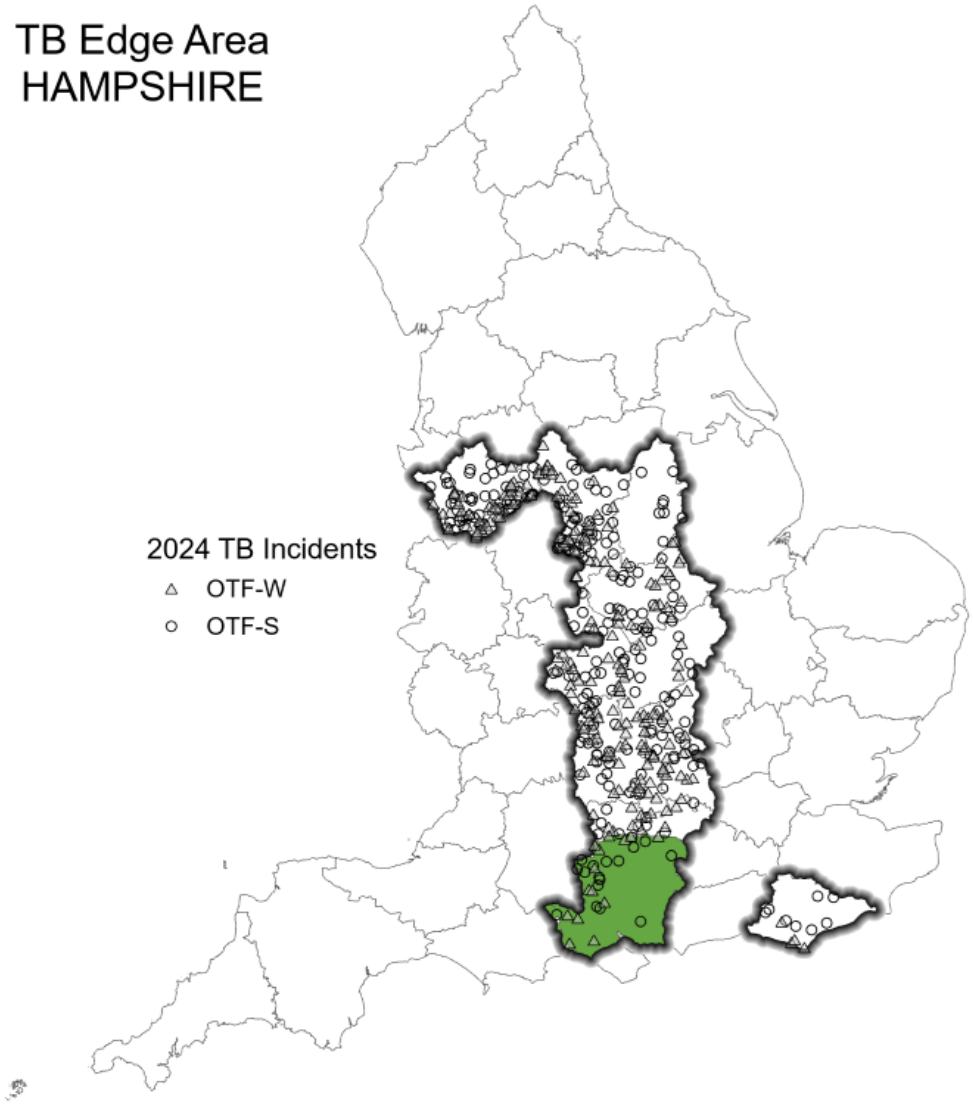
Animal &
Plant Health
Agency

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



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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 Hampshire, 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 This includes both 'Officially Tuberculosis-Free Status Withdrawn' (OTF-W) and 'Officially Tuberculosis-Free Status Suspended' (OTF-S) incidents.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 carcases 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 cases 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 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 Hampshire there were no Approved Finishing Units (AFUs) active during 2024. These have been excluded from the numbers presented in these reports 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

There are 691 cattle herds registered within the county of Hampshire. The majority of herds were small, with 63% of herds having fewer than 50 cattle, as shown in Appendix 1 and 2. Approximately two thirds (66%) of cattle in the county were beef animals.

There were no livestock markets in Hampshire in 2024. There was a flow of cattle, especially for fattening, from the HRA into Hampshire. The markets predominantly used were in the HRA: Frome in Somerset and Salisbury in Wiltshire. There was one medium-sized abattoir in Hampshire.

There are grazing rights across the common area of the New Forest for adjacent registered holdings, which must comply with the regulations set out in the New Forest TB control plan.

There was one Exempt Finishing Unit (EFU) and no AFUs in Hampshire in 2024.

In Hampshire, TB testing frequency varies based on risk. By default, cattle herds routinely undergo annual surveillance, with the exception of some in the north-west of the county, where testing is carried out every 6 months, as shown in Figure 8. This 6-monthly testing area borders the counties of Wiltshire (HRA, under 6-month

testing) and Berkshire (Edge area, but with part of the county also under 6-month testing). However, under the earned recognition scheme introduced in 2024, 5% of herds in this 6-month testing area were regarded as having a lower risk of contracting TB and were subsequently moved to annual testing.

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

Number of new TB incidents

A total of 31 new TB incidents were disclosed across Hampshire during 2024 (14 OTF-W and 17 OTF-S) (Figure 1). This represents a marked increase (24%) compared to 25 incidents in 2023 (7 OTF-W and 18 OTF-S). In particular, the increase was due to a 100% increase in OTF-W incidents.

Between 2018 and 2021, there was a decreasing trend in the number of new TB incidents, halving from 42 to 21 per year. However, in 2022 this trend reversed, with yearly increases to 22 new TB incidents in 2022, 25 in 2023 and 31 in 2024.

The proportion of herd types affected by the new TB incidents in 2024 was largely representative of the overall herd type distribution within the county. All 7 OTF-W incidents were in beef herds, and the majority (82%, 14 incidents) of new OTF-S incidents occurred in beef compared to dairy (18%, 3 incidents).

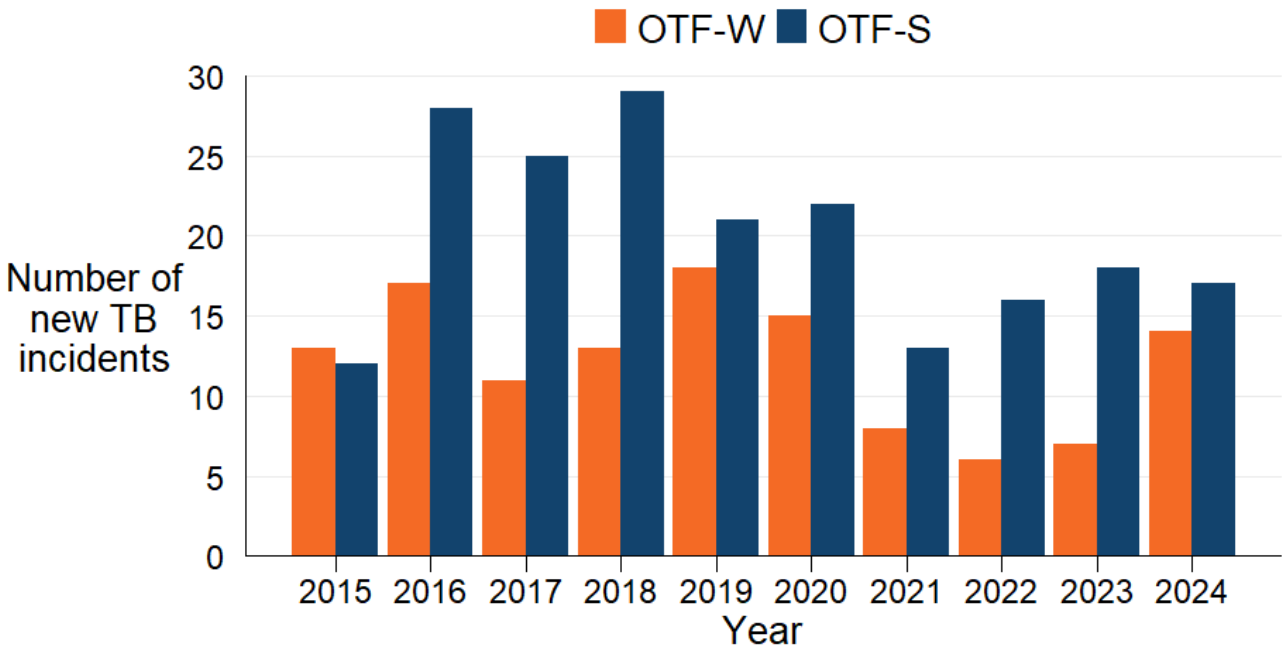

Figure 1: Annual number of new TB incidents in Hampshire, from 2015 to 2024.

