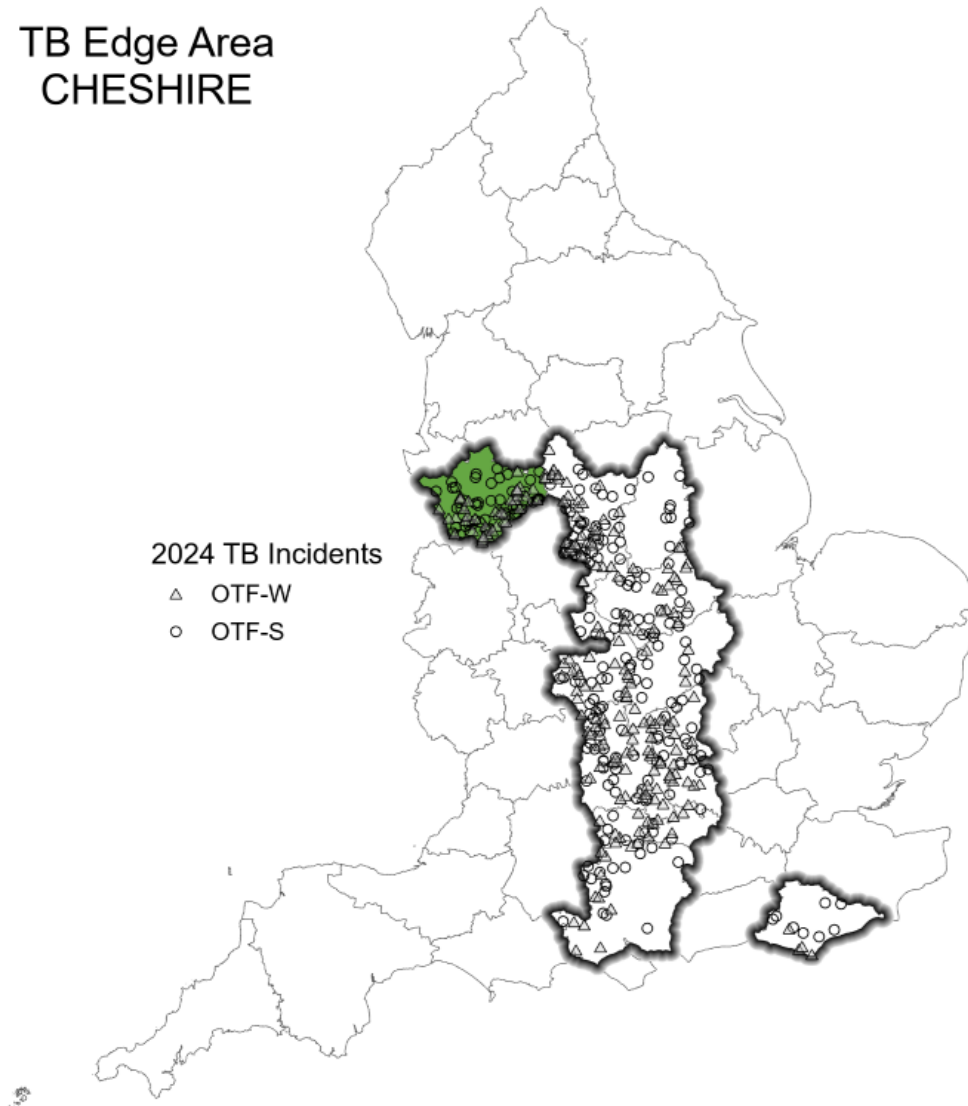




Animal &
Plant Health
Agency

Year End Descriptive Epidemiology Report of Bovine TB in the Edge Area of England 2024: Cheshire

TB Edge Area
CHESHIRE



Contents

Introduction	3
Classification of TB incidents	3
Cattle industry	4
Number of new TB incidents	5
Disclosing TB surveillance method	6
Duration of TB incidents	8
Incidence of TB	9
Prevalence of TB	10
Skin test reactors and interferon gamma test positive animals removed	11
Recurrent TB incidents	12
Three-year recurrence	12
Unusual TB incidents	13
TB incidents in other species	15
Geographical distribution of TB incidents	15
Main risk pathways and key drivers for TB infection	18
Forward look	25
Appendix 1: cattle industry demographics	27
Appendix 2: summary of headline cattle TB statistics	28
Appendix 3: suspected sources of M. bovis infection for all the new OTF-W and OTF-S incidents identified in the report period	31

Introduction

The Edge Area was originally established in 2013, along with the Low Risk Area (LRA) and High Risk Area (HRA) 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. The current aim is to obtain OTF status for the Edge Area as soon as possible.

TB in cattle and other mammals is primarily caused by the bacterium *Mycobacterium bovis* (*M. bovis*), and the disease is subsequently referred to in this report as TB. Although other sources may refer to TB 'breakdowns', this report will use the term 'incidents' throughout.

This report describes the frequency and geographical distribution of TB in cattle herds Cheshire, an Edge Area county, in 2024. It examines what factors are likely to be driving TB in this area, and the risks the disease in this county may pose to neighbouring areas.

It 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 and the scientific community.

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, interferon gamma test-positive animal, or slaughterhouse (SLH) case) with *M. bovis*-positive polymerase chain reaction (PCR) test (or bacteriological culture) results in tissue samples collected from carcasses during the PM inspection

OTF-S incidents are triggered by reactors to the skin test (or interferon gamma 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 incidents of TB reported at routine post-mortem meat inspection during commercial slaughter of cattle.

OTF-S incidents may be reclassified as OTF-W incidents following further testing and post-mortem examination (PME) of reactor cattle subsequently removed from the TB incident. This is particularly relevant for incidents which occur towards the end of the reporting period, and may cause discrepancies in the number of OTF-W or OTF-S incidents reported in the current and previous reports, Edge Area Year End Epidemiology reports or other official TB statistics.

Furthermore, the number of TB incidents and designation of those incidents as OTF-W or OTF-S may differ in this report compared to other official TB statistics due to differences in the information available at the time datasets are accessed.

In Cheshire there were 30 [Approved Finishing Units](#) (AFUs) active during 2024, all of which were active at the end of the reporting period. Of these, one experienced a new TB incident and 14 had an ongoing incidents at the end of 2024. These have been excluded from the numbers presented in this report due to the limited epidemiological impact of these incidents, with the exception of the incidence per 100 herd years at risk (HYR), which does include new TB incidents and time at risk contributed by AFUs.

Details of the data handling methodology used in this report, a glossary of terms, and the TB control measures adopted in the Edge Area, can be found in the [explanatory supplement for the annual reports 2024](#).

Cattle industry

Cheshire is predominantly a dairy county (68% of cattle) with some beef fattener and suckler herds of varying sizes, calf rearers, smallholders and pet cattle (see Appendix 1). Of all the cattle herds in the county, 53% contained up to 100 animals and 10% had over 500 animals, as shown in Appendix 1. The total number of cattle herds in Cheshire has reduced by 1% since 2023, as indicated in Appendix 2.

In Cheshire, there were no livestock markets and 2 collection centres. There were markets in Shropshire and Staffordshire, both in the HRA, and others in North Wales, which were frequently used by Cheshire cattle farmers. Four abattoirs were operating in Cheshire in 2024 and several larger throughput abattoirs within 30 miles of Cheshire.

There were 30 AFUs without grazing in 2024, compared to 36 in 2023. There was also one exempt finishing unit (EFU), the same as 2023.

Cheshire was originally divided between 2 TB risk areas: HRA in the southern quarter of the county along the border with Shropshire, and the Edge Area in the rest of the county. The whole of Cheshire was fully incorporated into the Edge Area in January 2018. Cattle herds in Cheshire have been under a routine 6-monthly TB

surveillance testing regime since January 2015 (in the original Edge Area portion) and January 2018 (rest of the county).

Herds that meet certain criteria and thus are identified as having a lower risk of TB, can benefit from “earned recognition” whereby they are tested annually. In Cheshire, 40% of cattle herds were regarded as having a lower risk of contracting TB, and thus eligible for annual testing under the [earned recognition scheme](#) in 2024.

Appendix 2 provides a summary of headline cattle TB statistics in Cheshire.

Number of new TB incidents

A total of 90 new TB incidents were disclosed across Cheshire during 2024 (39 OTF-W and 51 OTF-S) (Figure 1). This was a 10% decrease compared to 100 in 2023 (48 OTF-W and 52 OTF-S), and the lowest number recorded since before 2015.

The total number of TB incidents in Cheshire has been steadily decreasing since 2018. Over the last 10 years, the number of OTF-S incidents has fluctuated between 48 and 74 incidents per year. The number of OTF-W incidents increased from 93 to 122 incidents per year between 2015 and 2018. Since 2018, the number of OTF-W incidents continued to gradually decrease each year, with a 19% reduction from 2023 to 2024.

The decreasing trend in annual numbers of TB incidents may have been the combined effect of control measures aimed at the early detection and removal of infected cattle, including mandatory deployment of supplementary IFN- γ testing in many herds with OTF-W incidents in the county, alongside wildlife disease control measures, leading to reduced environmental contamination with *M. bovis*.

