



Animal &
Plant Health
Agency

Year End Descriptive Epidemiology Report: Bovine TB in the Edge Area of England 2022 County: Berkshire

TB Edge Area - BERKSHIRE



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Introduction

The Edge Area was originally established in 2013. In 2014, the bovine tuberculosis (TB) surveillance strategy for this area was incorporated into the UK Government's Strategy to achieve Officially Bovine Tuberculosis-Free (OTF) status for England by 2038. A key action was to recognise the different levels of TB in different parts of the country and to vary the approach to control accordingly. The current aim is to obtain OTF status for the Edge Area as soon as possible.

This report describes the frequency and geographical distribution of TB in cattle herds in Berkshire, an Edge Area county, in 2022. 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.

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 is intended for individuals involved in the control of TB, both locally and nationally. This includes, but it is not limited to, farmers, veterinarians, policy makers and the scientific community.

Details of the data handling methodology used in this report, a glossary of terms, and the TB control measures adopted in the Edge Area, can be found in the [explanatory supplement for the annual reports 2022](#).

Types of TB incident

Unless otherwise specified, this report includes all new TB incidents detected during the reporting period (1 January to 31 December 2022). This includes both 'Officially Tuberculosis-Free Status Withdrawn' (OTF-W) and 'Officially Tuberculosis-Free Status Suspended' (OTF-S) incidents.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 at least one skin test reactor positive to the Single Intradermal Comparative Cervical Tuberculin or SICCT test, in addition to either typical lesions of TB identified at post-mortem (PM) meat inspection, or at least one animal with an *M. bovis*-positive culture result from tissue samples collected from carcasses during the PM inspection (or both).

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

TB incidents in [Approved Finishing Units](#) (AFUs) without grazing are not included in the prevalence and incidence calculations in this report due to the limited epidemiological impact of these incidents.

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.

Cattle industry

There are approximately 200 cattle herds in Berkshire and beef herds are the predominant cattle enterprise in the county. The majority of herds are small and 54% of them have fewer than 50 cattle, as shown in Appendix 1 and 2.

Berkshire had no livestock markets or abattoirs in 2022. Markets close to Berkshire include Salisbury market in the neighbouring High Risk Area (HRA) county of Wiltshire, and Thame market in Oxfordshire (Edge Area).

There were 2 AFU's without grazing in Berkshire in 2022, the same as in 2021.

Cattle herds in the western half of Berkshire routinely undergo 6-monthly (6M) surveillance testing, however 24% 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 2022.

New TB incidents

A total of 18 new TB incidents were detected in Berkshire in 2022, a decrease of one compared to 2021, as displayed in Figure 1. This was due to a reduction of one OTF-S incident in 2022 (from 8 to 7). The number of OTF-W incidents detected was unchanged from 2021 (11).

There had been a steady decline in the number of new TB incidents in Berkshire from 2018 to 2020, followed by an increase in 2021.

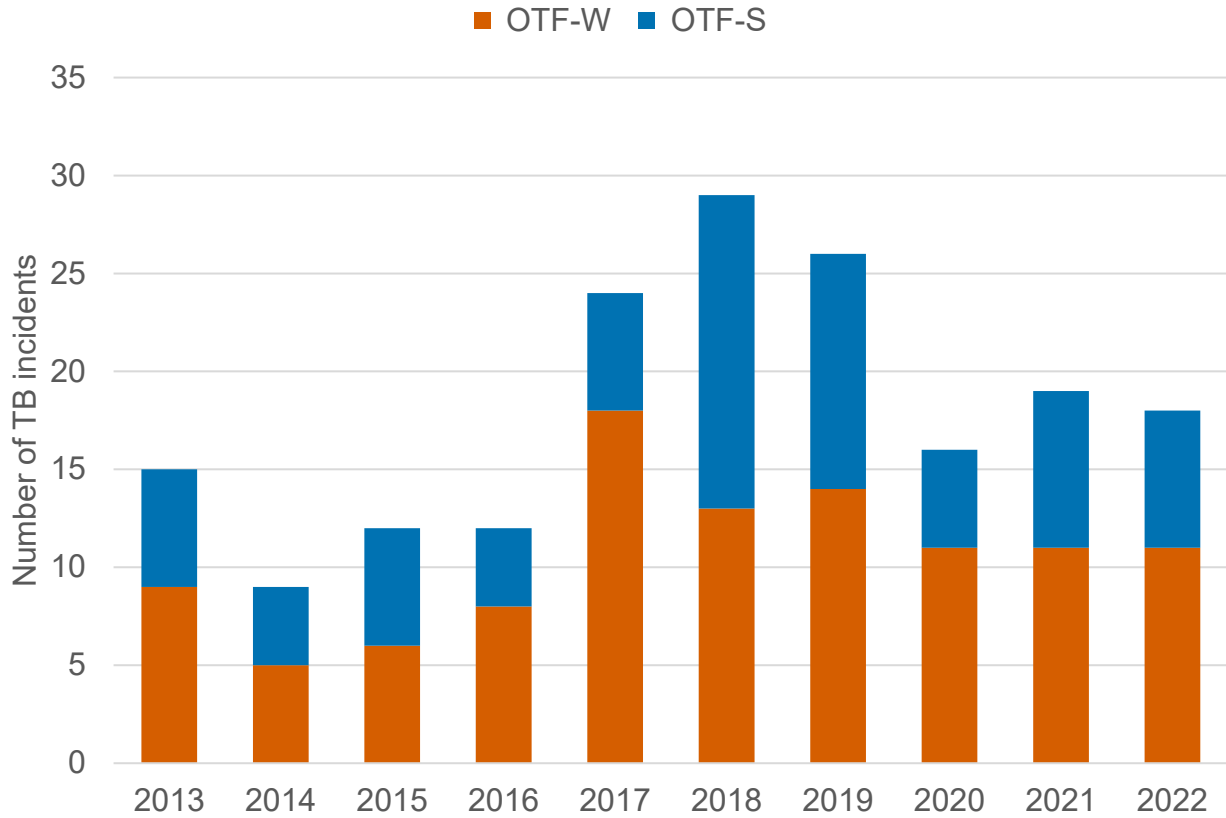


Figure 1: Annual number of new TB incidents in Berkshire, from 2013 to 2022.