Disclosing TB surveillance method

As in previous years, most incidents in 2024 were disclosed by whole herd testing (WHT) (21), followed by 6-monthly post-incident testing (6M, 4), slaughterhouse surveillance (2) and 12-monthly post-incident testing (12M, 2). Pre-movement and check testing disclosed one incident each. This is similar to 2023, where whole herd testing disclosed the greatest number of incidents (Figure 2).

No incidents were detected through radial testing in Hampshire's annual TB testing area in 2024. To note, the emergency measures introduced in December 2022, in response to the highly pathogenic avian influenza outbreak, had temporarily replaced radial testing with contiguous testing. These measures ended in March 2023 and therefore had no impact on testing in 2024, unlike in previous years.

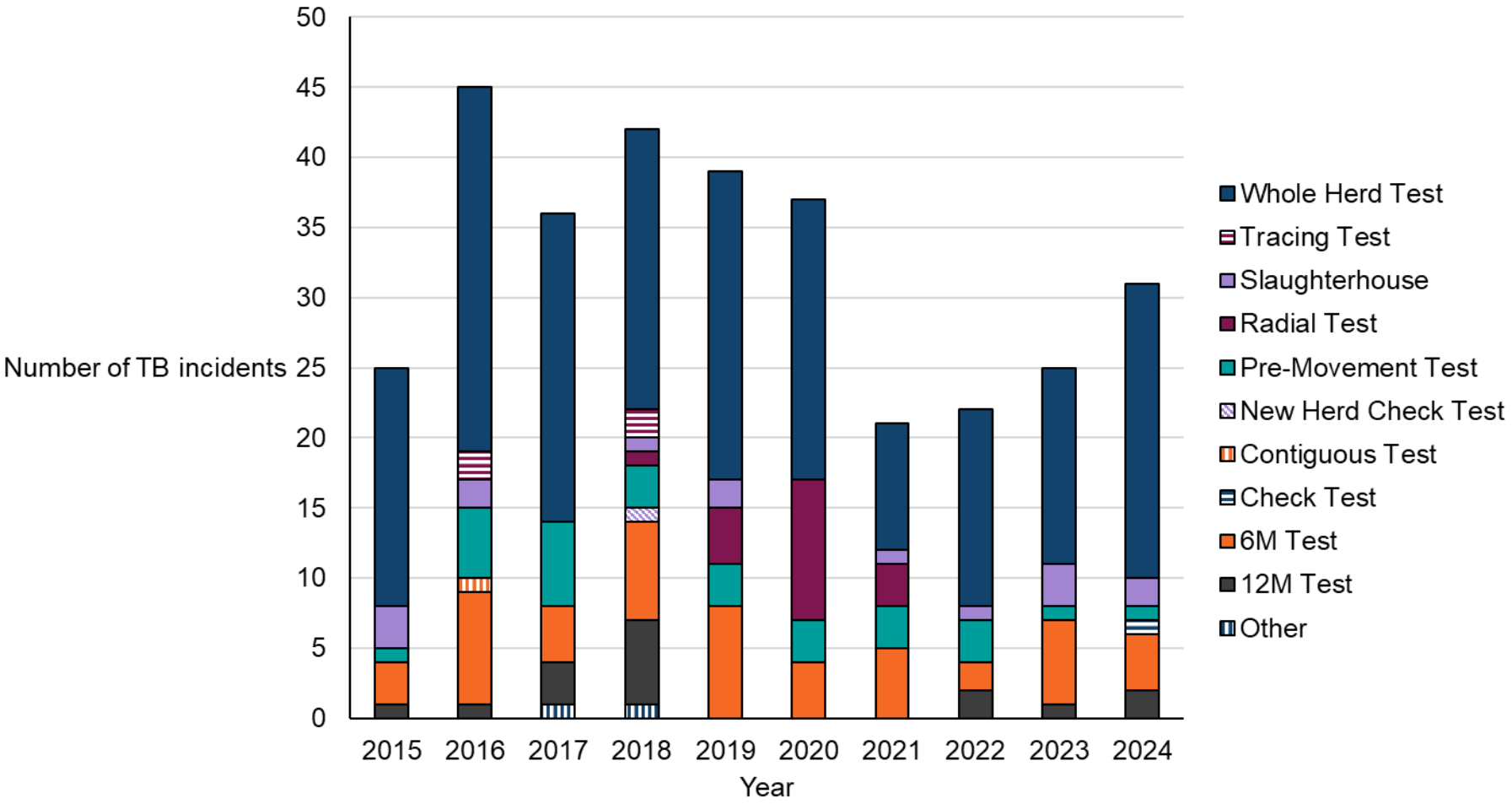

Figure 2: Number of new TB incidents (OTF-W and OTF-S) in Hampshire in 2024, according to the surveillance methods that detected them. Incidents disclosed by 'Other' tests includes, but are not limited to, private testing, inconclusive reactor retests, and export tests.

Duration of TB incidents

Of the 26 TB incidents resolved in Hampshire in 2024, 12 began in 2024 and 14 in 2023.

Of the 26 incidents which closed in 2024, 9 were OTF-W, of which 3 were resolved within 101 to 150 days, 3 within 151 to 240 days, and a further 3 within 241 to 550 days. No OTF-W incidents were persistent (where the affected herds were under movement restrictions for more than 550 days) before being resolved in 2024. The median duration of OTF-W incidents that ended in 2024 was 200 days, interquartile range (IQR) 148 to 255, which is shorter than in 2023 (median 294, IQR 203 to 337).

The remaining 17 incidents were OTF-S, of which 2 were resolved quickly within 101 to 150 days, 7 within 101 to 240 days and a further 8 within 241 to 550 days. No OTF-S incidents were persistent before being resolved in 2024. The median duration of OTF-S incidents was 200 days (IQR 172 to 284), compared to 181 in 2023 (IQR 168 to 247).

The median duration of all incidents that ended in 2024 in Hampshire was 200 days (IQR 167 to 268). This is slightly shorter than the duration of incidents that closed in 2023 in Hampshire, which was 203 days (IQR 174 to 310) and higher that the median duration of TB incidents that closed in 2024 in the overall Edge area, which was 186 days (IQR 159 to 260).

There were 18 TB incidents that were still open at the end of 2024, one of which was a persistent OTF-S incident.

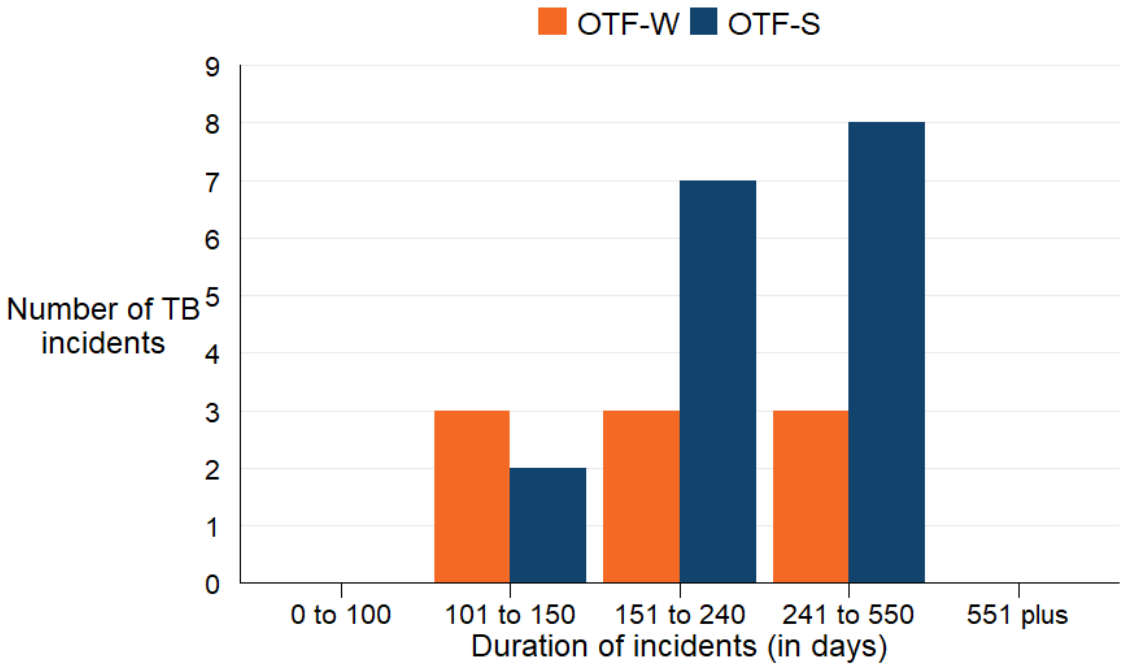

Figure 3: Duration of TB incidents (OTF-W and OTF-S) that closed in Hampshire in 2024.