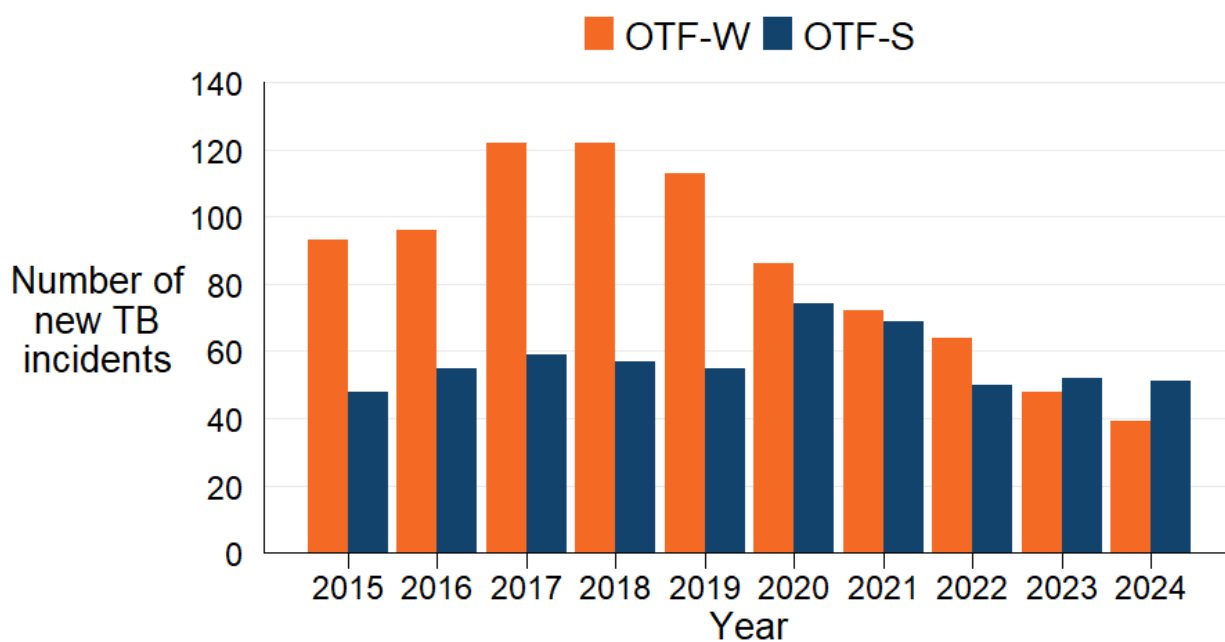


Figure 1: Annual number of new TB incidents in Cheshire, from 2015 to 2024.

Disclosing TB surveillance method

As in previous years, routine whole-herd tuberculin skin testing (every 6 or 12-months) continued to detect the most TB incidents in Cheshire in 2024 (57). This was followed by slaughterhouse surveillance (15), targeted 6-month post-incident testing (6M test) (15) and other testing (3), as shown in Figure 2.

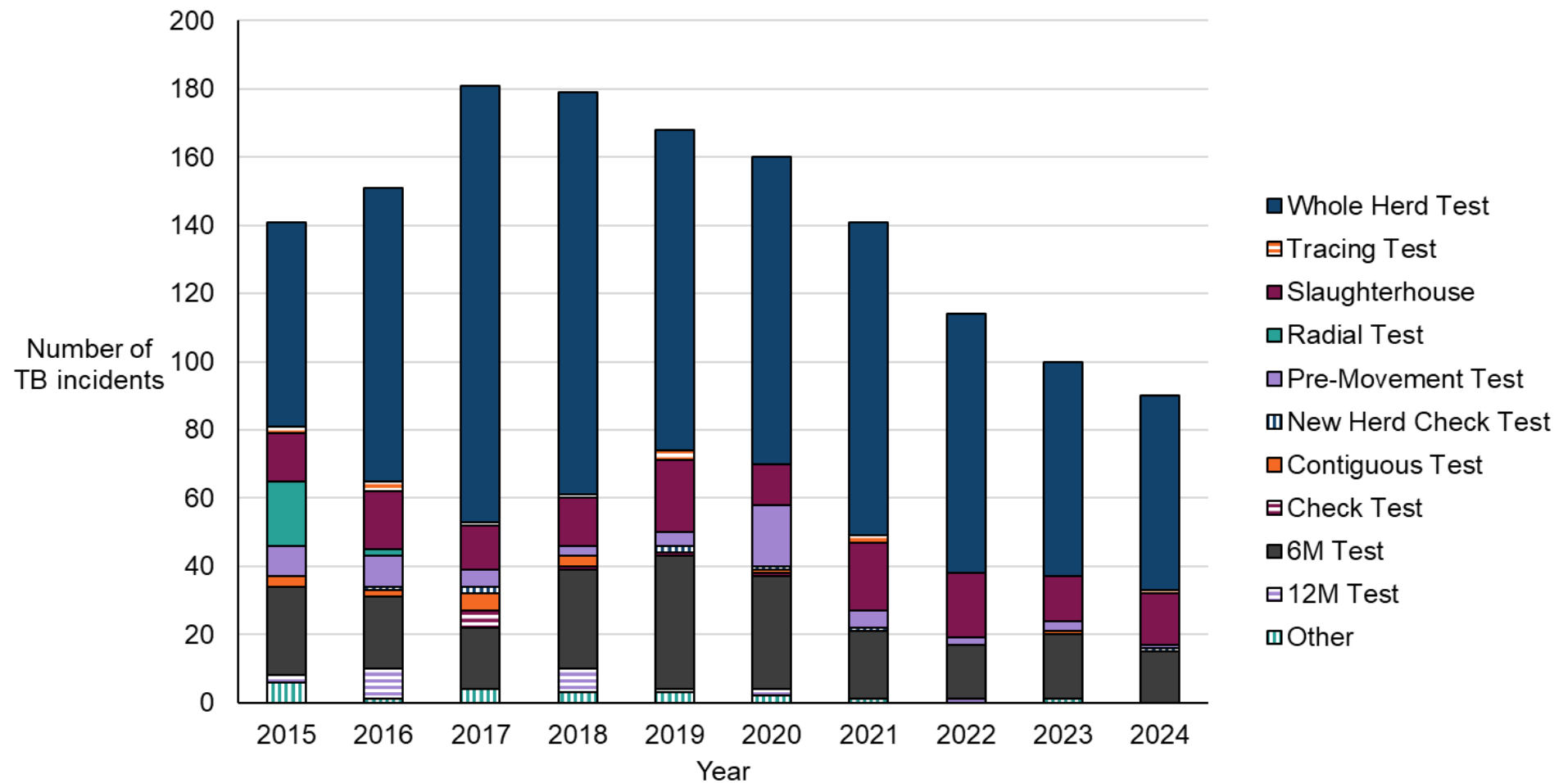


Figure 2: Number of new TB incidents (OTF-W and OTF-S) in Cheshire from 2015 to 2024, according to the surveillance methods that detected them. Incidents disclosed by 'Other' tests includes, but is not limited to, private testing, inconclusive reactor retests, and export tests.

Duration of TB incidents

Of the 96 TB incidents that were resolved in Cheshire in 2024, 43 started in 2024, 51 in 2023 and 2 in 2022. Of these, 50 were OTF-W incidents, of which 2 were classified as persistent (Figure 3) (where the affected herds were under movement restrictions for more than 550 days). Eight OTF-W incidents were resolved within 101 to 150 days, 28 within 151 to 240 days and a further 12 within 241 to 550 days. The median duration of OTF-W incidents that ended in 2024 was 198 days, interquartile range (IQR) 156 to 244, which is longer than in 2023 (median 177, IQR 152 to 227).

Two persistent OTF-W incidents were still open at the end of the year. In one of these persistent incidents, all necessary testing was carried out during and post-incident, however the incident remained open due to CTS anomalies (Cattle Tracing Movement System discrepancies not being resolved on a TB test). This highlights the importance of good record keeping and prompt action at the time of the TB test.

The remaining 46 TB incidents that closed in 2024 were OTF-S incidents, of which one was persistent. Twelve OTF-S incidents were resolved within 101 to 150 days, 27 within 151 to 240 days and a further 6 within 241 to 550 days. The median duration of OTF-S incidents was 161 days (IQR 150 to 208), a slight reduction compared to 2023 (median 152, IQR 142 to 166).

The median duration of all incidents that ended in 2024 in Cheshire was 174 days (IQR 151 to 236). This is shorter than the duration of incidents that closed in 2023, with a median of 188 days (IQR 159 to 265) and the median duration of TB incidents across all Edge Area counties (186 days, IQR 159 to 260).

There were 50 TB incidents that were still open at the end of 2024, including the 2 persistent OTF-W incidents mentioned above.