Disclosing test types

As in previous years, whole herd (6M or annual routine surveillance) testing continued to detect the most TB incidents in Berkshire in 2022 (9). This was followed by 6 month post-incident check testing (4). New TB incidents were detected by radial testing (2), and pre-movement testing (1) for the first time since 2019. One incident was detected by 12 month post-incident check testing for the first time since 2018, as shown in Figure 2.

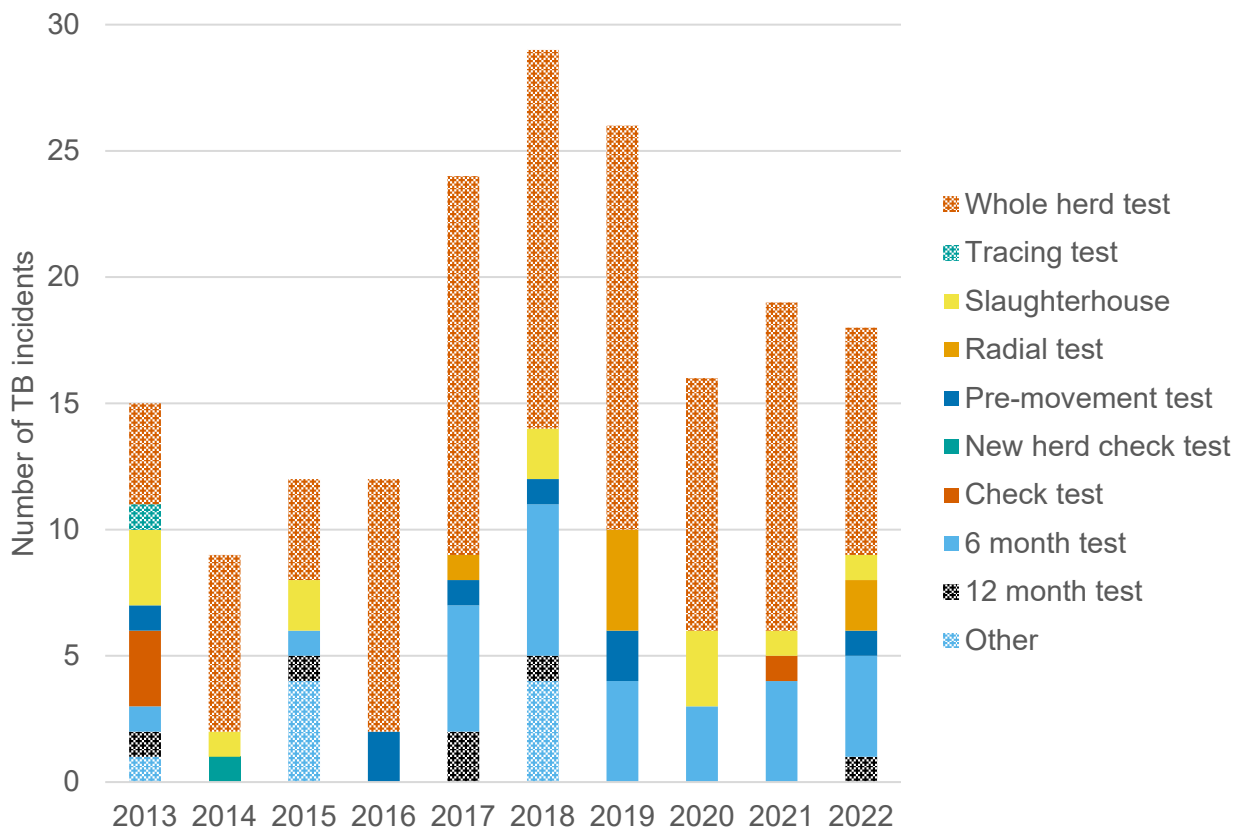


Figure 2: Number of new TB incidents (OTF-W and OTF-S) in Berkshire in 2022, according to the surveillance methods that detected them.

Duration of TB incidents

A total of 20 TB incidents were resolved in Berkshire during 2022. Of these, 8 were new TB incidents that started in 2022 and 11 started in 2021.

The median duration of OTF-W incidents that ended in 2022 was 268.5 days (interquartile range (IQR) 162 to 301). Two OTF-W incidents took 241-550 days to resolve, but the majority (8 out of 10) were resolved within 240 days.

There were 3 OTF-W incidents still ongoing at the end of 2022 (as in 2021) that had been under TB movement restriction for more than 550 days (i.e. persistent TB incidents).

Most OTF-S incidents ending in 2022 (8 out of 13) were resolved within 550 days, however 2 incidents were under movement restrictions for more than 550 days. The median duration of OTF-S incidents was 170.5 days (IQR 155 to 196).

The median duration of all incidents (OTF-W and OTF-S) that were resolved in 2022 was 185 days (IQR 157 to 286). This was shorter than the duration of incidents that ended in 2021; 208 days (IQR 181 to 246). For the whole Edge Area, the median duration of TB incidents that ended in 2022 was 182 days (IQR 157 to 286).

Unusual TB incidents

Three dairy herds in Berkshire remained under continuous movement restrictions for 5, 10, and 11 years respectively at the end of 2022, because of continued detection of infected cattle at short interval tests. Two of these persistently infected dairy herds had a survey for wildlife activity on the farm and additional advice on reducing potential cattle-badger interactions. In partnership with the farmers, action plans were formulated in previous years. Despite multiple additional rounds of interferon gamma (IFN- γ) blood testing, as well as supplementary IDEXX antibody testing on one of the premises, these incidents have continued and were not resolved by the end of 2022, suggesting the presence of residual cattle infection in the herds that has not been possible to detect and/or repeated infection from wildlife.