Incidence of TB

The incidence in Hampshire in 2024 has risen to 4.6 incidents per 100 herd years at risk (HYR), from 3.8 in 2023, continuing an upward trend observed annually since 2021. This follows 2 previous years of declining incidence in 2019 and 2020, which had fallen from a peak of 5.6 in 2019 (see Figure 4).

In 2024, Hampshire had the third lowest incidence rate out of the 11 counties in the Edge Area, remaining below the overall Edge Area (7.3 incidents per 100 HYR). However, this represents an increasing shift since 2022, when Hampshire had the lowest incidence in the Edge Area (3.4).

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).

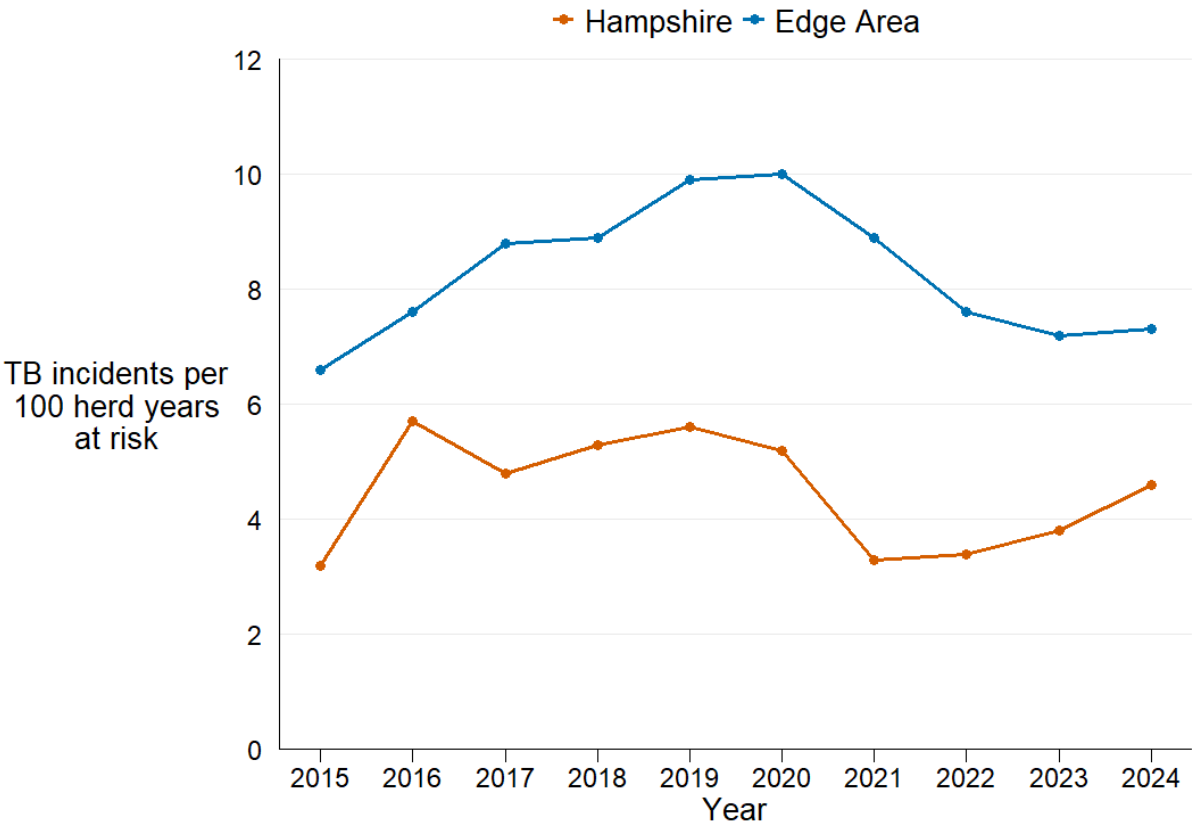

Figure 4: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Hampshire and the Edge Area, from 2015 to 2024. There were no new TB incidents in AFUs in Hampshire in 2024.

Prevalence of TB

Hampshire had the fourth lowest end of year prevalence out of the 11 counties in the Edge Area (2.4%). This was lower than the overall prevalence for the whole of the Edge Area in 2024 (4.0%), as shown in Figure 5.

This represents an increase from 1.8% in 2023 and is comparable to the annual prevalence for the county reported in 2018. Prevalence in Hampshire had steadily risen to a peak of 3.1% of herds under TB restrictions in 2020, before dropping to a low of 1.5% in 2021. Since then, both TB incidence and prevalence have shown a consistent upward trend.

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.

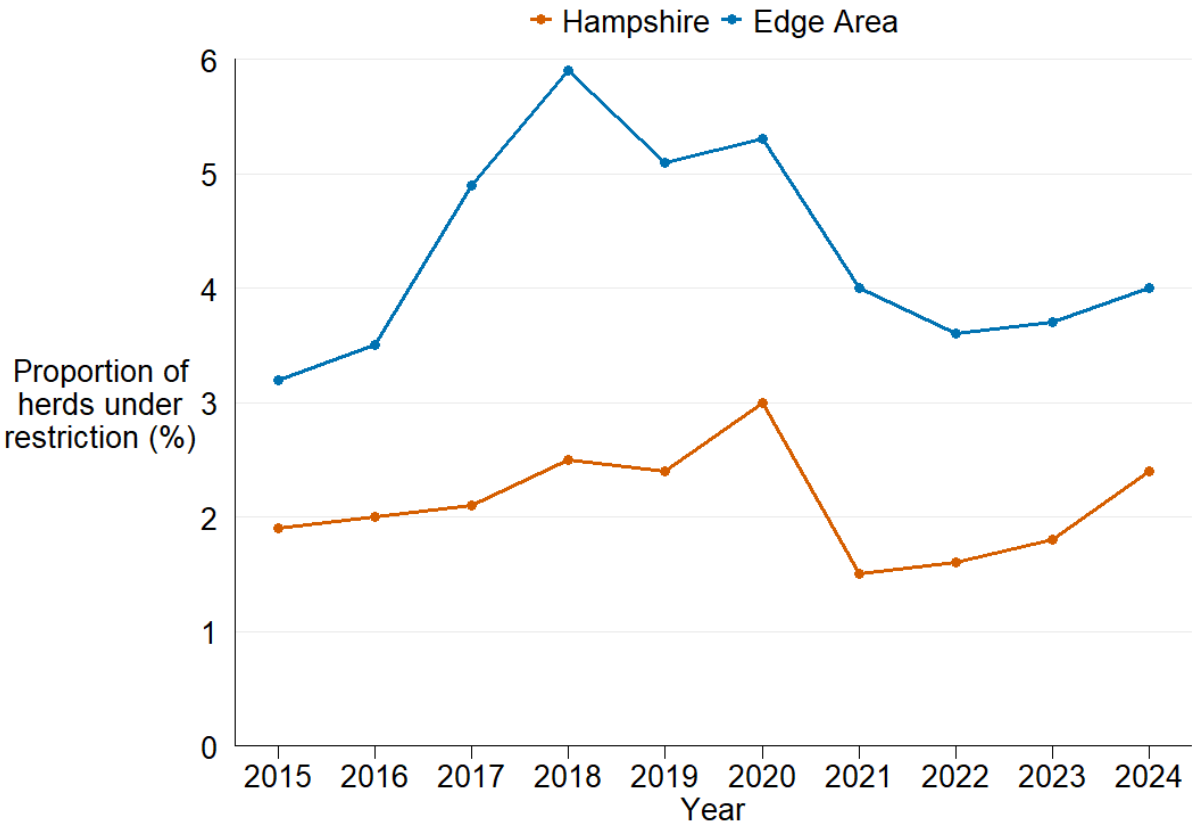

Figure 5: Annual end of year prevalence in Hampshire and the Edge Area overall, from 2015 to 2024. This is the proportion of live herds under TB movement restrictions on the 31 December 2024.

