TB-positive ‘found dead’ badger carcases were identified within the area (WGS clade B3-11, genotype 25:a), 2 in 2019 and one in 2020. The isolates from both badgers in 2019 had a close genetic relationship with those from the local cattle incidents, based on WGS analysis. As a result, licensed culling of badgers began in 2020 and continued annually until 2024. In 2024, 54 badgers were removed from the Lincolnshire area of HS23 and 269 were removed from the Leicestershire area. Further information can be found in TB hotspots in the Low Risk Area of England.

Additionally, a new Enhanced Surveillance Area (ESA) was established directly to the east of HS23. This area was established due to a higher proportion of TB incidents occurring from 2018 to 2023 than expected for the LRA, but with no evidence of epidemiological links to HS23. In 2024, there was one new TB incident in the ESA (OTF-W, culture negative). Cattle herds within the ESA are subject to annual testing.

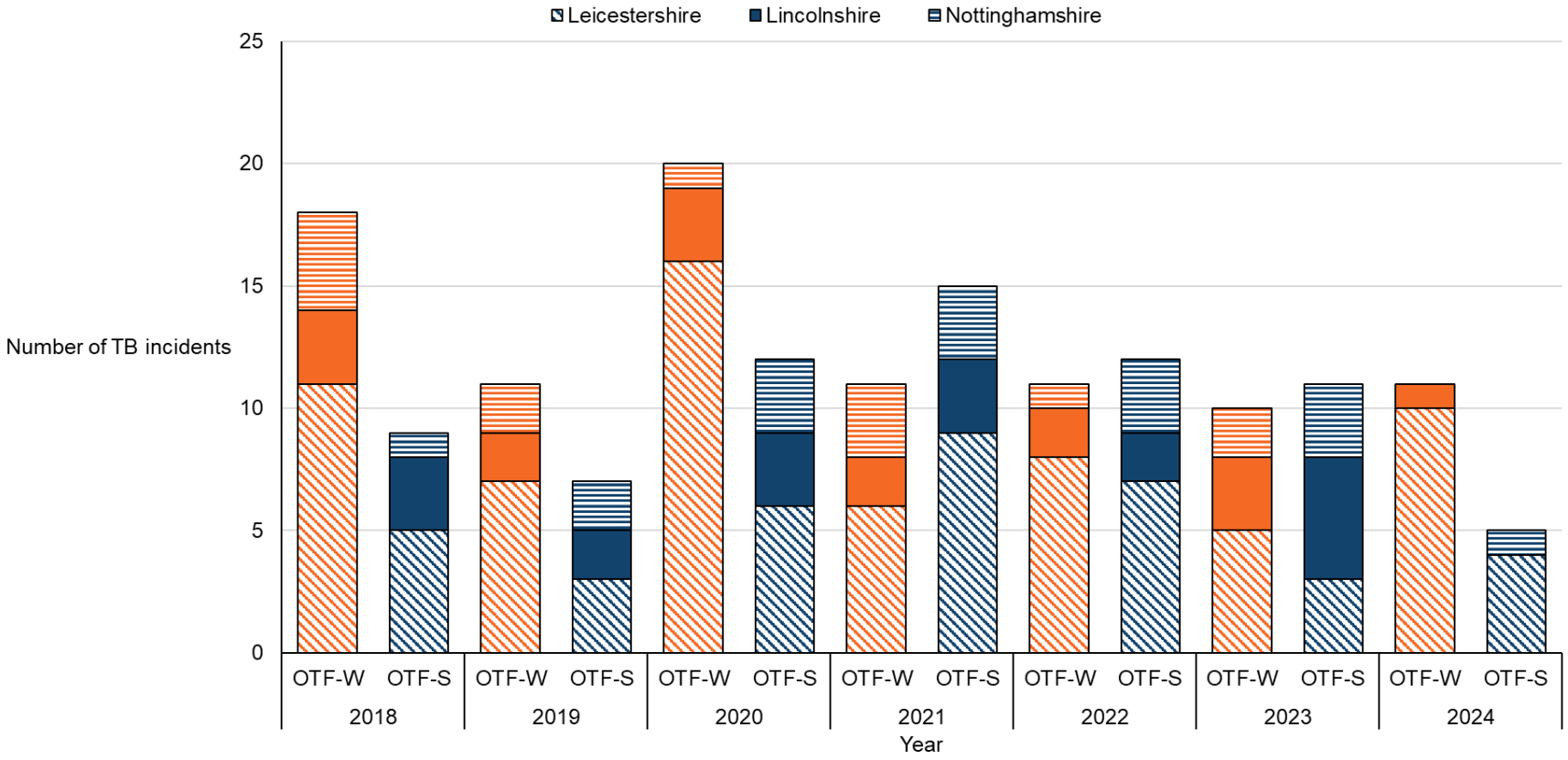


Figure 9: Annual number of new TB incidents in HS23, from 2018 to 2024. Incidents in the Leicestershire portion of HS23 are shown as diagonal stripes, those in Lincolnshire are solid colours, and those in Nottinghamshire are in horizontal stripes.