TB in other species

There is no statutory routine TB surveillance of non-bovine species, apart from Post-Mortem Examination (PME) of animals slaughtered for human consumption. Targeted TB testing takes place in non-bovine herds with laboratory confirmed *M. bovis* infection, and in specific herds of camelids, goats and captive deer at an elevated risk of infection.

There was one TB incident reported in Berkshire in 2022 in wild deer (Muntjac) near Eling Hermitage. Whole Genome Sequence (WGS) analysis can be used to see the relationship between cattle incidents in the area and wild deer populations. The WGS of this deer isolate was closely related to cattle TB in the west Berkshire area. This suggests that wild deer are involved in the local spread of TB, which is probably mostly involving badgers and cattle. However, it is not possible to say from the limited WGS data whether wild deer might be infecting some cattle, although it cannot be ruled out.

APHA, in collaboration with the University of Nottingham, conducted a project to detect the presence and location of TB infection in badgers 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 carcasses. They were delivered to the University of Nottingham, where they underwent post-mortem examination and testing for the presence of TB infection by culture. Those that tested positive were sent for further whole genome sequencing and clade identification (genetic strain). The project aimed to collect 100 carcasses of badgers found dead per county, most likely those killed in road traffic accidents (RTAs). Once 100 carcasses of a sufficient quality were examined per county, collection ceased in that county. Once county targets were achieved, all stakeholders were informed. The survey ended in April 2023 and its results will be communicated to all stakeholders once all the bacteriological cultures and WGS analysis have been completed. Its results will help develop a picture of the disease situation in the Southern Edge Area.

Incidence of TB

In 2022 Berkshire had 11.3 new TB incidents per 100 herd-years at risk, the third highest rate out of the 11 counties in the Edge Area. This was higher than the overall figure for the Edge Area for the same year (7.6), but below the overall figure for the HRA (14.4). TB incidence in Berkshire decreased in 2022 from 12.7 incidents per 100 herd-years at risk in 2021, as displayed in Figure 3.

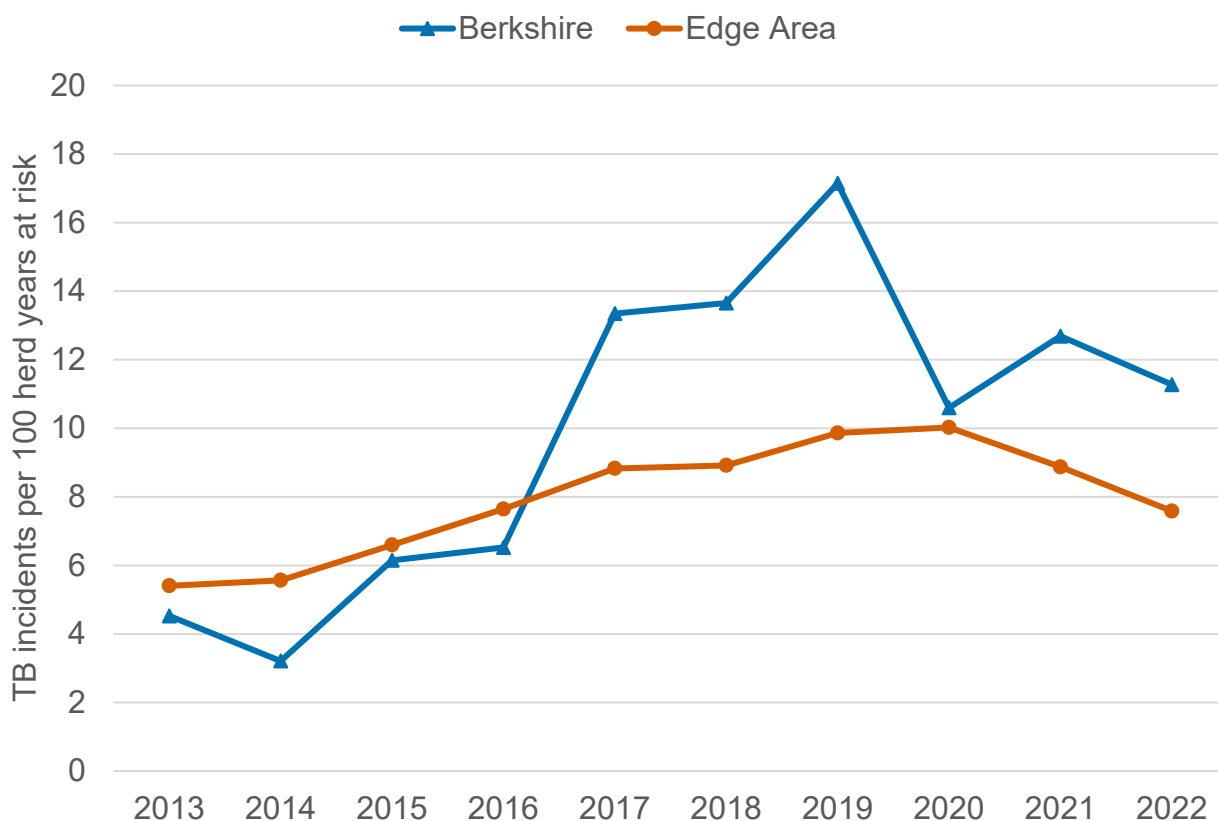


Figure 3: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Berkshire, from 2013 to 2022.

Prevalence of TB

The end-of-year prevalence in Berkshire also decreased marginally in 2022 to 6.1%, from 7.2% in 2021, as indicated in Figure 4. End-of-year prevalence has halved in Berkshire over the past 4 years, from a high of 12.7% in 2018.