Skin test reactors and interferon gamma test positive animals removed

A total of 104 cattle were removed from TB incidents in Hampshire during 2024. Of these, 84 were skin test reactors and 20 were positive by the supplementary interferon gamma (IFN-γ) blood test, as shown in Figure 6.

Compared to 2023, this was a 36% decrease in the total number of animals removed (162, including 118 skin test reactors and 44 IFN-γ test positive animals). In general, the number of IFN-γ test positive animals has decreased in the last 10 years. The number of skin test reactors has remained fairly constant over the last 10 years apart from spikes in 2016, 2018 and 2020.

The overall decrease in IFN-γ positive animals compared to 2023 can be partially explained by a large proportion of the new OTF-W incidents in the county occurring in the 6-monthly testing area of the county, meaning many are ineligible for IFN-γ testing since the changes to the eligibility for IFN-γ testing introduced in 2021. Only 19% of animals removed in 2024 were IFN-γ test positive compared to 51% in 2021.

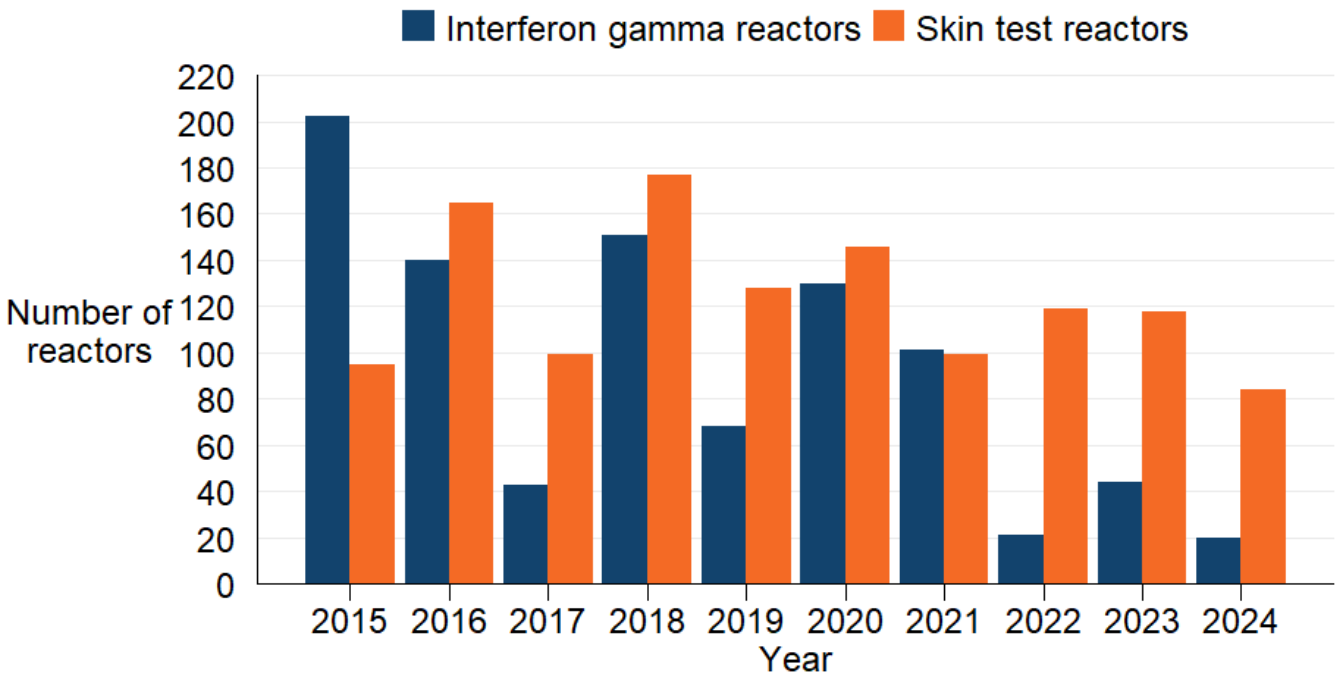

Figure 6: Number of skin test reactors and IFN-γ test positive cattle removed by APHA for TB control reasons in Hampshire, from 2015 to 2024.

Recurrent TB incidents

Three-year recurrence

In Hampshire, 8 of the 17 (47%) herds with a new OTF-S TB incident and 5 of the 14 (36%) with an OTF-W incident had experienced another TB incident in the previous 3 years (Figure 7). This is the sixth highest recurrence (42%) reported in the counties of the Edge Area and an increase from 2022 (27%) and 2023 (36%). Despite this, it is still lower than the percentage of recurrent incidents in the whole of the Edge Area (47%) and neighbouring counties Berkshire (58%), Buckinghamshire (45%) and Oxfordshire (58%).

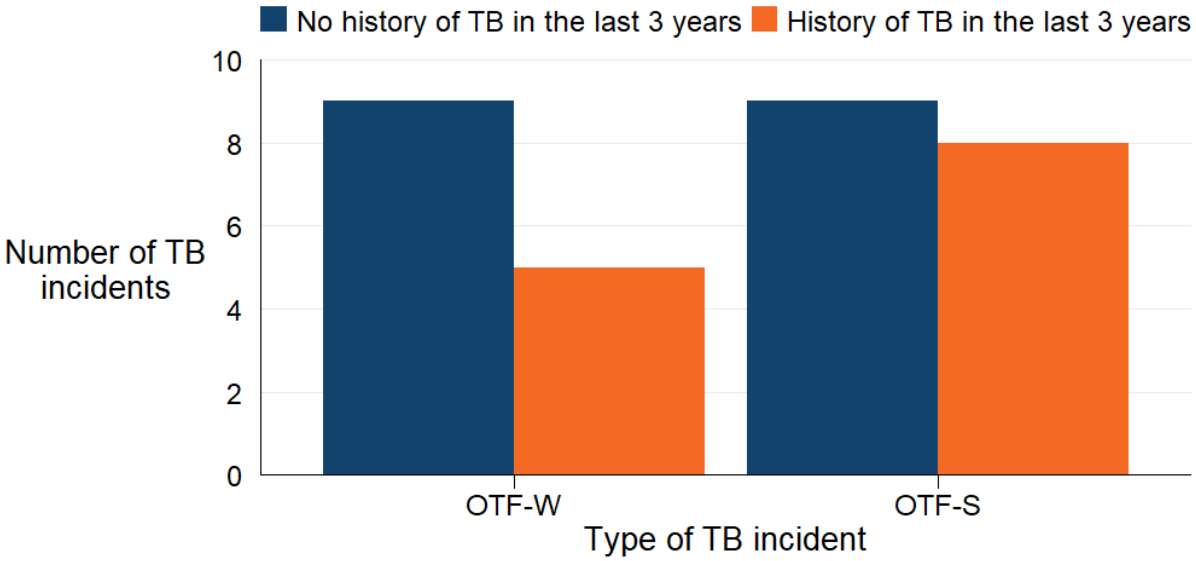

Figure 7: Number of herds with a TB incident (by OTF-W and OTF-S) in Hampshire in 2024, with and without a history of any TB incident in the previous 3 years of the disclosing test.

Unusual TB incidents

An explosive OTF-W incident was disclosed through whole herd testing (WHT) in 2024 in a suckler herd of approximately 260 cattle, with 22 reactors at the disclosing test, 21 of those later confirmed, and 4 additional reactors confirmed at the first short interval test. Further testing is still ongoing, and the incident remained open at the time of writing this report.

This herd has a history of TB, with previous incidents recorded in 2014, 2018, and 2022, the latter classified as a slaughterhouse case. The 2018 incident persisted for 2 years and was resolved following 2 rounds of IFN-γ testing alongside multiple rounds of skin testing.

The cultured M. bovis isolate from the 2024 incident was identified as Whole Genome Sequence (WGS) clade B6-62, consistent with isolates from the herd's

previous incidents and raises concerns about possible residual infection. However, further genomic analysis of the current isolate revealed it was not so closely related to previous isolates on the same holding and more closely related to other recent local isolates. This suggests recent endemic transmission from local sources including wildlife reservoirs or via local cattle movements, although it cannot be ruled out that the agent could have remained on farm if disease was not completely cleared from previous incidents and evolved over time. Located on the Berkshire border, the herd lies within the known homerange of this clade, where epidemiological investigations suggest that wildlife is likely to be playing a role in disease transmission and local cattle moves are also common.