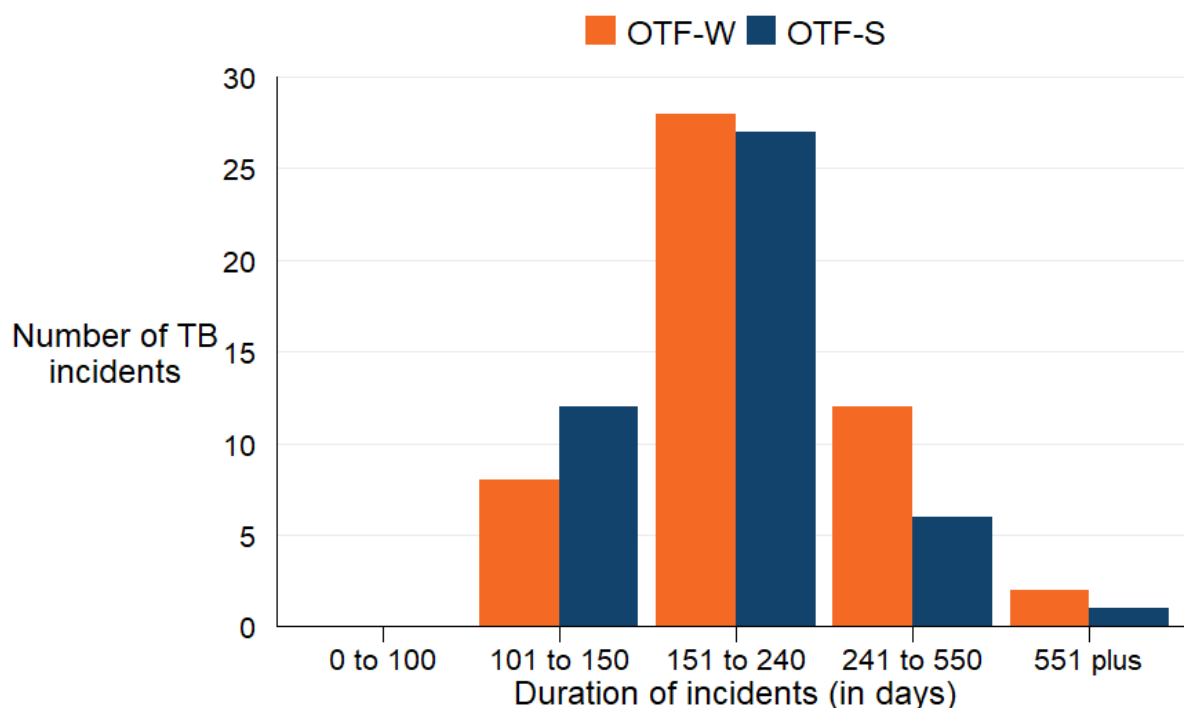


Figure 3: Duration of TB incidents (OTF-W and OTF-S) that closed in Cheshire in 2024.

Incidence of TB

In 2024, the incidence rate was 8.7 incidents per 100 herd years at risk (HYR), the fifth highest incidence rate out of the 11 counties in the Edge Area. This was higher than the overall incidence rate for the whole of the Edge Area in 2024 (7.3 incidents per 100 HYR), as shown in Figure 4. The incidence rate for Cheshire was lower than that of the whole HRA (13.6) and was lower than all individual HRA countries apart from the West Midlands (6.0 per 100 HYR).

Between 2015 and 2019 the incidence rate generally increased, peaking at 16.5 incidents per 100 HYR in 2019. Since then, the incidence has steadily decreased each year, although the rate of decrease appeared to slow between 2023 (9.0 incidents per 100 HYR) and 2024. The incidence rate in 2024 was the lowest recorded in the county in the last 10 years.

In the Edge area overall the incidence rate increased from 6.6 incidents per 100 HYR in 2015 to a peak of 10.0 in 2020, before gradually declining to 7.3 in 2024, a small increase compared to 2023 (7.2).

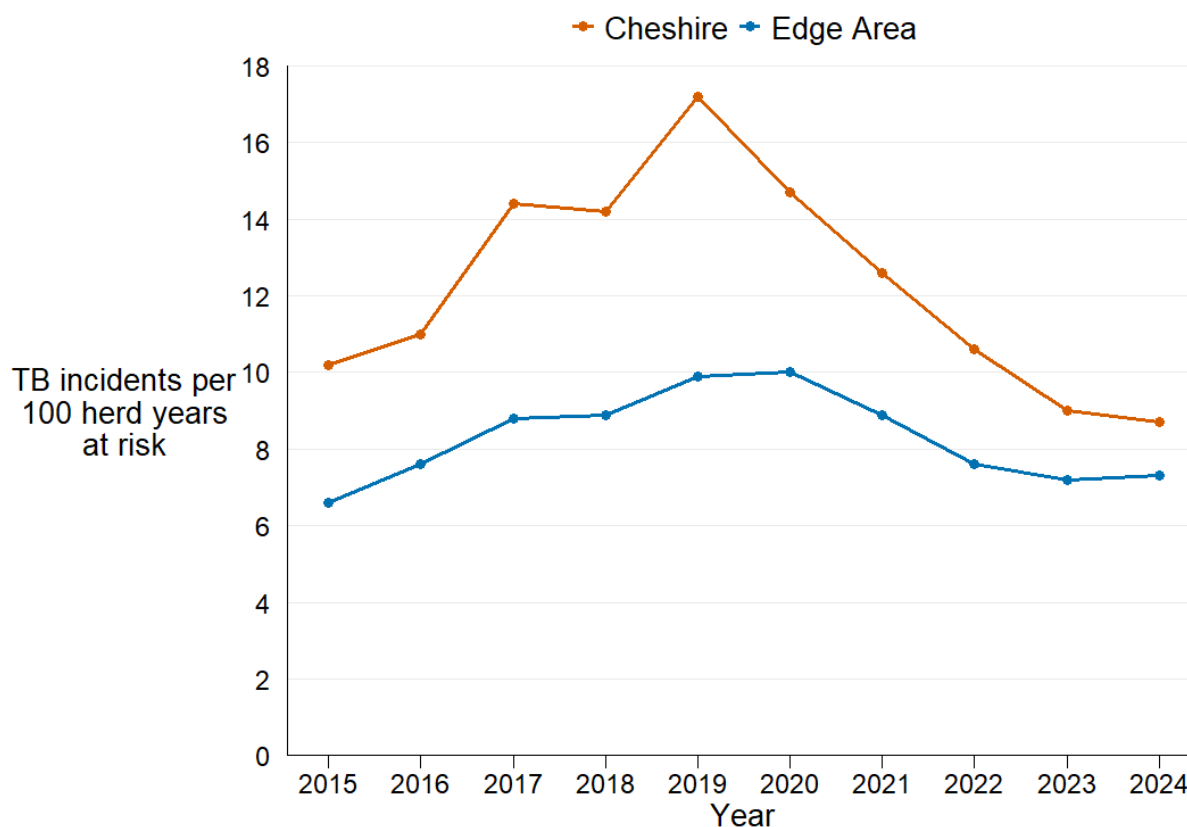


Figure 4: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Cheshire and the Edge Area, from 2015 to 2024. This includes one new TB incident in an AFU in Cheshire in 2024.

Prevalence of TB

In 2024, the prevalence was 3.9%, the fifth highest end of year prevalence out of the 11 counties in the Edge Area, a decrease from 4.4% in 2023. This was slightly lower than the overall prevalence for the whole of the Edge Area in 2024 (4.0%), as shown in Figure 5.

In Cheshire between 2015 and 2017 there was a marked increase in prevalence, from 4.0% to 8.5%. Since 2018 there has been a gradual decrease to 4.4% in 2022 and 2023. A further decrease was observed in 2024.

In the Edge area overall, the prevalence increased steadily between 3.2% in 2015 to 5.9% in 2018. This was followed by a gradual decrease to 3.6% in 2022. In 2023, the prevalence rose to 3.7%, increasing again to 4.0% in 2024.

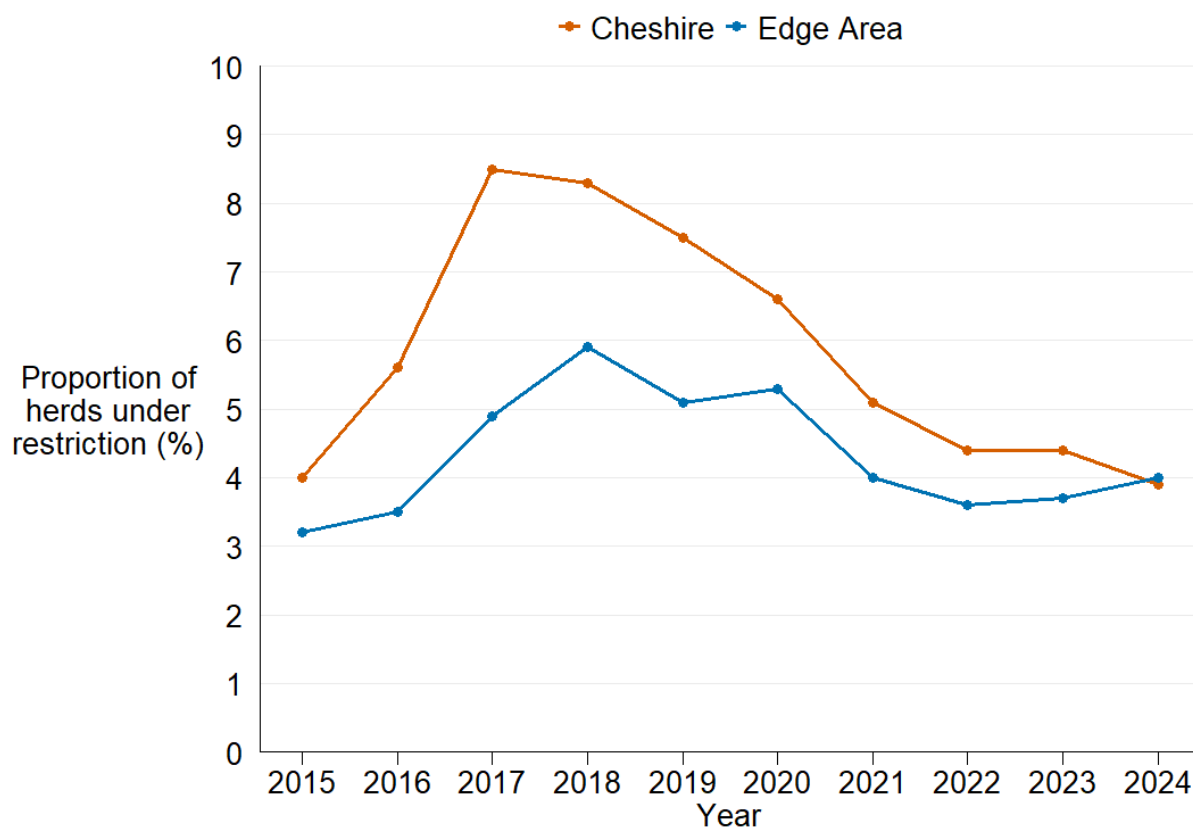


Figure 5: Annual end of year prevalence in Cheshire and in the Edge Area overall, from 2015 to 2024. This is the proportion of live herds under TB movement restrictions on the 31 December 2024.