The decrease in incidence and prevalence since 2018/2019 is likely to be the result of several factors: increased testing frequency of cattle herds in West Berkshire since 2018 that detects infection earlier, reducing spread and residual infection within the herd, reduced incidence in neighbouring HRA counties where cattle are purchased from, more careful sourcing of cattle (e.g. through the use of [ibTB](#)), and badger control measures.

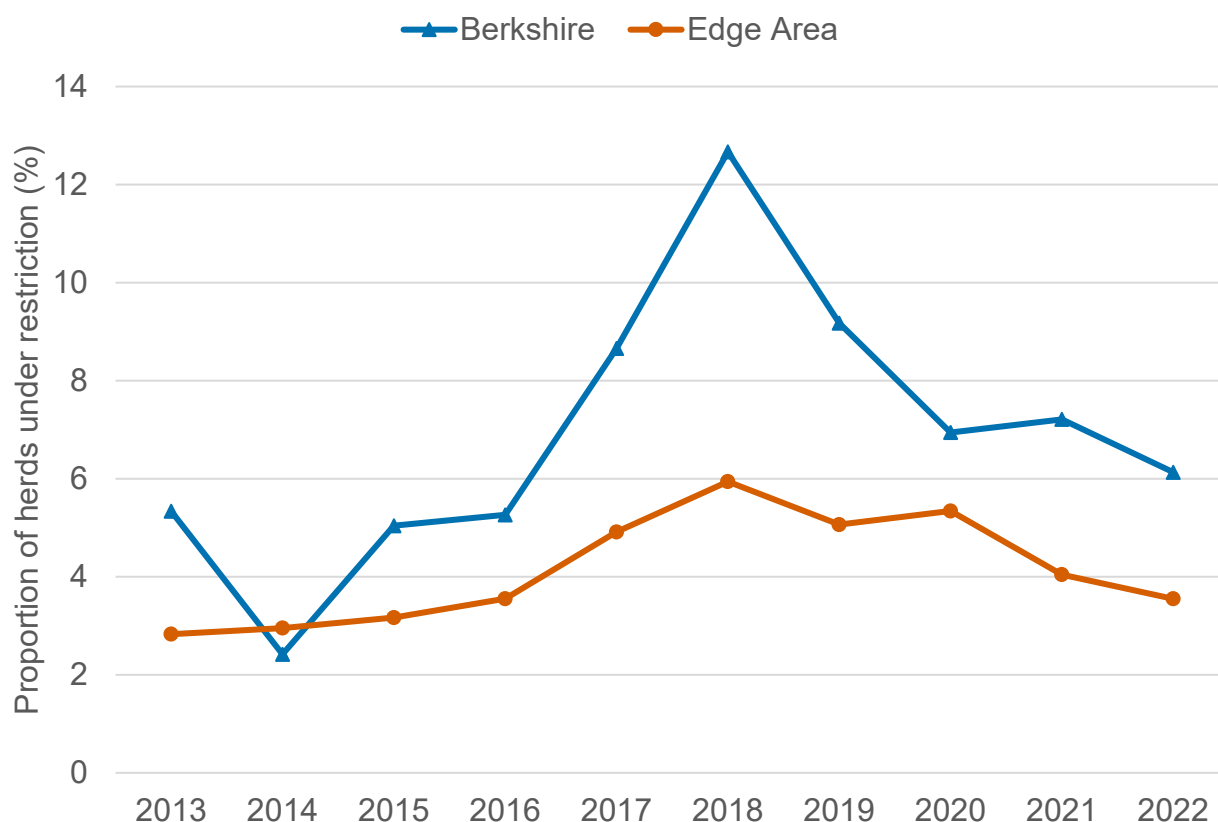


Figure 4: Annual end of year prevalence in Berkshire, from 2013 to 2022.

Re-occurring TB incidents

In Berkshire, 5 of the 7 (71%) herds with a new OTF-S TB incident in 2022, and 7 of the 11 (64%) with an OTF-W incident, had experienced another TB incident in the previous 3 years), as shown in Figure 5. This is the highest re-occurrence compared to neighbouring Edge Area counties, Oxfordshire, Buckinghamshire and Hampshire.

Compared to the whole of the Edge Area where 50% of herds experienced re-occurring incidents, Berkshire had the second highest re-occurrence (67%).

Re-occurrence of an incident in the same herd is a problem in west Berkshire. Residual infection remaining in the herd from a previous incident, and reinfection from other sources, especially wildlife, explain most of the re-occurring incidents which are likely to be OTF-W. Having a history of TB is a risk factor for a herd to sustain a new re-occurring and OTF-W incident. This is due to residual undetected infection remaining in the herd and/or being located in an area with infected wildlife.