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 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. 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 carcases is statutory and suspect carcases are inspected and tested by APHA.

In Hampshire, 5 new TB incidents involving non-bovine species were reported in 2024. Three of these occurred on a single holding and involved pigs that had been recently purchased and moved through a market only days prior to being slaughtered and later confirmed positive. The WGS clade was identified as B6-15.

The remaining 2 incidents were detected in wild fallow deer and reported to the local APHA field team by deer stalkers. One incident was found in the north-west of the county, within the 6-monthly testing area. The cultured M. bovis isolate from this deer was identified as WGS clade B6-62, a strain well documented in this region. However, due to contamination of the sample, further genomic analysis to determine the isolate’s similarity to other local B6-62 incidents could not be completed, limiting our understanding of possible local infection dynamics.

The second deer incident was located in the south-west of Hampshire, on the border of the New Forest National Park. The isolate from this incident was identified as WGS clade B6-85. While there is a known cluster of B6-85 incidents developing in central-west Hampshire, further genomic analysis showed that this particular isolate was unrelated to both current and historical B6-85 strains in the county. Instead, its genetic profile suggests an origin in Somerset. This could be due to the considerable distances that fallow deer are capable of traveling, or it may point to more complex transmission dynamics. It raises further questions around the roles that different species (including cattle, deer, and badgers) play in the transmission of TB, particularly with respect to their susceptibility to infection versus their capacity to spread disease.

APHA, in collaboration with the University of Nottingham, conducted a survey in 2021 to 2023 to estimate the prevalence and geographic distribution of M. bovis infection in badgers found dead in Buckinghamshire, Oxfordshire, Berkshire, Hampshire and East Sussex, collectively known as the 'Southern Edge Area'. Volunteers were recruited in each county to help with the safe and timely retrieval of badger carcases. They were delivered to the University of Nottingham, where they underwent post-mortem examination and testing for the presence of M. bovis infection by culture. M. bovis isolates from culture-positive badgers underwent WGS and clade identification (genetic strain) at APHA Weybridge. The project aimed to collect 100 carcases of badgers found dead per county, most likely those killed in road traffic accidents (RTAs). Once 100 carcases of a sufficient quality were examined per county, further collections ceased in that county. Once county targets were achieved, all stakeholders were informed. The survey ended in April 2023 and a paper describing its methodology and results has been written up and submitted for publication in a scientific journal. The results of this survey will help develop a picture of the disease situation in the Southern Edge Area of England.

Geographical distribution of TB incidents

Most of the new and ongoing OTF-W TB incidents were located in the north and west part of Hampshire (Figure 8). Out of the 14 OTF-W incidents, 6 were detected in the 6-monthly testing area (in the north-west of the county) and 8 in the 12-monthly testing area (mostly clustered in the central-west of the county near the border with Wiltshire and Dorset).

As for the OTF-S incidents, these have historically been more widely spread across the county but in 2024 they appeared to be more abundant in the central-western part of the county in particular, along the border with the HRA.

Most OTF-W incidents in Hampshire during 2024 were associated with M. bovis WGS clade B6-62, which encompasses the previously designated spoligotype 10, as well as other closely related spoligotypes. This clade has an established homerange covering north-west Hampshire, extending east along the Berkshire border and into neighbouring counties including Berkshire, Wiltshire, Oxfordshire, into the central region of the Edge Area and HRA.

Many of the affected herds had medium to low, or even very low, levels of cattle movement indicated from the Cattle Movement Algorithm (CMA), suggesting that these incidents may be linked to residual infection or local wildlife reservoirs rather than recent cattle movements. There appears to be a mix of re-emerging infections from previous incidents and new incidents, with several local links evident when assessing the genetic relatedness of isolates. The levels of genetic relatedness could suggest a common source of infection within the local wildlife, however, as local movements occur frequently within the county, the possibility of cattle moving with undetected infection, along with other risks such as the presence of residual infection within herds that have suffered previous incidents, are both also plausible risk pathways for these new incidents.

In addition, historically, B6-62 incidents were primarily found in the 6-monthly testing area in the north-west of the county. However, a number of recent B6-62 incidents have been identified in the central-west region of Hampshire, under 12-monthly testing, indicating wider spread of this clade within the county. Some of these show a genetic relationship to incidents near the Berkshire border and others further north in Oxfordshire. Whilst the genetic data would indicate that this introduction was likely due to movements from 6-monthly testing Edge Areas, the continued monitoring of future incidents in this area will be important in understanding if this clade has become established in the area, being further propagated by local movements and involvement of wildlife populations due to disease spill-over.

WGS clade B6-13 was disclosed in 2 OTF-W incidents, both in the south-west of the county. This clade has a homerange in the south-west of England, covering parts of Wiltshire, Avon, Somerset and Devon. These incidents either had medium or low/very low cattle movement indicated from the CMA, and despite being located near to the Wiltshire border, there was little to no genetic relatedness (below 10 SNPs difference) between these isolates and other incidents to establish potential origins of infection.

WGS clade B6-85 was identified in 2 OTF-W incidents in the central-west region of Hampshire in 2024. Clade B6-85 is typically associated with the south-west of England and has been linked to TB incidents in both cattle and alpacas, particularly in areas near the Oxfordshire–Berkshire border.

One of the 2 B6-85 affected holdings experienced its first TB incident in 2024. Both reactors identified on this farm had been purchased animals that had previously passed through the neighbouring herd, which also had a B6-85 incident earlier in 2024, though the incidents were not concurrent. The isolates from the 2 reactors were genetically identical and differed by only 2 SNPs from the isolate in the neighbouring herd, suggesting a likely epidemiological link.

Although no genomic data is available from the neighbouring herd’s previous incident in 2022, it was confirmed to also involve clade B6-85. Other related isolates have been found predominantly in Devon, with additional incidents in Oxfordshire.

Between 2020 and 2024, 4 OTF-W incidents involving clade B6-85 occurred within a 4.5 km radius in this part of Hampshire, all showing a high degree of genetic relatedness (0–2 SNPs). While residual infection and local cattle movements may explain some of the incidents, one incident in 2020 involved a holding which would have no movement history with these other holdings.

All of the above indicates that clade B6-85 may have been originally introduced into Hampshire via cattle movements, potentially spilling-over into local wildlife, and subsequently becoming established in the local wildlife population. Ongoing investigations of future incidents in this area may be critical to understanding the incursion of infection via movements of domestic animals and the potential role of wildlife in this emerging B6-85 cluster.

WGS clade B6-91 was identified in a single OTF-W incident in the south of Hampshire in 2024. The isolate was closely related (one SNP difference) to that of a

previous incident in 2020, which had affected both this herd and a neighbouring holding with which it reportedly shared grazing, which was also the last time this clade was reported in the county. The 2024 isolate also showed genetic similarity to other incidents from the HRA, including Wiltshire. One of the disclosing reactors was a purchased animal from the HRA, although the source farm had no recorded TB history.

This holding is located near the border of the New Forest National Park and exercises common grazing rights, which may complicate disease control and increase the risk of transmission between herds and to wildlife or from wildlife, but is under close monitoring through the TB Control Plan that is exercised in the New Forest by graziers.

WGS clade B4-11 was identified in a single OTF-W incident in the east of Hampshire which began in 2023 and closed in April 2024. The affected herd had experienced a previous incident involving the same clade, suggesting that residual infection may be a contributing factor. Additionally, a high number of cattle movements into the herd were recorded from the HRA, where clade B4-11 is known to be more prevalent. There have been other incidents involving this clade reported in Hampshire in recent years. However, these incidents generally show low genetic relatedness to each other and are often associated with herds that have high levels of cattle movements from the HRA, where clade B4-11 is known to predominate.

The WGS clade was undetermined for 3 OTF-W incidents, 2 within the 6-monthly testing area of the county and 1 in the 12 monthly testing area.