Skin test reactors and interferon gamma test positive animals removed

A total of 1,045 cattle were removed as TB test reactors from TB incidents in Cheshire during 2024. Of these, 621 were skin test reactors and 424 were positive by the supplementary IFN- γ blood test (Figure 6).

The number of animals removed has fluctuated over the last 10 years, peaking in 2018, with a subsequent decrease to the lowest recorded in 2023. This was followed by a 29% increase in the total number of cattle removed as TB test reactors in 2024 compared to 2023 (812: 644 skin test reactors and 168 IFN- γ positive animals). In 2024, there were the lowest number of tuberculin skin test reactors recorded since 2015, however, IFN- γ reactors were the highest recorded since 2021.

The slight decrease in skin test reactors compared to 2023 could reflect the slight decrease in new incidents and incidents that were open at any time during 2024 compared to 2023. More frequent use of IFN- γ , increasing overall sensitivity of testing and earlier removal of affected animals, may also contribute.

The marked increase in IFN- γ positive animals compared to 2023 was mainly driven by the increased use of supplementary IFN- γ testing in incident management (30% increase in tests undertaken). This is due to a combination of increased use of ad-hoc testing and more herds meeting IFN- γ testing criteria. Other contributing factors may include increased herd sizes in incidents compared to the previous year, repeated use in some chronic incidents, and increased use of recurrent IFN- γ test reasons, for example when an incident occurred within 18 months of the herd regaining OTF status following a previous incident with lesion and/or confirmatory test positive animals.

During 2024, the discretionary voluntary IDEXX antibody test was applied on one occasion. Also, a head-to-head project (IDEXX/Enferplex with IFN- γ) was applied on a different herd. Both herds were persistent incidents.

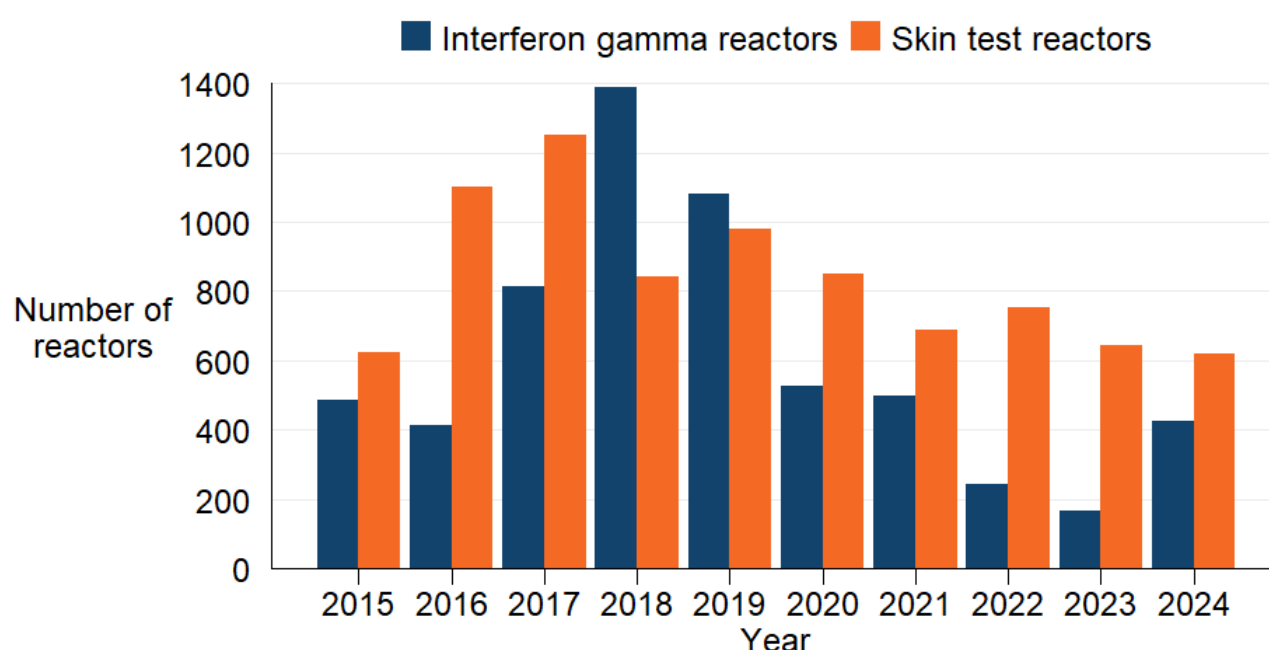


Figure 6: Number of skin test reactors and IFN- γ test positive cattle removed by APHA for TB control reasons in Cheshire, from 2015 to 2024.

Recurrent TB incidents

Three-year recurrence

In Cheshire, 35 of the 51 (69%) herds with a new OTF-S TB incident and 16 of the 38 (42%) with an OTF-W incident had experienced another TB incident in the previous 3 years (Figure 7). One herd had 2 incidents in 2024 and is therefore only counted once. Cheshire has the third highest percentage of recurrent herd incidents (57% of all incidents starting in 2024) of the 11 counties in the Edge area and was higher than the Edge area overall (47%). There was a 17% relative reduction in the percentage of recurrent herd incidents in Cheshire compared to 2023 (69%).

This may be partly explained by the more restricted use of mandatory IFN- γ testing in 2023 to recurrent incidents rather than all OTF-W incidents following a policy change in 2021. This may have resulted in infected cattle remaining within herds as a source of residual infection. During 2024, there was increasing use of ad-hoc IFN- γ testing in both OTF-W and OTF-S incidents. Additionally, despite several years of badger disease control, some farms still had active setts and re-infection from wildlife is possible, especially if biosecurity was suboptimal.

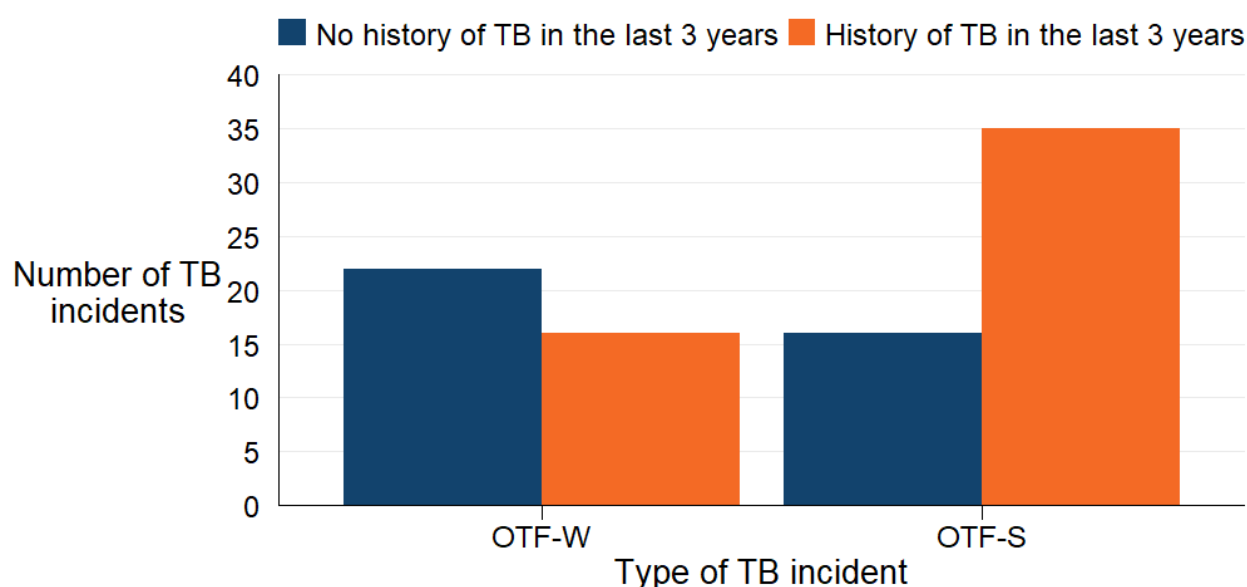


Figure 7: Number of herds with a TB incident (by OTF-W and OTF-S) in Cheshire in 2024, with and without a history of any TB incident in the previous 3 years of the disclosing test.

Unusual TB incidents

During 2024, a total of 5 incidents across the county were classed as chronic (lasting longer than 12 months). Four of those incidents became persistent, triggering enhanced management procedures. It is important to mention that one incident became persistent due to CTS anomalies (Cattle Tracing Movement System discrepancies not being resolved on a TB test). Four incidents involved dairy farms, where infection had likely become persistent for reasons including concurrent infection with Johne's disease (*Mycobacterium avium* subspecies *paratuberculosis*) which can reduce the sensitivity of TB testing, re-infection from potentially infected wildlife, and the removal of the requirement for mandatory IFN- γ testing in new OTF-W incidents since 2021.