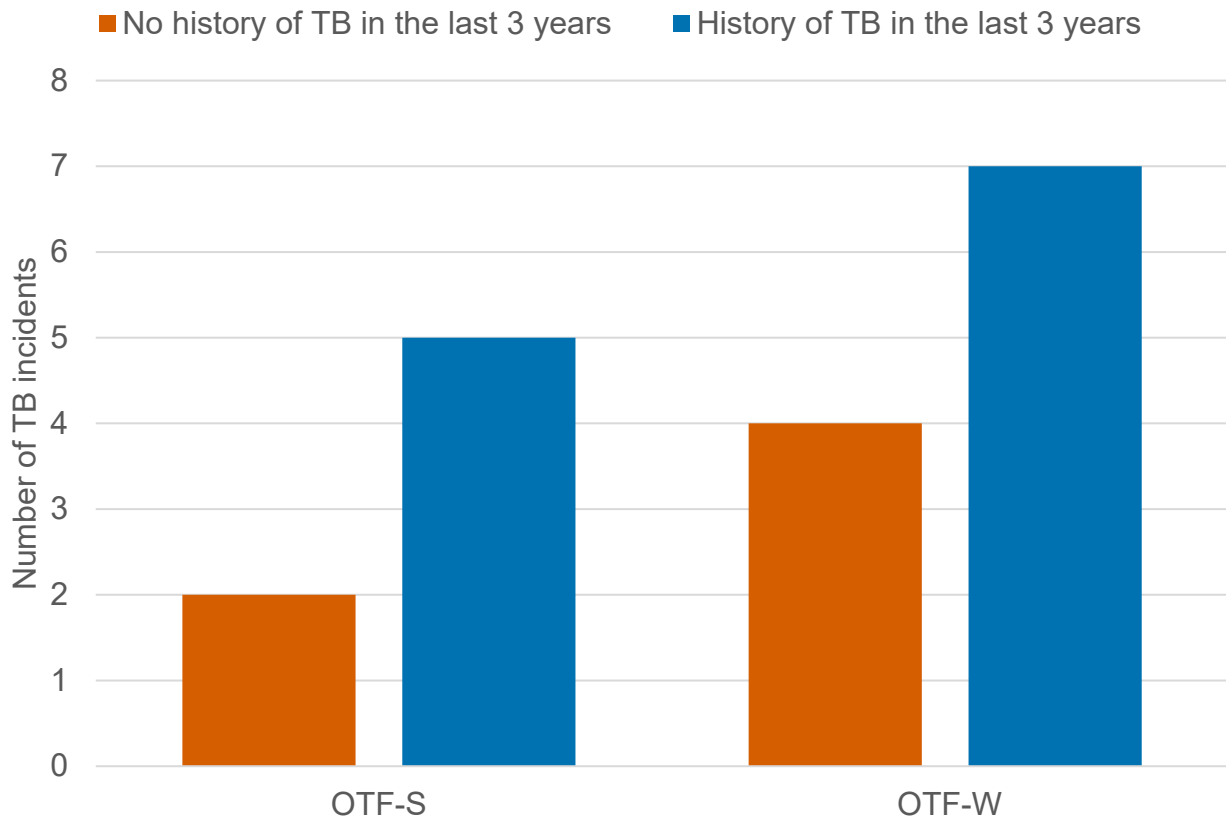


Figure 5: Number of herds with a TB incident (by OTF-W and OTF-S) in Berkshire in 2022, with and without a history of any TB incident in the previous three years.

Geographical distribution of TB incidents

As indicated in Figure 6, and similar to previous years, the majority of the new TB incidents in 2022 were within the western half of the county. In this area of the county most herds are routinely tested for TB every 6 months and the cattle density is higher than in the eastern half. As in previous years, the strain of *M. bovis* identified in most OTF-W incidents in Berkshire was WGS clade B6-62.

There were 2 new OTF-W and one OTF-S TB incidents in the eastern half of Berkshire, still within areas of higher cattle density. Both OTF-W incidents involved WGS clade B6-62 of *M. bovis*. One of those occurred near the border with Oxfordshire and the other in the north-east of Berkshire bordering Buckinghamshire. Cattle movements from the Edge Area and local source of infection such as infected wildlife were possible routes of infection in both OTF-W herds.