Hotspot 28

A cluster of OTF-W incidents of uncertain origin were disclosed in 2019 and 2020, all with WGS clade B3-11 (formerly genotype 25:a) in the east of the county. As such, a hotspot was established in 2020. Isolates were most closely related to those in Cheshire, suggesting that historic movements of undetected infected cattle from Cheshire may have been responsible for introduction of TB to HS28. The boundary of HS28 was adjusted in 2023 according to the geographical distribution of cattle herds, cattle incidents, and the locations of TB-positive badger carcases. In early 2024 the decision was made to introduce badger vaccination in HS28, and the HS moved from Stage 3 (Wildlife Involved) to Stage 4 (Wildlife Disease Control).

The number and type of cattle herds can change year on year. In 2024, HS28 contained 201 cattle herds, with 178 beef herds (89%), 11 dairy herds (5%), 7 LFUs, 4 calf rearers and one temporary gathering. This accounted for approximately 26,000 cattle, with an average herd size of 160 animals.

Since establishing HS28 in December 2024, there have been 58 incidents, of which 30 were OTF-W and 28 OTF-S (there was also one OTF-W incident with a different WGS clade associated). The number of total new cases over the last 5 years can be considered relatively stable, except for a peak in OTF-S incidents in 2020 (Figure 10). Of the 30 OTF-W incidents, there were 3 each in 2019 and 2023, 4 in 2021 and 2022, 7 in 2020 and 9 in 2024. There were 3 OTF-S incidents in 2019, 2020 and 2024, 4 in 2022, 7 in 2023 and 8 in 2021.

Whilst there was a decrease in the number of OTF-S incidents from 7 in 2023 to 3 in 2024, the number of OTF-W incidents increased to the highest number seen since the establishment of the hotspot (9). Three of these OTF-W incidents were found to have a high proportion of animals showing visible lesions of TB at PME (71 to 94% of reactors). Alongside an increased number of skin test reactors from 47 reactors in 2023 to 127 in 2024, these findings are of concern.

From establishing the hotspot to the end of 2024, 109 found-dead badgers were subject to PME. Of these, 5 (collected in 2023 and 2024) have tested positive for M. bovis. A total of 8 found-dead wild deer were subject to PME, all negative for M. bovis.

WGS analysis of isolates from the badger carcases suggested epidemiological associations with neighbouring cattle incidents.

Investigations into the cluster of TB incidents in cattle herds continues. Phylogenetic analysis of WGS data from M. bovis isolates indicates that the cattle incidents are closely related, and so local spread of infection within HS28 is likely.