Towards the end of 2024, an incident started in an AFU without grazing located close to the original Duddon cluster (see Geographical distribution of TB incidents section below). The incident was triggered by multiple slaughterhouse cases disclosed in a short period, triggering enhanced measures being applied (TB testing). Whole genome sequencing (WGS) analysis of isolates (clade B3-11) from this incident were found to be either identical or very closely related to other herds in the cluster, identifying an extension of the original Duddon cluster. The keeper purchases

youngstock in the spring which are grazed in fields around the AFU on a separate holding number before entering the AFU in the autumn. Cattle are not purchased from any of the other farms in the Duddon cluster. Infection could have occurred at pasture whilst on the other holding, from indirect contact with infected badgers either via pasture or via contaminated forage fed within the AFU. The close proximity of cattle within pens in the AFU likely resulted in cow-to-cow transmission whilst undergoing fattening. Incidents in AFUs are not shown in the maps in this report, or contribute to the numbers reported, with the exception of incidence.

There was one incident, ongoing since 2022, with suspected Johne's Disease and *M. bovis* co-infection. Despite the farmer being proactive and flexible with IFN- γ and serological testing being applied, this incident did not resolve in 2024.

The Nantwich cluster continued to be active in 2024 with several new incidents, some disclosing high numbers of reactors (see Geographical distribution of TB incidents section below). One incident was recurrent, with a previous incident on this holding in 2023, and was triggered by a suspect slaughterhouse case that had been on farm for almost 7.5 years. The isolate from this incident was closely related to a previous isolate from this premises in 2023. Therefore, the most likely source attribution was residual infection in the herd. A mandatory IFN- γ test and SICCT test disclosed 33 IFN- γ test positive animals and 36 skin reactors, 25 of which were both skin and IFN- γ positive. Of those animals removed, 33% had visible lesions at post-mortem meat inspection (PMMI). This incident resolved within 10 months after a further partial herd IFN- γ test. This cluster has been subject to detailed review and recommendations made for managing disease in the area.

There was an explosive incident 5 miles south of Nantwich close to the original Nantwich cluster, with 47 skin reactors at a routine surveillance whole herd test (WHT). In total, 79 cattle were removed as skin test reactors in a period of 10 months. Only one had visible lesions at PMMI, suggestive of an early mass infection. The herd was largely closed. They had maize land for feeding cattle next to a 2023 explosive incident in the Nantwich cluster and had also left cattle feed on the floor outside whilst a bin was repaired. Possible sources included contaminated feed (maize or concentrates), contaminated vehicle tyres or contamination by infected badgers whilst housed. An infected badger had been identified within a mile of this farm in recent years. WGS analysis from the isolates (B3-11) from this incident herd shows very close relationships with 23 other incidents within 7 miles of this premises in recent years, indicating likely wildlife involvement or environmental contamination with low to negligible risk from the cattle movement algorithm assessment.

An incident with 2 different WGS clades (B3-11 and B6-11) was disclosed inside the Nantwich cluster area. The B3-11 clade was isolated from a youngstock reactor which was sourced as a calf from one of the explosive incidents in the Nantwich cluster. This reactor was disclosed through spread trace testing from the TB incident at the farm of origin. Likely tuberculous mastitis and pooled milk feeding had resulted in infection in calves and subsequent spread from the original holding to multiple other farms through youngstock movement. The B3-11 isolate from this premises was related to the farm of origin isolate, but not very closely (6 and 8 single

nucleotide polymorphism (SNP) difference). The B6-11 clade was outside of its homerange of the West Midlands and the east of Wales. This isolate was within 4 (SNPs) difference, and therefore closely related to, an isolate identified in 2020 on the reactor farm of origin. The reactor was purchased as a calf under 42 days of age in 2023, and the source of infection on the origin farm is unclear. The animal was test negative on 3 skin tests after purchasing, before being disclosed on check test as a reactor. Infection could have been contracted from another undisclosed infected animal on its farm of origin. No disease report form (DRF) veterinary investigation was carried out for this incident, but cattle are regularly trace tested, therefore higher risk purchases may be implicated.

TB incidents in other species

There is no statutory routine TB surveillance of non-bovine species, apart from Post-Mortem Examination of animals slaughtered for human consumption, or carcasses 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. Enhanced voluntary wildlife surveillance takes place in LRA hotspots, but not within the Edge Area. Although no active surveillance of wild deer is in place, reporting of suspected TB lesions in wild deer and wildlife carcasses is statutory and suspect carcasses are inspected and tested by APHA.

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

Geographical distribution of TB incidents

There were clusters of incidents in several locations in Cheshire, mostly in similar locations compared to the previous 2 years. In 2022, a cluster of clade B3-11 (Duddon cluster) developed along the A51 between Tarporley and Tarvin (which lies 8km east of Chester along the A51 within West Cheshire) which extended eastwards in 2023 and north-west in 2024 towards Tarvin. Six new incidents were recorded in the cluster in 2024. The *M. bovis* isolates associated with those incidents (where available) were shown to be genetically very closely related on WGS. Disease investigations identified either wildlife or residual infection as the likely pathways. Incidents were presented with relatively small numbers of reactors, typically needing 2 to 3 SITs (Short Interval Test) to resolve. There has also been evidence of recurrence and WGS has shown close phylogenetic relationships between the isolates (18 incidents within 4.5 miles since 2019).

The Nantwich cluster (clade B3-11) appeared in the last quarter of 2023 involving the parishes of Newhall, Walgherton, Audlem, adjoining Wrenbury Cum Frith, Norbury, Austerson, Broomhall, Coole Pilate, and Dodcutt Cum Wilkesley. As previously described, TB incidents in this cluster typically present with high numbers of reactors on skin and or IFN- γ testing. The cluster has extended southwards, but, to date,

many individual farms within the cluster have remained clear after incident resolution.

There were also small clusters of incidents centred on the parish of Siddington and extending to Wincle, Sutton and Bosley where there are large populations of wild deer and badgers. Other clusters include Somerford, Swettenham, Lower Withington, Brereton and Newbold Astbury. These are all areas of a high cattle density. There were some OTF-S incidents across the north of the county, but borders with Merseyside and western Greater Manchester remain clear of infection, likely due to the lower cattle density in these locations.

Parts of Cheshire are within the homerange for WGS clades B1-11, B3-11, B6-11, B6-22 and B6-62. The predominant clades of *M. bovis* isolated from cattle in Cheshire remained B3-11 (64), and B6-11 (14). There were 4 incidents with clade B6-62 (11%), and 2 incidents with clade B6-22 (5%). There was one incident caused by clade B1-11 and one incident caused by B6-87, which is outside of homerange. The B1-11 incident was near Sandbach in a 'flying' dairy herd (a dairy herd where cattle are kept only for milk production, and all replacement heifers are purchased from other sources). Clade B1-11 is commonly found in Shropshire, and the incident was most likely caused by the purchase of undetected infected cattle from this area. The B6-87 incident was in another 'flying' dairy herd south of Crewe. Clade B6-87 is commonly found in Devon and may have been introduced via cattle movements.

Figure 8 shows the likelihood that cattle movements were associated with the source of the TB infection, according to the cattle movement algorithm. This algorithm and its method is explained in more detail in the [explanatory supplement for the annual reports 2024](#). Similar to 2022 and 2023, most incidents were assessed as having a low/very or low/negligible cattle movement likelihood.

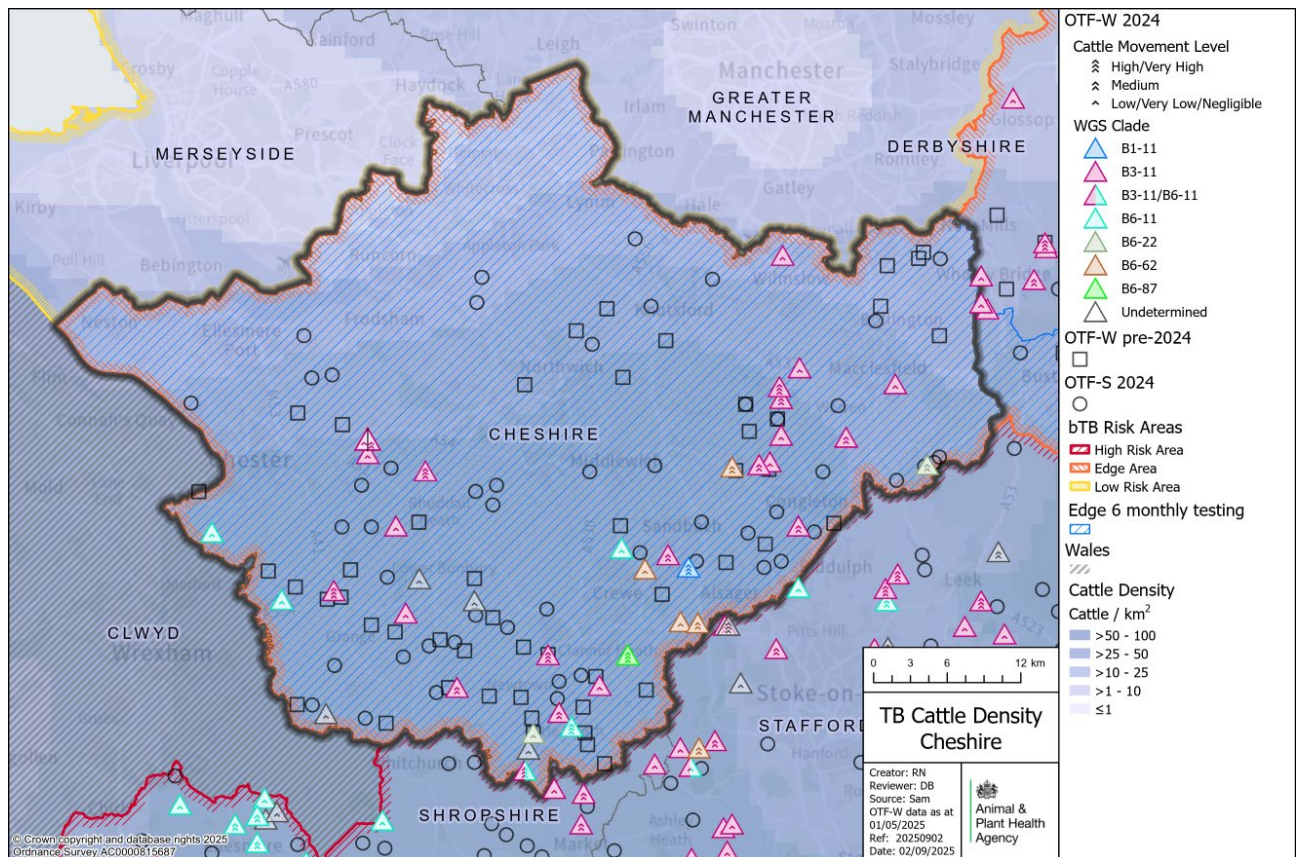


Figure 8: Location of cattle holdings in Cheshire with new TB incidents (OTF-W and OTF-S) and OTF-W incidents still ongoing at the beginning of 2024, overlaid on a cattle density map.