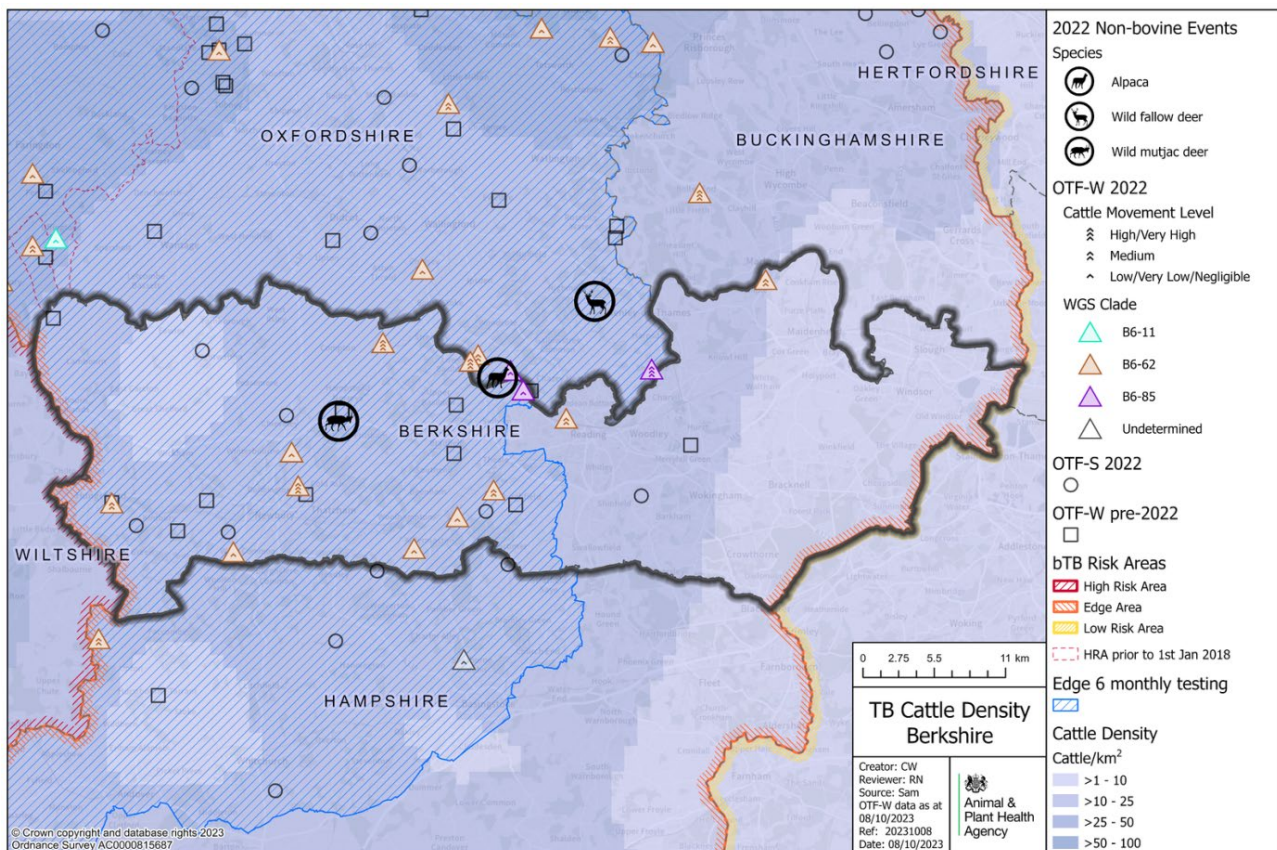


Figure 6: Location of cattle holdings in Berkshire with new TB incidents (OTF-W and OTF-S) in 2022 and cattle holdings with pre-2022 OTF-W incidents still ongoing at the beginning of 2022, overlaid on a cattle density map. The movement score for each farm is symbolised with 3 chevrons for cattle movements associated with a high likelihood of infection, 2 chevrons for a medium likelihood and one chevron for a low likelihood.

Skin test reactors and interferon gamma test positive animals removed

Appendix 2 provides a summary of headline cattle TB statistics in Berkshire. A total of 113 cattle were removed from TB incidents in Berkshire during 2022, as shown in Figure 7. The tuberculin skin test detected 109 infected animals and 4 were detected through the IFN- γ blood test. This is a decrease of 44 positive cattle removed in 2021. The proportion of skin (96%) to IFN- γ blood (4%) test reactors differed from that of 2021. There was an 80% reduction in the number of animals receiving an IFN- γ test in 2022, from 1,664 tests in 2021, to 328 in 2022. This led to a reduction in the number of animals detected by IFN- γ testing. Both the diversion of staff resources into the highly pathogenic avian influenza (AI) outbreak, and policy changes, which restricted the mandatory deployment of IFN- γ tests to herds that had another TB incident within the past 18 months, could have accounted for the reduction in IFN- γ tests performed between 2021 and 2022.

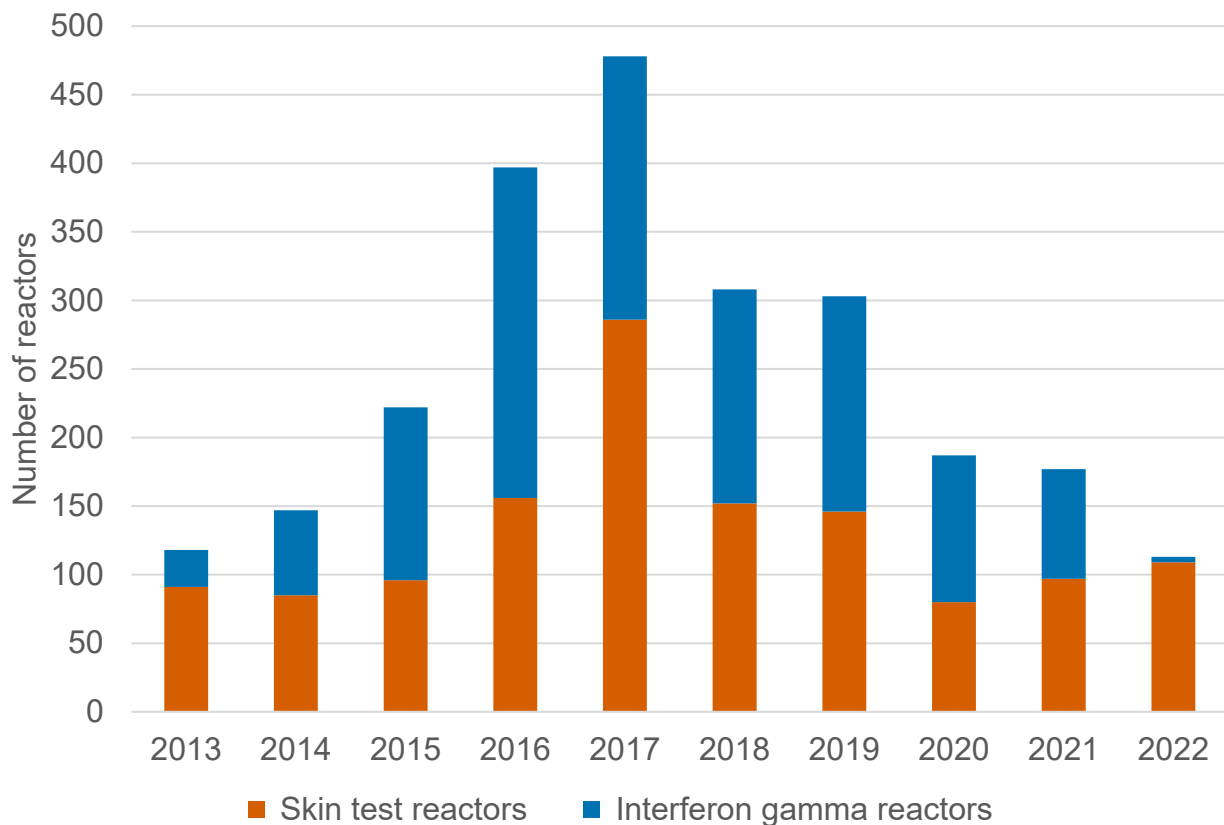


Figure 7: Number of skin test reactors (SICCT) and interferon gamma (IFN- γ) test positive cattle removed by APHA for TB control reasons in Berkshire, from 2013 to 2022.