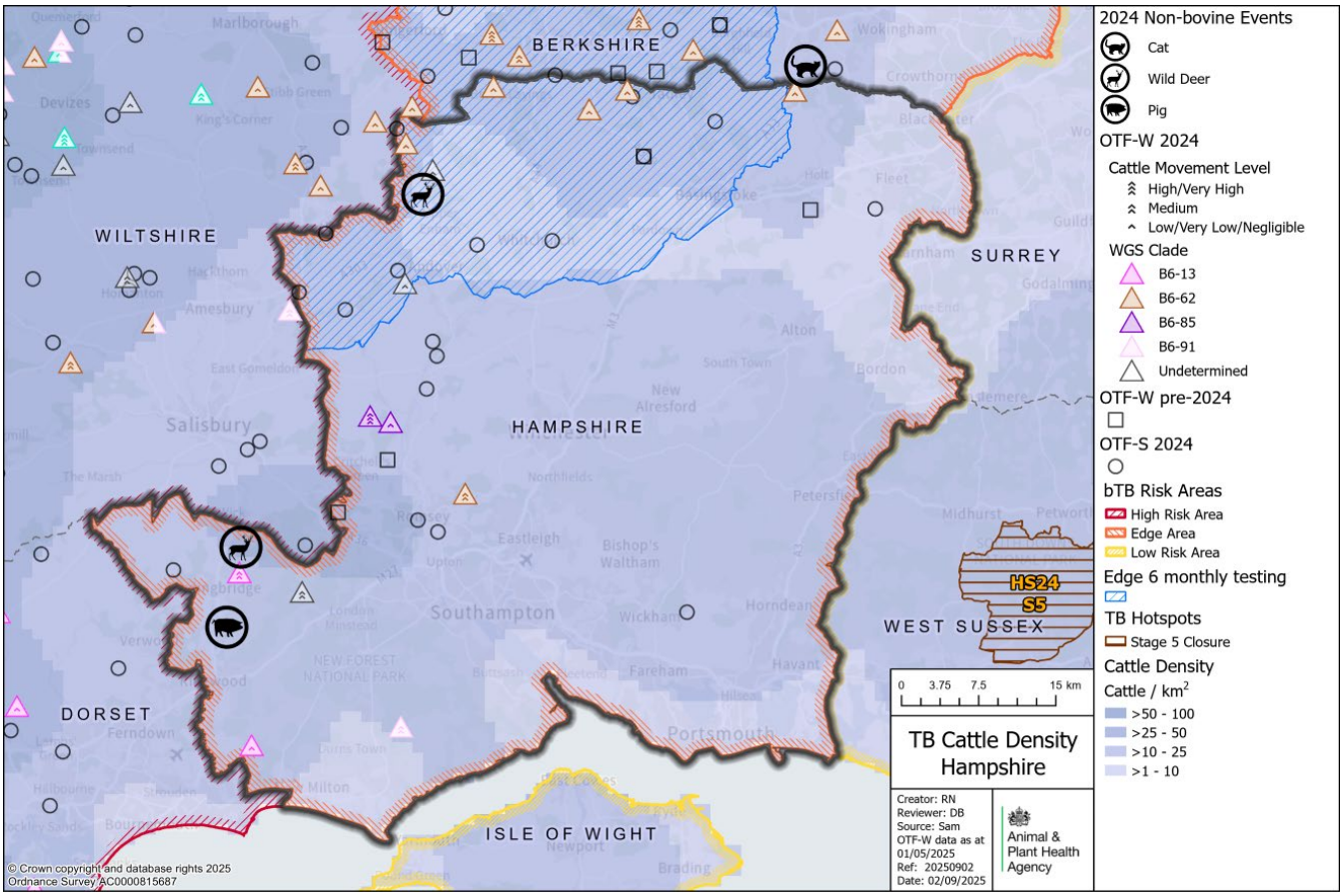

Figure 8: Location of cattle holdings in Hampshire with new TB incidents (OTF-W and OTF-S) and OTF-W incidents still ongoing at the beginning of 2024, overlaid on a cattle density map.

Figure 8 description: A map of Hampshire 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). Bright pink represents clade B6-13, brown represents clade B6-62, purple represents clade B6-85, and pale pink represents clade B6-91. Transparent triangles represent incidents where the WGS clade was undetermined. 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 suffix S5, indicates the stage of controls in place in 2024: brown is stage 5 (closure). The location of new TB incidents is described in the main text.

Main risk pathways and key drivers for TB infection

Not all Disease Report Form (DRF) veterinary investigations to identify the source of infection were carried out in 2024, with 6 out of 31 (19%) new TB incidents in Hampshire receiving a preliminary or final investigation. The findings from these investigations are reported in Appendix 3.

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.

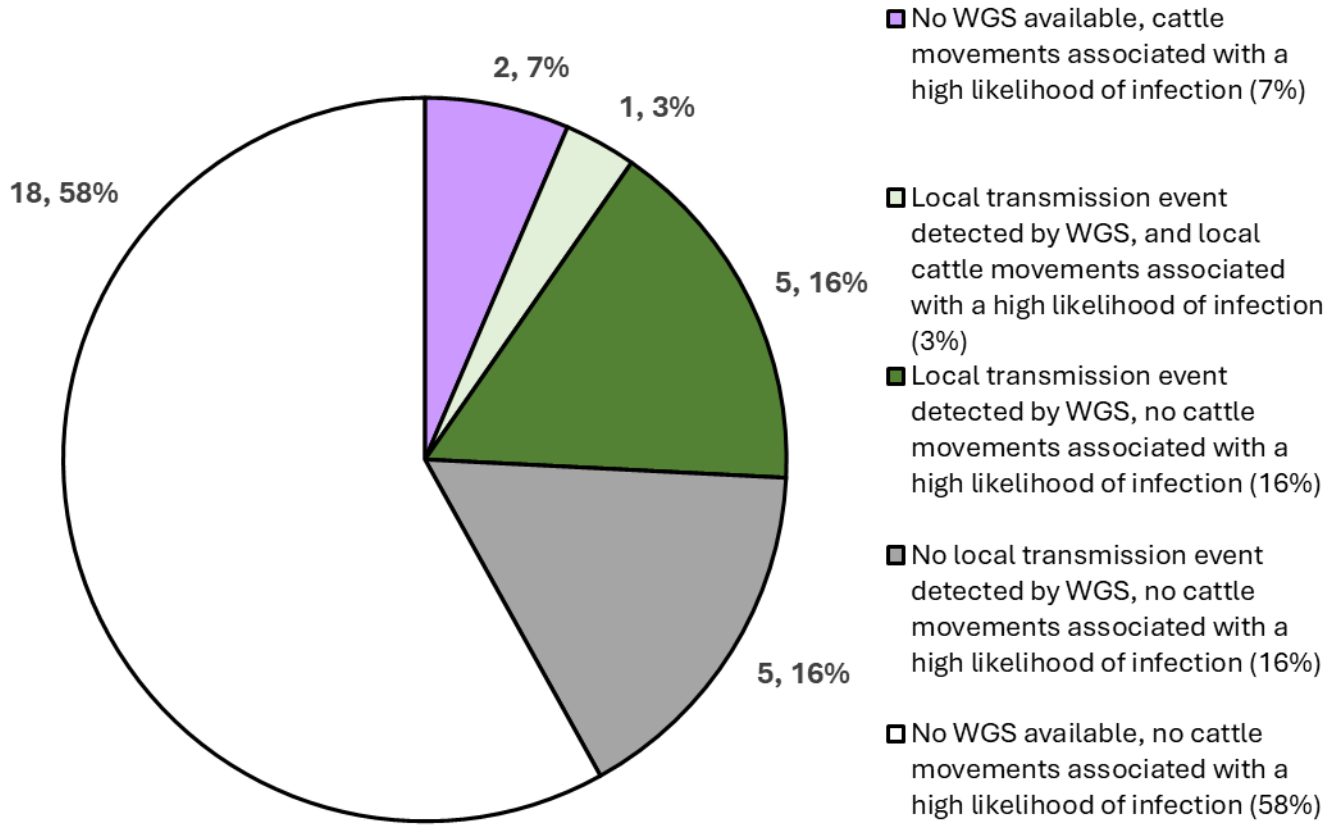

Figure 9: Pie chart showing the risk pathway combinations identified by the WGS local transmission of infection indicator and cattle movement algorithm for all 31 new TB incidents starting in Hampshire in 2024. Numbers presented in each segment display the number of new TB incidents in 2024 in each segment and the percentage of the total new TB incidents in Hampshire in 2024.