Figure 8 description: A map of Cheshire 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, shown as squares. Dark blue areas represent higher cattle density and light blue represent lower cattle density. The 2024 OTF-W incidents are shown as triangles, coloured by WGS clade, and contain chevrons to show the cattle movement algorithm score allocated to the incident (low/medium/high risk of cattle movements). Blue represents clade B1-11, pink represents clade B3-11, half pink and half turquoise represents clade B3-11/B6-11, turquoise represents clade B6-11, pale green represents clade B6-22, brown represents clade B6-62, and bright green represents clade B6-87. Transparent triangles represent incidents where the WGS clade was undetermined. OTF-S incidents in 2024 are shown as circles.

Main risk pathways and key drivers for TB infection

In 2024, 87 out of 90 (97%) new TB incidents in Cheshire received a preliminary or final APHA veterinary investigation (Disease Report Form or 'DRF') to identify the source of infection. The findings from this investigation are reported in Appendix 3.

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 top 3 possible drivers of the occurrence of TB in cattle in Cheshire during 2024 were:

- exposure to infected badgers
- residual cattle infection
- movements of undetected infected cattle

The most likely infection pathway for cattle herds in 2024 identified during APHA veterinary investigations was potential exposure to infected badgers, accounting for a weighted contribution of 71.5% (Appendix 3). This was marginally higher compared to previous years, 2023 (69.0%) and 2022 (65.1%).

Residual cattle infection had a weighted contribution of 10.1%, which was slightly higher than previous years (8.4% in 2023).

The movement of undetected, infected cattle into (and within) the county had a weighted contribution of 9.1%, which was lower compared to the previous year (11.8% in 2023).

Other or unknown sources had a lower weighted contribution of 5.2% in 2024 compared to 8.6% in 2023. This category is added to those incidents in which there was high uncertainty around the selected pathways as alluded to earlier in the report.

Other infected wildlife (mostly wild deer) had a higher weighted contribution compared to the previous year (2.9% in 2024 compared to 0.7% in 2023, though was similar to the years prior (3.0% in 2022).

Contiguous cattle infection had a weighted contribution of 0.7%, lower than previous years (0.9% in 2023 and 2.5% in 2022). Exposure to undetected infected contiguous

cattle has been identified in certain incidents where cattle movements have not been found to be playing a role and where there is no known infection in wildlife.

Exposure to fomites had a weighted contribution of 0.4% in 2024, which is similar to previous years (0.6% in 2023).

It is not always possible for a veterinary investigation to be carried out for every new TB incident. Therefore, new data-driven methods to quantify the likelihood of risk pathways for TB infected herds have been developed by APHA, which include the:

- cattle movement algorithm
- WGS local transmission of infection indicator

The methodology used can be found in the [explanatory supplement for the annual reports 2024](#).

There is always a degree of uncertainty about the estimated true routes of TB infection into a herd. The absence of a local transmission event, or cattle movements associated with a high likelihood of infection does not completely negate these pathways. Nonetheless, the evidence provided by the cattle movement and WGS data, when combined, can provide valuable insights into the possible risk pathways. Figure 9 provides the percentage of herds where each risk pathway combination was identified. The spatial distribution of these categories is presented in Figure 10. Each category is described in greater detail in the following text.

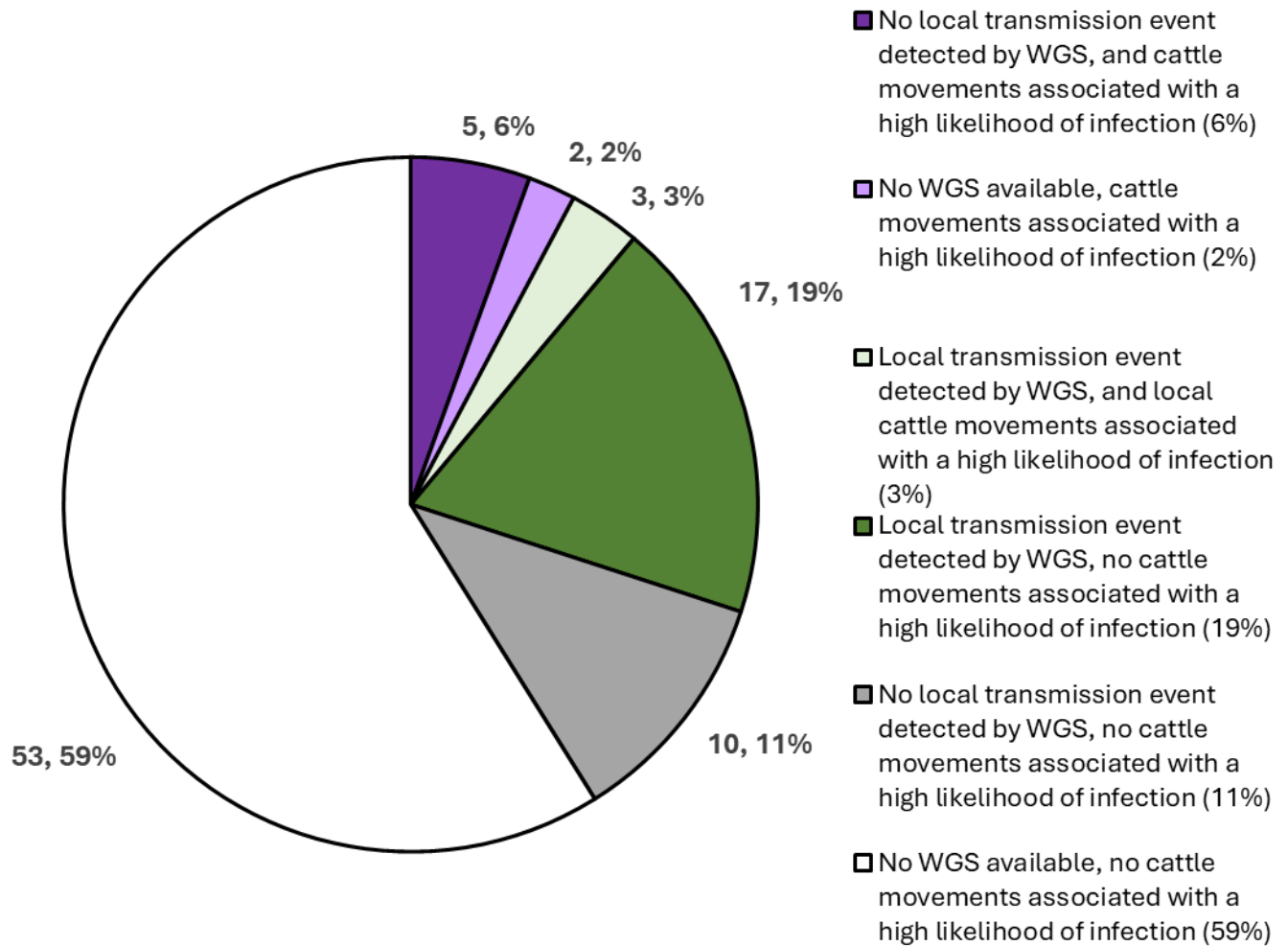


Figure 9: Pie chart showing the risk pathway combinations identified by the WGS local transmission of infection indicator and cattle movement algorithm for all 90 new TB incidents starting in Cheshire in 2024. Numbers presented in each segment display the number of new TB incidents in 2024 in each segment and the percentage of the total new TB incidents in Cheshire in 2024.

WGS data was available for 35 (39%) of all new TB incidents in Cheshire. The WGS local transmission of infection indicator identified evidence of local transmission for 20 (22%) new TB incidents in 2024 (Figure 9).

A local transmission event is defined as evidence from WGS data which identified another *M. bovis* isolate within 3 single nucleotide polymorphisms (SNPs) away from another incident, which occurred within a 9km radius, and within the previous 4 years or following 6 months after incident confirmation.