Main risk pathways and key drivers for TB infection

It is important to try to understand the risk pathways and key drivers that are likely to have introduced TB infection into a herd. This information can help identify mitigations that may reduce TB risk for individual businesses.

Implementing practical measures can help to reduce the risk of TB incursion into a herd that is TB free ([biosecurity](#)), as well slowing disease spread within a herd where TB is present (biocontainment).

Furthermore, the [ibTB](#) online tool can be used to inform purchasing choices, reducing the risk of introducing undetected infection when moving cattle into a herd.

In 2022, 1 out of 18 (6%) new TB incidents in Berkshire received a preliminary or final APHA veterinary investigation to identify the source of infection. The findings from this investigation are reported in Appendix 3. The small number of investigations carried out in 2022 was mainly due to the diversion of field resource to the large avian influenza outbreak which occurred in 2021 and 2022.

New data-driven methods to quantify the likelihood of risk pathways for TB infected herds have been developed by APHA. These include the:

- Cattle Movement Algorithm
- WGS Local Reservoir Indicator

The Cattle Movement Algorithm uses cattle movement data to identify individual animals that were moved into a TB incident herd as having a negligible, very low, low, medium, high or very high likelihood of being the source of the TB infection. At the herd level, the cattle movement score is dictated by the animal with the highest ranked movement into that herd. Herds are classified as having either:

- cattle movements associated with a high likelihood of infection (a herd with any movements scored as a high or very high likelihood)
- no cattle movements with a high likelihood of infection (the highest likelihood score was negligible, very low, low or medium)

The WGS Local Reservoir Indicator uses whole-genome sequence (WGS) data from cattle *M. bovis* isolates to identify TB incidents that are linked by genetics, time and space. A TB incident where at least one other TB incident is identified that satisfies all the following 3 criteria is considered to have evidence of a local reservoir of infection:

- it has a WGS with no more than three single nucleotide polymorphism (SNP) differences relative to the TB incident of interest
- it is within 4 years before or 6 months after the start date of the incident of interest
- it is within a 9km radius of the incident of interest

Further details about the methodology used can be found in the [explanatory supplement to the annual reports 2022](#).

There is always a degree of uncertainty about the estimated true routes of TB infection into a herd. The absence of a local reservoir, 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 8 provides the percentage of herds where each risk pathway combination was identified. The spatial distribution of these categories are presented in Figure 9. Each category is described in greater detail in the following text.

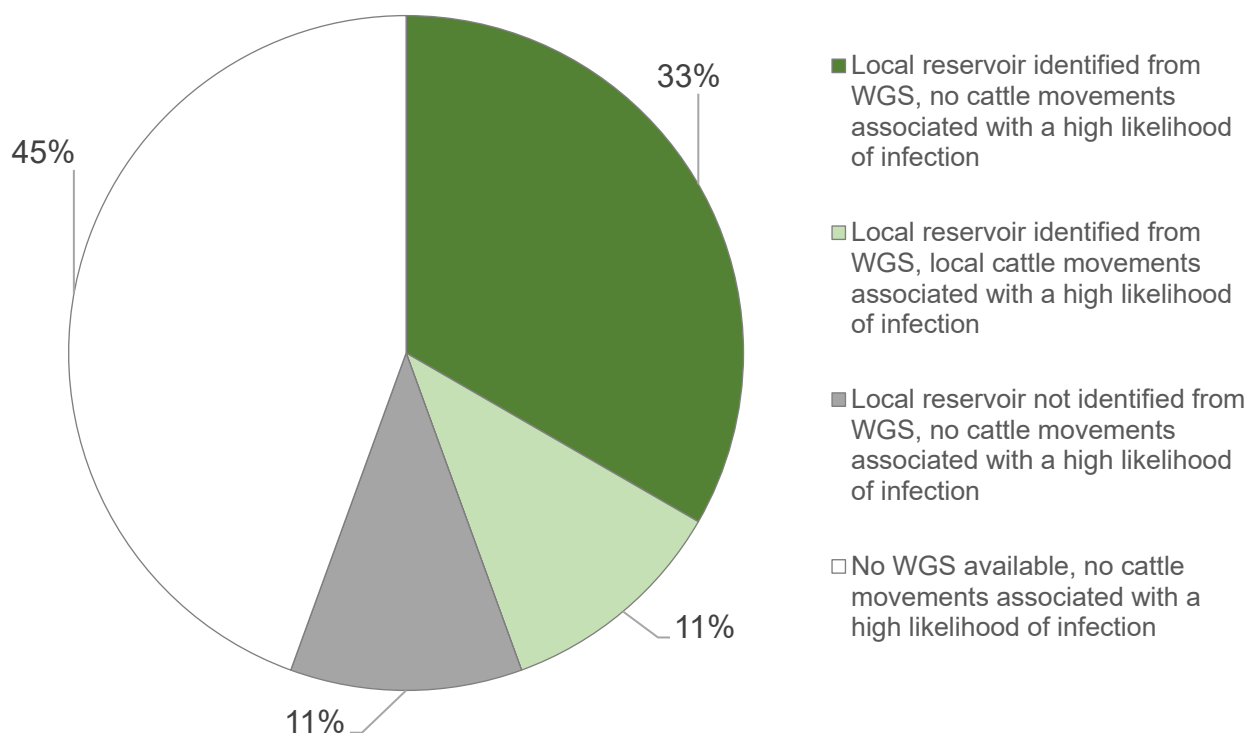


Figure 8: Risk pathway combinations identified by the WGS local reservoir indicator and cattle movement algorithm for all 18 new TB incidents starting in Berkshire in 2022

WGS data was available for 10 (56%) of all new TB incidents in Berkshire. The WGS Local Reservoir Indicator identified a potential local reservoir of infection for 8 (44%) new TB incidents in 2022.