WGS data was available for 11 (35%) of all new TB incidents in Hampshire. The WGS local transmission of infection indicator identified evidence of local transmission for 6 (19%) 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 5 OTF-W incidents (16% 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 and
- a local transmission event was identified
- without strong evidence of cattle movements

There was one OTF-W incident (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 this incident:

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

There were 2 TB incidents (7% 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 20 (65%) of all new TB incidents in Hampshire, accounting for 3 OTF-W and 17 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 5 OTF-W incidents (16% 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 18 TB incidents (58% 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

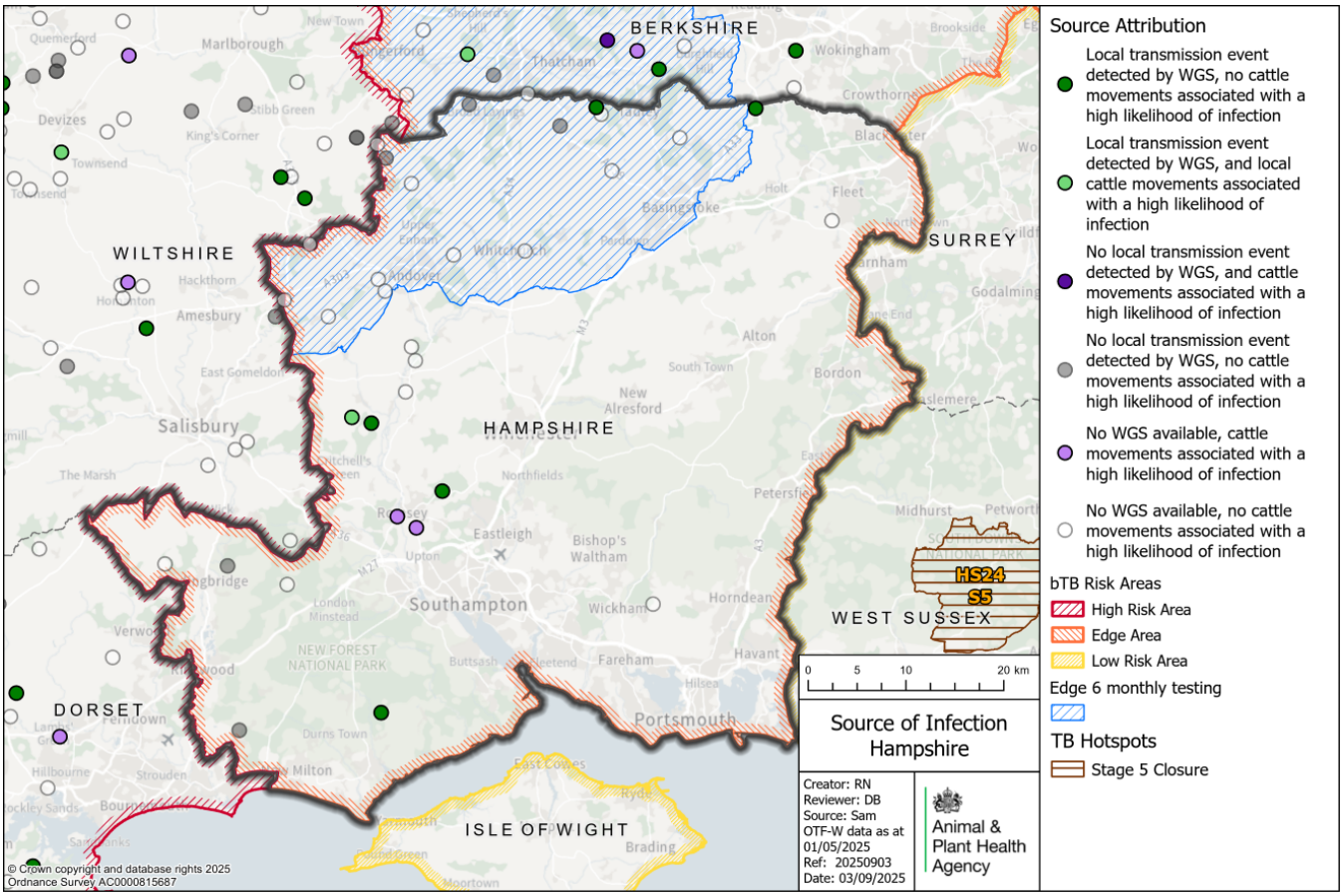

Figure 10: Map of the available evidence for risk pathways of TB infection into the herd, for all TB incidents (OTF-W and OTF-S) in Hampshire that started in 2024.

Figure 10 description: Map of the Hampshire and adjoining areas showing the locations of the 31 new TB incidents in Hampshire, coloured by the risk pathway identified for the incident. Dark green are herds with 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 local 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. 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. The geographical location of TB hotspots is shown with hashed lines. The colour of the hotspot, along with the suffix S5, indicates the stage of controls in place in 2024: brown is stage 5 (closure).

Figure 11 shows that new incidents in 2024 occurred in areas where TB was previously detected.

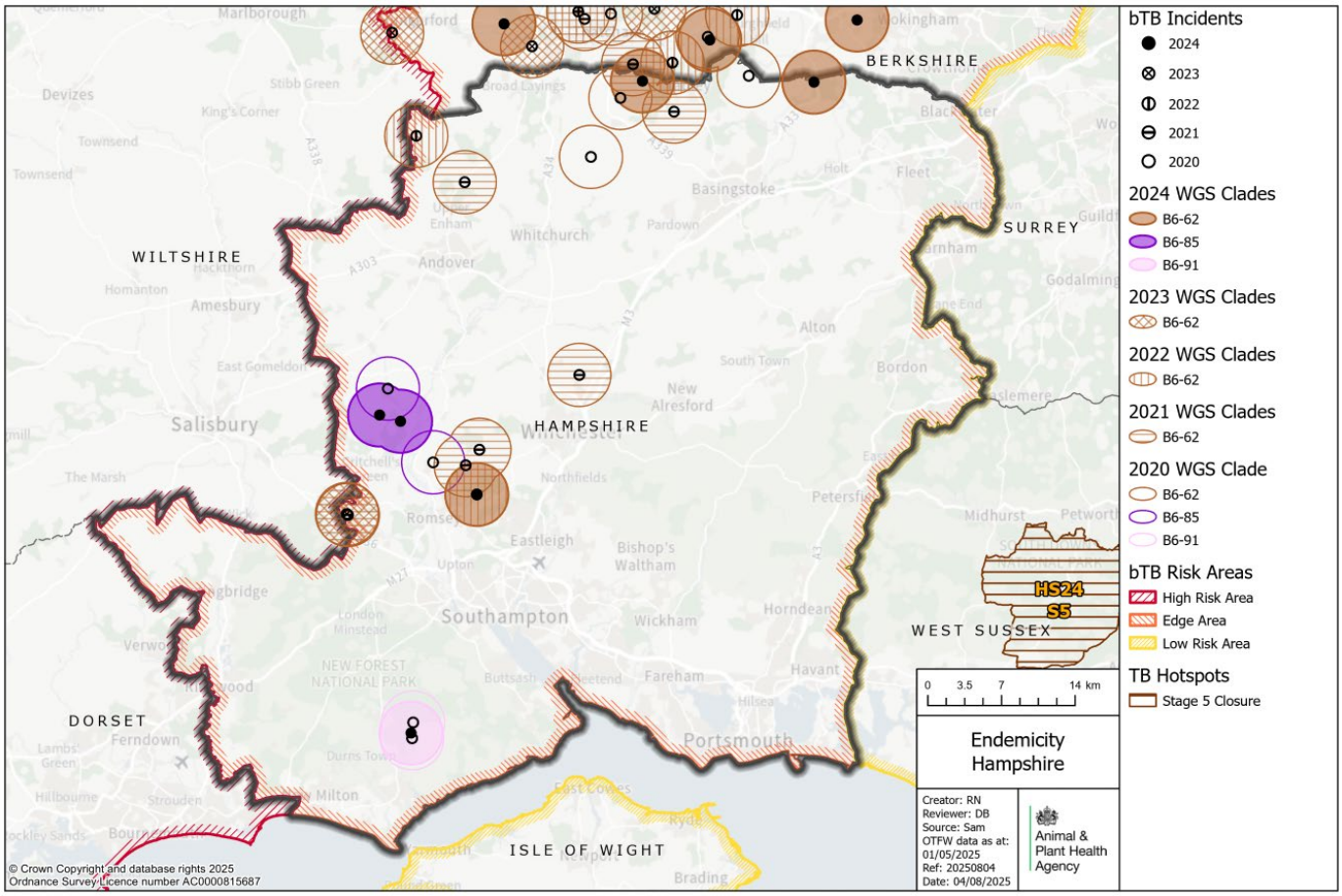

Figure 11: WGS clades of M. bovis detected in Hampshire between 2020 and 2024, where the WGS clade identified in the infected herd was within 3 SNPs of another TB incident that was within 9km and occurred in the previous 4 years or 6 months after the incident of interest, with a 3km buffer zone around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

Figure 11 description: Map of Hampshire 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 overall number of new TB incidents in Hampshire has continued to rise in 2024. Worryingly, OTF-W incidents doubled from 7 in 2023 to 14 in 2024, while OTF-S incidents practically remained unchanged, from 18 in 2023 to 17 in 2024. The total new herd incidents of TB per year in the county has been steadily increasing, from 21 incidents in 2021 to the 31 incidents seen in 2024. Whilst this has not reached the county 10-year high of 42 incidents in 2018, it is a concerning upward trend and is mirrored in the incidence and prevalence, which have also steadily increased since 2021. These figures, along with the expanding endemicity, and Hampshire exhibiting the fifth highest percentage of recurrent herd incidents in the Edge area (42%), suggest that the long-term objective of achieving Officially TB-Free (OTF) status for England by 2038 could prove challenging.