There were 17 OTF-W incidents (19% of all new incidents in 2024, dark green symbols in Figures 9 and 10) for which a broad spectrum of local pathways cannot be ruled out, including:

- residual infection in the herd
- contiguous contact with infected cattle
- direct or indirect contact with potentially infected wildlife

This is because for these incidents:

- WGS data was available
- a local transmission event was identified
- without strong evidence of high-risk cattle movements

There were 3 OTF-W incidents (3% of all new incidents in 2024, light green symbol in Figures 9 and 10) for which the source of infection may be attributed to the movement of undetected infected cattle from holdings within the local area (less than 25km), but other local infection pathways (as described above) cannot be ruled out. This is because for these incidents:

- WGS data was available
- a local transmission event was identified
- with strong evidence of local high-risk cattle movements (within 25km)

There were 5 OTF-W incidents (6% of all new incidents in 2024, dark purple symbols in Figures 9 and 10) for which the movement of undetected infected cattle from outside the local area is the most likely source of infection, however local cattle movements cannot be ruled out.

This is because for these incidents:

- WGS data available
- a local transmission event was not identified
- there was evidence of local or non-local high-risk cattle movements

There were 2 TB incidents (2% of all new incidents in 2024, light purple symbols in Figures 9 and 10) for which the source of infection is likely to be related to the movement of undetected, infected cattle from within or outside the local area.

This is because for these incidents:

- no WGS data available
- local and non-local high-risk cattle movements were identified

WGS data was not available for 55 (61%) of all new TB incidents in Cheshire, accounting for 4 OTF-W and 51 OTF-S incidents. This absence of genetic data limits our ability to identify if these incidents are likely to be linked to local transmission of disease. Nevertheless, in these instances, the cattle movement algorithm can still provide an indication on the presence/absence of cattle movements that could have played a part in disease transmission

There were 10 OTF-W incidents (11% of all new incidents in 2024, grey symbols in Figures 9 and 10) for which the source of infection remains unclear.

This is because for these incidents:

- WGS data was available
- a local transmission event was not identified
- there was no evidence of local or non-local high-risk cattle movements

There were 53 TB incidents (59% of all new incidents in 2024, white symbols in Figures 9 and 10) for which the source of infection remains unclear, but for which local pathways cannot be ruled out.

This is because for these incidents:

- no WGS data available
- no local or non-local high-risk cattle movements were identified

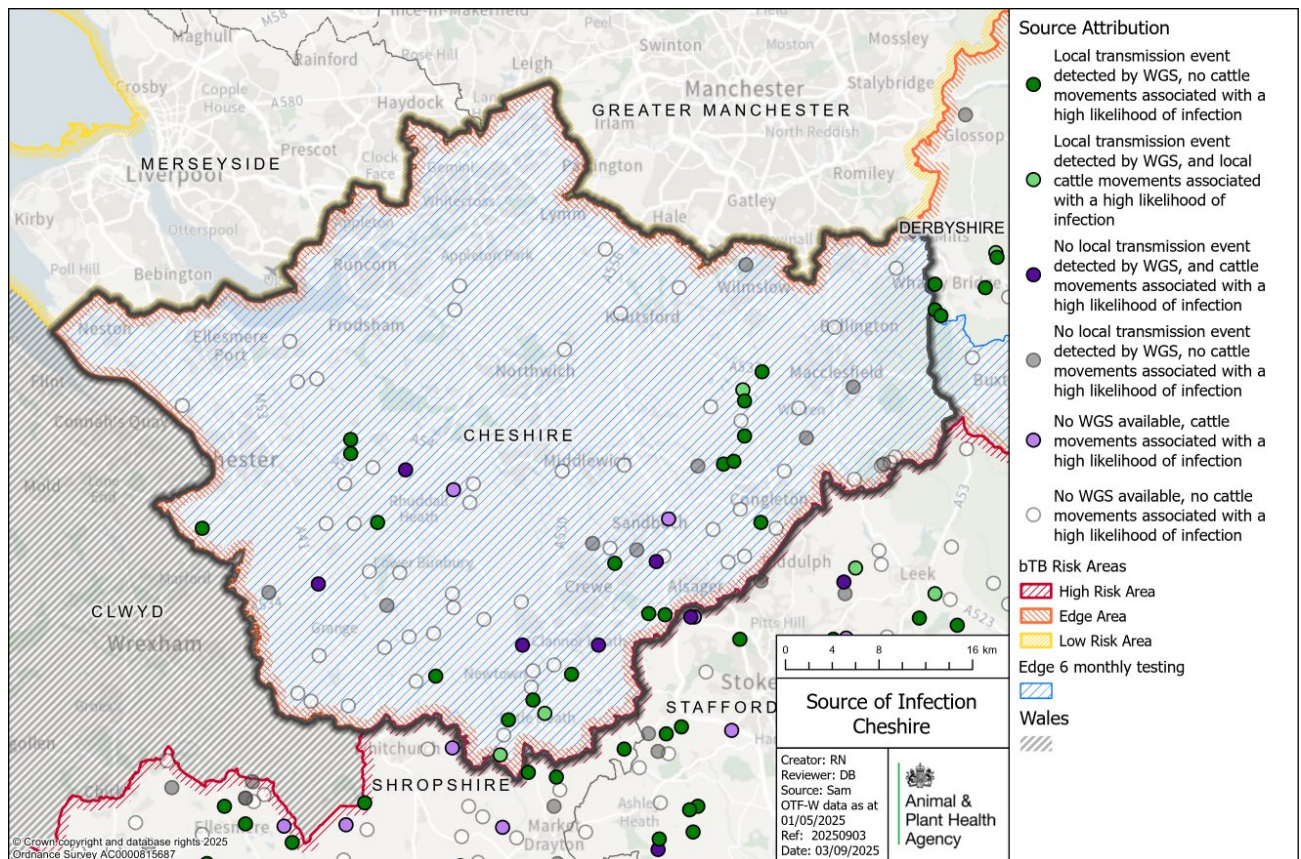


Figure 10: Map of the available evidence for risk pathways of TB infection into the herd, for all TB incidents (OTF-W and OTF-S) in Cheshire that started in 2024.

Figure 10 description: Map of the Cheshire and adjoining areas showing the locations of the 90 new TB incidents in Cheshire, coloured by the risk pathway identified for the incident. Dark green are herds where a local transmission event was identified from WGS and no cattle movements with a high likelihood of infection were identified in the herd, light green represents incidents where local transmission event was identified from WGS and cattle movements with a high likelihood of infection were identified in the herd. Dark purple represents incidents where no local transmission event was identified from WGS and there were cattle movements identified with a high likelihood of infection in the herd. Light purple represents incidents with no WGS available and where there were cattle movements identified with a high likelihood of infection in the herd. Grey shows incidents where no local transmission event was identified from WGS and there were no cattle movements with a high likelihood of infection were identified in the herd either. White shows incidents with no WGS available and where there were no cattle movements with a high likelihood of infection were identified in the herd.

Figure 11 displays TB incidents detected in Cheshire between 2020 and 2024, where the WGS local transmission of infection indicator identified other local, temporarily and genetically related isolates. This shows the accumulation of local transmission events over time. The WGS clade is provided to identify clusters of related infection. In Cheshire, clade B3-11 has historically clustered, and continues to cluster, along the border with the HRA counties of Shropshire and Staffordshire and alongside the

Edge area county of Derbyshire. Clade B3-11 has also clustered internally in the South Duddon and Nantwich clusters and more easterly in the Siddington area near Macclesfield. Clade B6-11 has been more predominantly found towards the centre of Cheshire but has appeared more sporadically in only 5 locations in the southern half of Cheshire in 2024.

There were 4 new incidents with WGS clade B6-62 in the south-east of Cheshire, close to border with Staffordshire. There were also 2 new incidents of B6-22 in the south of Cheshire, close to the border with Shropshire, similar to the locations of B6-22 isolations in 2021 and 2023.

Except for the ongoing cluster of B3-11 in the north-east of Cheshire, around the LRA border with the Stockport area of Greater Manchester, the northern border of Cheshire continued to be free of a local transmission of infection in 2024 and didn't experience any OTF-W incidents (Figure 11).