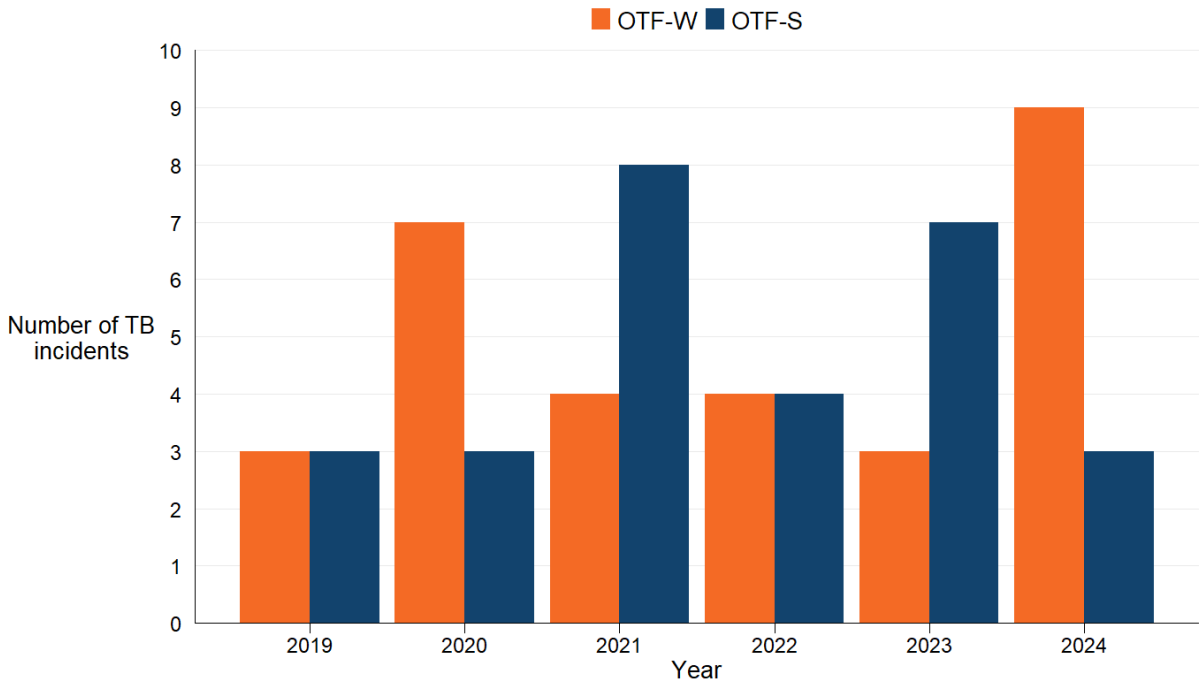


Figure 10: Annual number of new TB incidents in HS28, from 2016 to 2024.

APHA is continuing to collect and test for TB in ‘found dead’ badger and wild deer carcases within hotspots that are reported via the ‘web report’ form or to the Defra Rural Services Helpline (03000 200 301) for collection.

Main risk pathways and key drivers for TB infection

Evidence collected during APHA veterinary investigations into the source of infection within herds was used to inform this understanding. In 2024, 18 (100%) of new TB incidents in Lincolnshire received a preliminary or final APHA veterinary investigation to identify the source of infection.

It can be challenging to retrospectively establish the route of infection for a TB incident herd. Ideally this investigation includes a thorough on-farm investigation and scrutiny of routinely collected data, such as cattle movement records, and the results of WGS where available. Up to 3 hazards and risk pathways were selected for each incident investigated. Each of these potential sources were given a score that reflects the likelihood of that pathway being the true one, based on the available evidence.

Details of the protocol used for these investigations, and the subsequent methodology used to calculate the weighted contribution of the different suspected sources of M. bovis infection can be found in the explanatory supplement for the annual reports 2024.

The key drivers of the TB epidemic in Lincolnshire during 2024 were identified as follows:

- exposure to potentially infected badgers
- movement from undetected infected cattle
- residual cattle infection

Potential exposure to infected badgers was considered the main risk pathway for infection for cattle herds in the county in 2024. It had a weighted contribution of 32%, as shown in Appendix 3. This is lower than 2023 (38%) and 2022 (38%).

The movement of undetected infected cattle continued to be another important risk pathway. Compared to 2023, the weighted contribution increased by 8 percentage points in 2024 (22% to 30%).

Residual cattle infection sources had a weighted contribution of 15% in 2024. There has been a large increase when compared with 0.8% in 2023

There was a degree of uncertainty around the source of some new incidents. Other or unknown sources had a weighted contribution of 13% in 2024. This category is added to those incidents in which there was high uncertainty around the selected pathways as alluded to earlier in the report.

Forward look

The main concerns in Lincolnshire continue to be the 2 stage 4 Hotspots (HS23 and HS28), with HS28 showing a worsening disease picture in 2024. The TB picture in the Lincolnshire portion of HS23 remained stable.

Improvements to biosecurity, ongoing education and encouragement of responsible cattle sourcing practices will be key to control and eradicate any local spread of TB and maintain the low-risk TB status in Lincolnshire.

Further control measures for both cattle and wildlife must be introduced within HS28. Additional cattle controls, including 6-monthly testing and increased use of the IFN-γ test within HS28 have been proposed for implementation in 2025.

The current controls within HS23 and the rest of Lincolnshire appear to be effective and should continue.

It is uncertain whether OTF status can be achieved by 2038 within Lincolnshire due to the levels of disease within the 2 ongoing hotspots. However, given the low incidence of disease in the rest of the county, OTF status may still be feasible.

Appendix 1: cattle industry demographics

Table 1: Number of cattle herds by size category in Lincolnshire as of 31 December 2024 (RADAR data on number of holdings in the report year)

Size of herds	Number of herds
Undetermined	11
1 to 50	308
51 to 100	115
101 to 200	100
201 to 350	63
351 to 500	21
Greater than 501	26
Total number of herds	644
Mean herd size	115
Median herd size	52

Table 2: Number (and percentage of total) of animals by breed purpose in Lincolnshire as of 31 December 2024 (Sam data showing the number of herds flagged as active at the end of the report year)

Breed purpose	Number (and percentage of total) cattle in Lincolnshire
Beef	64,965 (87%)
Dairy	7,694 (10%)
Dual Breed	1,424 (1%)
Unknown	11 (0.02%)
Total	74,094