There is evidence of local transmission events within the county. M. bovis WGS clade B6-62 has been detected over several years in both cattle and wildlife in Hampshire. Several isolates show very close genetic relatedness between species, suggesting ongoing local transmission, including recurrence. Continued genomic monitoring is essential, particularly within the clade's known homerange in the north and north-west of the county, to track ongoing transmission and emergence of new infection pockets, such as in the central-west area. These emerging patterns may be driven by local cattle movements, which are frequent in Hampshire, and potential wildlife involvement, both of which warrant close scrutiny.

In addition, there is growing evidence of a second likely endemic clade B6-85 in the central-west region. Several closely related incidents have emerged in recent years, with signs of residual infection and genomic links between affected holdings, despite no cattle movement history between them in some incidents.

However, a lack of supporting wildlife data limits the certainty of conclusions around wildlife involvement. One wild deer incident in 2024 was found to carry clade B6-85, but further genomic analysis confirmed it was an unrelated isolate originating from the south-west, highlighting the wide-ranging movement of some wildlife species. While this adds complexity to understanding TB dynamics, it does not provide direct evidence of B6-85 circulation in the local wildlife population. Further wildlife surveillance will be essential in the coming years to understand the trajectory of this clade in the region.

The 6-monthly testing regime in the north-west of Hampshire remains a vital tool for the early detection of TB. Increased testing frequency enhances the likelihood of prompt identification, helping to reduce onward transmission through cattle movements and potentially to local wildlife populations. However, in 2024, out of the 14 OTF-W incidents, only 6 were detected in the 6-monthly testing area (in the north-west of the county) with 8 in the 12-monthly testing area (mostly clustered in the central-west of the county near the border with Wiltshire and Dorset). Some of these incidents in the 12-monthly testing area appear to be of likely endemic origin (notably clades B6-62 and B6-85) as seen in Figure 8.

Given all the above, the rising incidence, emerging clusters of concern and extending distribution of incidents appearing in the west of the county along the border of the HRA there may be merit in potentially expanding the 6-monthly testing area to ensure timely detection and improved control of TB in these higher-risk areas.

The high percentage of recurrent herd incidents within the county also highlights the need for the improved detection of undisclosed disease. This could be achieved by considering an increase in the amount of IFN-γ testing to include all new and recurrent incidents for both the 6-month and 12-month testing areas.

Additional measures that can be employed in conjunction with testing that would help address the most common risk pathways for TB infection in Hampshire include:

- incentivising the uptake of effective biosecurity measures
- managing the TB risks posed by cattle movements to reduce the risk of spread of TB within and between farms: promote better informed purchasing of cattle, especially higher risk moves from the HRA or previously OFT-W herds
- continuation and further adoption of control measures to prevent the spread of TB between cattle and wildlife, including on-farm biosecurity, infection control in badgers, and local control of the population of wild deer, where appropriate. Both of the neighbouring HRA counties and a significant proportion of the 6-monthly testing area of Hampshire were part of the Badger Control Policy (BCP) since 2021

It also includes the continuation of additional measures taken during both OTF-W and OTF-S TB incidents to prevent residual cattle infection in herds after the end of incidents, such as:

- increasing sensitivity by using severe interpretation for the SICCT on incident herds
- IFN-γ testing OTF-W herds
- de-coupling IFN-γ and skin testing in OTF-W herds to help identify IFN-γ test positive animals earlier in the incident
- limiting or excluding all cattle movements onto all incident herds

The persistence of clade B4-11 in the county underlines the importance of biosecurity and cattle movement controls. This clade has been consistently linked to purchased animals, particularly from the HRA, rather than local transmission. Preventing its establishment in cattle through contiguous spread, local movements, and its spillover to local wildlife will be key to avoiding further propagation within Hampshire.

Given the recent increase in TB incidence in the county and the shifting distribution of OTF-S incidents toward the Wiltshire and Dorset borders, ongoing monitoring is essential to assess the potential cross-border spread of new clades in the future.

Appendix 1: cattle industry demographics

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

Size of herds	Number of herds
Undetermined	2
1 to 50	436
51 to 100	106
101 to 200	76
201 to 350	42
351 to 500	11
Greater than 501	18
Total number of herds	691
Mean herd size	78
Median herd size	28

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

Breed purpose	Number (and percentage of total) cattle
Beef	35,750 (66%)
Dairy	16,287 (30%)
Dual purpose	2,125 (3%)
Unknown	0 (0%)
Total	54,162

Appendix 2: summary of headline cattle TB statistics

Table 3: Herd-level summary statistics for TB in cattle in Hampshire 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	838	822	820
(b) Total number of whole herd skin tests carried out at any time in the period	840	815	805
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	670	676	674
(d) Total number of OTF cattle herds at the end of the report period (herds not under any type of TB movement restrictions)	801	791	775
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	825	807	800
(f.1) Total number of new OTF-S TB incidents detected in cattle herds during the report period	16	18	17
(f.2) Total number of new OTF-W TB incidents detected in cattle herds during the report period	6	7	14
(f.3) Total number of new TB incidents (OTF-W and OTF-S) detected in cattle herds during the report period	22	25	31
(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?	0	2	1

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?	5	2	10
(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)?	0	2	2
(g.4) Of the new OTF-W herd incidents, how many were first detected through routine SLH TB surveillance?	1	3	2
(h.1) Number of new OTF-W incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	0	0	0
(h.2) Number of new OTF-S incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	0	0	0
(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)	4	4	9
(j) New confirmed (positive M. bovis culture) incidents in non-bovine species detected during the report period (indicate host species involved)	1 wild fallow deer	2 wild deer	2 wild deer and 3 pig
(k.1) Number of grazing approved finishing units active at end of the period	0	0	0

Herd-level statistics	2022	2023	2024
(k.2) Number of non-grazing approved finishing units active at end of the period	0	0	0
(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 Hampshire 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)	94,400	89,466	84,853
(b.1) Reactors detected by tuberculin skin tests during the year	119	118	84
(b.2) Reactors detected by additional IFN-γ blood tests (skin-test negative or IR animals) during the year	21	44	20
(c) Reactors detected during year per incidents disclosed during year	6.4	6.5	3.4
(d) Reactors per 1,000 animal tests	1.5	1.8	1.2
(e.1) Additional animals slaughtered during the year for TB control reasons (dangerous contacts, including any first time IRs)	10	1	4
(e.2) Additional animals slaughtered during the year for TB control reasons (private slaughters)	2	2	3
(f) Slaughterhouse cases (tuberculous carcases) reported by the Food Standards Agency (FSA) during routine meat inspection	2	7	6
(g) SLH cases confirmed by M. bovis PCR testing or bacteriological culture	1	3	2

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, 6 out of 31 (19%) new TB incidents in Hampshire 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 6 incidents with a preliminary or a final veterinary assessment in Hampshire, in 2024

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	0	2	3	0	45.0%
Cattle movements	5	1	1	0	27.6%
Contiguous	1	0	0	0	2.1%
Residual cattle infection	1	0	1	0	8.4%
Domestic animals	0	0	0	0	0.0%
Non-specific reactor	0	0	0	0	0.0%
Fomites	0	0	0	0	0.0%
Other wildlife	5	0	0	0	8.6%
Other or unknown source	0	0	0	0	8.3%

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.

Data Protection:

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

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