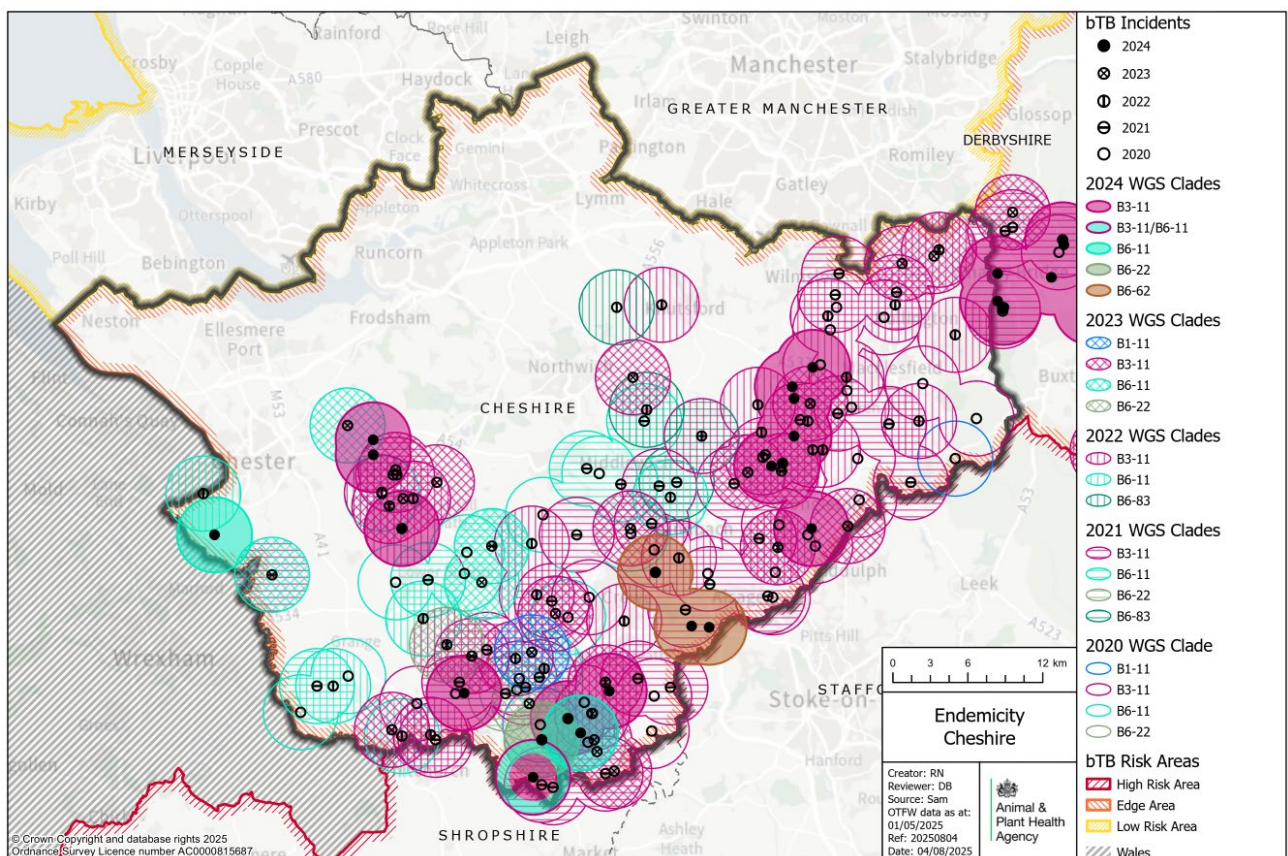


Figure 11: WGS clades of *M. bovis* detected in Cheshire between 2020 and 2024, where the WGS clade identified in the infected herd was within 3 SNPs of another TB incident that was within 9km and occurred in the previous 4 years or 6 months after the incident of interest, with a 3km buffer zone around each incident.

Figure 11 description: Map of Cheshire and adjoining areas showing the location of TB incidents with a WGS clade where a local transmission event was identified. Clades are shown as circles on the map with each clade represented by a different colour. The year from which the clade was identified is shown a solid colour (2024) or different types of hash (2020 to 2023).

Forward look

The proportion of OTF-W compared to OTF-S incidents decreased in 2024 compared to 2023, remaining lower than in 2018. The whole county incidence rate continued to decrease, the same as the prevalence. Utilising of all available tools to detect and to reduce the burden of infection, it might be possible to achieve OTF status by 2038.

There was a 3.5% decrease in the number of skin test reactors and a 152% increase in IFN- γ test positives compared to 2023. While decreased number of skin test reactors follows the trend, various factors are likely to have influenced the increase in numbers IFN- γ test positives. For example, increased use of the IFN- γ test compared to 2023 and closer keeper liaison via the large number of DRF visits completed, encouraging uptake of voluntary IFN- γ testing.

Badger vaccination continues in Cheshire. In 2024, 196 badgers were vaccinated in Cheshire, a 53% increase compared to 2023 (128) and representing 4.7% of all badger vaccination in England in 2024. Further information on badger vaccination in Cheshire can be found in the [summary of badger vaccinations 2024](#). Badger vaccination should be widely encouraged within the county as a disease control measure, especially with the completion of the badger cull. All badger cull licences within Cheshire have now ceased, with Area 11-Cheshire completing their final year in 2022 and Area 34-Cheshire completing in 2024.

The reporting of suspect TB lesions in deer carcasses is essential to help increase the understanding of TB infection in wildlife populations and the role they play in the transmission of TB and is strongly encouraged by APHA. Stakeholder engagement with deer stalkers and other members of the public to help support this cause would help increase knowledge of TB in wildlife (and wild deer population).

Maintaining and improving upon the following measures will be vital to continue to address the most common risk pathways for TB infection in cattle in Cheshire. These include:

- badger TB disease control measures to reduce the risk of transmission to cattle, including the further expansion of badger vaccination
- 6-monthly herd testing in higher risk herds to enable earlier detection of disease within herds including by encouraging farms on earned recognition to opt out of yearly testing, if herds are located in the southern part of Cheshire where disease is clustering
- wider discretionary use of the IFN- γ blood testing in OTF-W incident herds and in unusual or problematic OTF-S incidents (in addition to its mandatory use in recurrent OTF-W incidents) alongside ad-hoc serological testing, where considered appropriate
- increase awareness of measures to enable farmers to protect their herds from TB. This includes improving biosecurity and reducing risk of unwittingly introducing TB via cattle movements (through use of the [TB Hub](#), APHA visits, TB Advisory Service, private vets, [ibTB mapping tool](#))

- use of targeted measures in areas of particular concern, such as clusters. These may include further use of discretionary cattle tests, increased submission of samples for WGS, further sett surveys, wildlife surveillance and badger vaccination
- general stakeholder engagement to facilitate some of the above points and ensure continued efforts to maintain progress.

Appendix 1: cattle industry demographics

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

Size of herds	Number of herds
Undetermined	20
1 to 50	447
51 to 100	162
101 to 200	164
201 to 350	146
351 to 500	94
Greater than 501	121
Total number of herds	1,154
Mean herd size	197
Median herd size	82

Table 2: Number (and percentage of total) of animals by breed purpose in Cheshire as of 31 December 2024

Breed purpose	Number (and percentage of total) cattle
Beef	61,806 (27%)
Dairy	155,372 (68%)
Dual purpose	10,312 (4%)
Unknown	29 (0.01%)
Total	227,519

Appendix 2: summary of headline cattle TB statistics

Table 3: Herd-level summary statistics for TB in cattle in Cheshire 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	1,431	1,348	1,329
(b) Total number of whole herd skin tests carried out at any time in the period	2,025	1,989	1,876
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	1,172	1,154	1,101
(d) Total number of OTF cattle herds at the end of the report period (herds not under any type of TB movement restrictions)	1,292	1,238	1,209
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	1,359	1,276	1,264
(f.1) Total number of new OTF-S TB incidents detected in cattle herds during the report period	50	52	51
(f.2) Total number of new OTF-W TB incidents detected in cattle herds during the report period	64	48	39
(f.3) Total number of new TB incidents (OTF-W and OTF-S) detected in cattle herds during the report period	114	100	90
(g.1) Of the new OTF-W herd incidents, how many can be considered the result of movement, purchase or contact from or with an existing incident based on current evidence?	8	7	4

Herd-level statistics	2022	2023	2024
(g.2) Of the new OTF-W herd incidents, how many were triggered by skin test Reactors or twice-inconclusive reactors (2xIRs) at routine herd tests?	37	25	20
(g.3) 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 or check tests)?	8	10	4
(g.4) Of the new OTF-W herd incidents, how many were first detected through routine slaughterhouse TB surveillance?	19	13	15
(h.1) Number of new OTF-W incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	N/A	N/A	N/A
(h.2) Number of new OTF-S incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	N/A	N/A	N/A
(i) 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)	46	50	38
(j) New confirmed (positive M. bovis culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	0	0
(k.1) Number of grazing approved finishing units active at end of the period	0	0	0
(k.2) Number of non-grazing approved finishing units active at end of the period	35	36	30
(k.3) Number of grazing exempt finishing units active at end of the period	1	1	1
(k.4) Number of non-grazing exempt finishing units active at end of the period	0	0	0

Table 4: Animal-level summary statistics for TB in cattle in Cheshire 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)	496,113	490,400	480,402
(b.1) Reactors detected by tuberculin skin tests during the year	753	644	621
(b.2) Reactors detected by additional IFN- γ blood tests (skin-test negative or IR animals) during the year	242	168	424
(c) Reactors detected during year per incidents disclosed during year	8.7	8.1	11.6
(d) Reactors per 1,000 animal tests	2.0	1.7	2.2
(e.1) Additional animals slaughtered during the year for TB control reasons (dangerous contacts, including any first time IRs)	28	17	24
(e.2) Additional animals slaughtered during the year for TB control reasons (private slaughters)	5	6	3
(f) Slaughterhouse cases (tuberculous carcasses) reported by the Food Standards Agency (FSA) during routine meat inspection	59	43	56
(g) SLH cases confirmed by M. bovis PCR testing or bacteriological culture	20	23	36

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, 87 out of 90 (97%) new TB incidents in Cheshire received a preliminary or final APHA veterinary investigation to identify the source of infection. Not all Disease Report Form (DRF) investigations were carried out in 2024.

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](#).

Table 5: Suspected sources of M. bovis infection for the 87 incidents with a preliminary or a final veterinary assessment in Cheshire, in 2024

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	32	60	45	1	71.5%
Cattle movements	15	13	1	0	9.1%
Contiguous	2	0	1	0	0.7%
Residual cattle infection	12	10	4	0	10.1%
Domestic animals	0	0	0	0	0%
Non-specific reactor	0	0	0	0	0%
Fomites	2	0	0	0	0.4%
Other wildlife	5	2	1	0	2.9%
Other or unknown source	1	0	0	0	5.2%

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.



© Crown copyright 2025

You may re-use this information (excluding logos) free of charge in any format or medium, under the terms of the Open Government Licence v.3. This licence can be found at this [link](#) or requested by this [email](#).

Data Protection: For information on how we handle personal data visit www.gov.uk and search Animal and Plant Health Agency Personal Information Charter.

This publication is available [Bovine TB epidemiology and surveillance in Great Britain](#).

Any enquiries regarding this publication should be sent to us at the [National TB Epi Mailbox](#).

www.gov.uk/apha

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