Appendix 2: summary of headline cattle TB statistics

Table 3: Herd-level summary statistics for TB in cattle in Lincolnshire between 2022 and 2024 (SAM data)

Herd-level statistics	2022	2023	2024
(a) Total number of cattle herds live on Sam at the end of the reporting period	865	824	816
(b) Total number of cattle herds subject to annual TB testing (or more frequent) at the end of the reporting period (any reason)	199	303	284
(c) Total number of whole herd skin tests carried out at any time in the period	348	387	374
(d) Total number of OTF cattle herds having TB whole-herd tests during the period for any reason	277	296	306
(e) Total number of OTF cattle herds at the end of the report period (herds not under any type of TB movement restrictions	818	780	751
(f) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	853	813	798
(g.1) Total number of new OTF-S TB incidents detected in cattle herds during the report period	10	13	6
(g.2) Total number of new OTF-W TB incidents detected in cattle herds during the report period	7	6	12
(g.3) Total number of new TB incidents (OTF-W and OTF-S) detected in cattle herds during the report period	17	19	18
(h.1) Of the new OTF-W herd incidents, how many occurred in a holding affected by another OTF-W incident in the previous 3 years?	6	2	6
(h.2) Of the new OTF-W herd incidents, how many could be considered secondary to a primary incident based on current evidence?	3	3	1

Herd-level statistics	2022	2023	2024
(h.3) Of the new OTF-W herd incidents, how many were triggered by skin test reactors or twice-inconclusive reactors (2xIRs) at routine herd tests?	1	0	0
(h.4) Of the new OTF-W herd incidents, how many were triggered by skin test reactors or 2xIRs at other TB test types (such as forward and back-tracings, contiguous, check tests)?	5	6	11
(h.5) Of the new OTF-W herd incidents, how many were first detected through routine slaughterhouse TB surveillance?	1	0	1
(i.1) Number of new OTF-S incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	3	4	3
(i.2) Number of new OTF-W incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	3	4	8
(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)	7	6	13
(k) Number of OTF-W herds still open at the end of the period that were on a finishing unit	1	1	1
(l) New laboratory-confirmed incidents of M. bovis infection in non-bovine domestic species or captive deer detected during the report period (indicate host species involved)	0	0	0

Table 4: Animal-level summary statistics for TB in cattle in Lincolnshire between 2022 and 2024.

Animal-level statistics (cattle)	2022	2023	2024
(a) Total number of cattle tested with tuberculin skin tests or additional IFN-γ blood tests in the period (animal tests)	54,621	59,409	59,030
(b.1) Reactors detected by tuberculin skin tests during the year	40	59	136
(b.2) Reactors detected by additional IFN-γ blood tests (skin-test negative or IR animals) during the year	19	31	38
(c) Reactors detected during year per incidents disclosed during year	3.5	4.7	9.7
(d) Reactors per 1,000 animal tests	1.1	1.5	3.0
(e.1) Additional animals slaughtered during the year for TB control reasons (dangerous contacts, including any first time IRs)	6	4	0
(e.2) Additional animals slaughtered during the year for TB control reasons (private slaughters)	4	0	6
(f) Slaughterhouse (SLH) cases (tuberculous carcases) reported by the Food Standards Agency (FSA) during routine meat inspection	9	2	2
(g) SLH cases confirmed by M. bovis PCR testing or bacteriological culture	2	0	1

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 in the table above.

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 3: suspected sources of M. bovis infection for all the new OTF-W and OTF-S incidents identified in the report period

In 2024, 18 out of 18 (100%) new TB incidents in Lincolnshire received a preliminary or final APHA veterinary investigation to identify the source of infection.

Each TB incident could have up to 3 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)
- possible (score 1)

The sources 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 6, then the score is made up to 6 using the ‘Other or unknown source’ option. Buffering up to 6 in this way helps to reflect the uncertainty in assessments where only ‘likely’ or ‘possible’ sources are identified.

Table 5 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). WGS of M. bovis isolates can be a powerful tool in identifying a likely source of infection, however WGS clades 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 for the annual reports 2024.

Please note that each TB incident could have up to 3 potential pathways so totals may not equate to the number of actual incidents that have occurred.

Table 5: Suspected sources of M. bovis infection for the 16 incidents with a preliminary or a final veterinary assessment in Lincolnshire, in 2024

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	10	2	4	0	31.9%
Cattle movements	8	1	2	2	29.9%
Contiguous	1	0	0	0	0.8%
Residual cattle infection	5	3	0	0	15.2%
Domestic animals	0	0	0	0	0.0%
Non-specific reactor	1	0	0	0	0.7%
Fomites	0	0	0	0	0.0%
Other wildlife	7	0	1	0	8.6%
Other or unknown source	1	0	0	0	13.0%

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