Most of the TB incidents with WGS data available had a local reservoir identified without strong evidence of cattle movements (6, 33%). These are dark green symbols in Figure 9.

For these incidents, 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

A further 2 new TB incidents (11%) had evidence of both a local reservoir and local cattle movements (within 25km) that were associated with a high likelihood of TB infection. For these TB incidents, local cattle movements may have played a part in the spread of this local infection, in addition to the previously listed local pathways. These incidents are symbolised in light green in Figure 9.

For 2 new TB incidents (11%), the WGS Local Reservoir Indicator did not find evidence of a local reservoir, and there was also no evidence of cattle movements associated with a

high likelihood of TB infection. The source of infection is unclear for these incidents (grey symbols).

For a further 8 new TB incidents in 2022 (45%), there was no evidence of cattle movements associated with a high likelihood of TB infection, and no WGS data available to explore the presence of a local reservoir. These are shown as white dots in Figure 9, as there is insufficient evidence to determine a likely infection pathway.

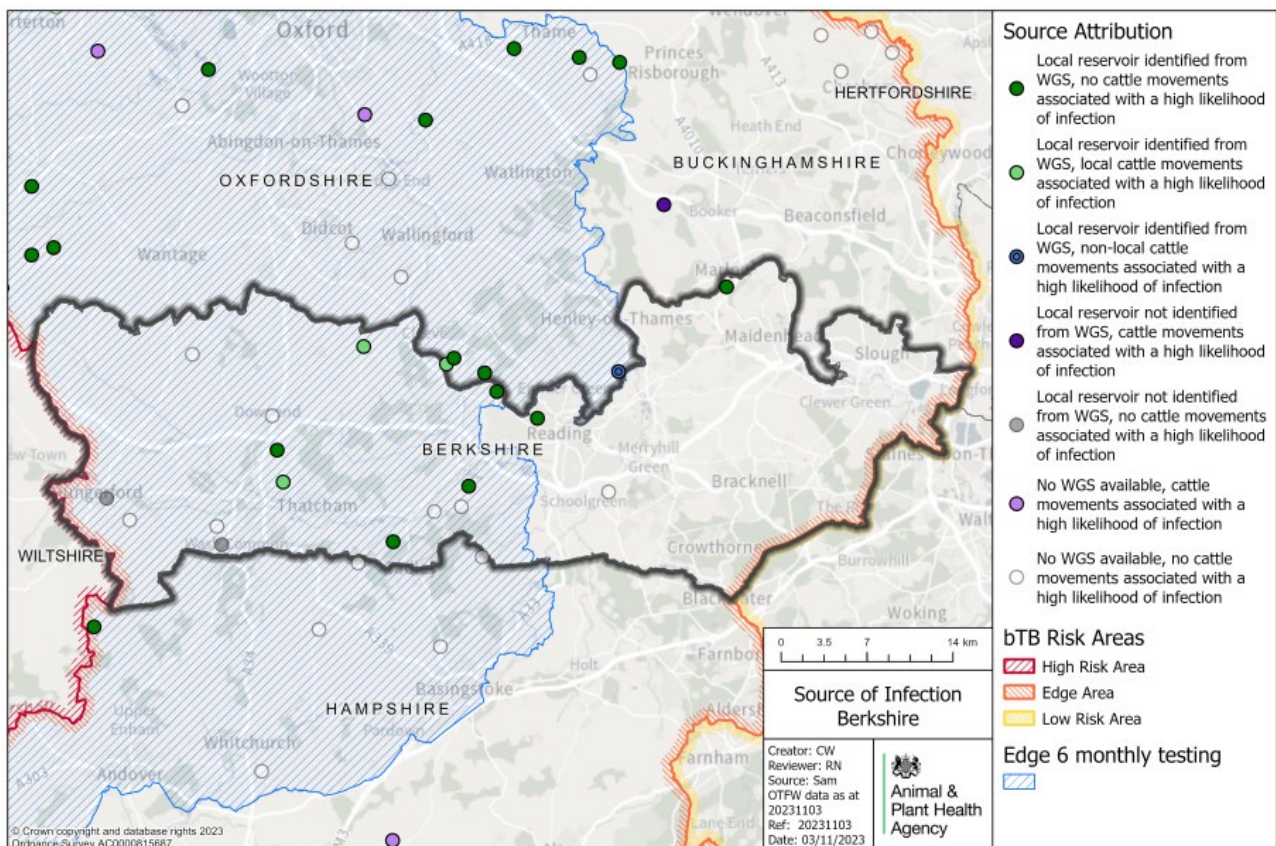


Figure 9: Map of the available evidence for risk pathways of TB infection into the herd, for all TB incidents (OTF-W and OTF-S) in Berkshire that started in 2022.

Genotyping was replaced with whole genome sequencing (WGS) of *M. bovis* isolates at Animal and Plant Health Agency (APHA) in 2021. Most OTF-W incidents in Berkshire in 2022 were caused by infection with WGS clade B6-62 of *M. bovis* (see Figure 10). WGS clade B6-62 encompasses the previously designated spoligotype 10, as well as other closely related spoligotypes.

One incident was caused by infection with WGS clade B6-85. This incident occurred in the north of the county, on the border with Oxfordshire’s Henley Cluster, indicating that there has been spread southwards of this cluster into Berkshire because there is evidence of local spread of both B6-62 and B6-85 in this area of Oxfordshire. The absence of cattle movements associated with a high likelihood of TB infection into this holding supports the likelihood of local wildlife being a probable source of infection.

Genotype 10:a and 10:u (both equivalent to clade B6-62) were first disclosed in Berkshire in around 2010 and have been present and spreading across the county since then. Genotype 10:a had been present before this time in the area of Wiltshire bordering Berkshire, suggesting the original incursion was from the west, possibly via north-west Hampshire.

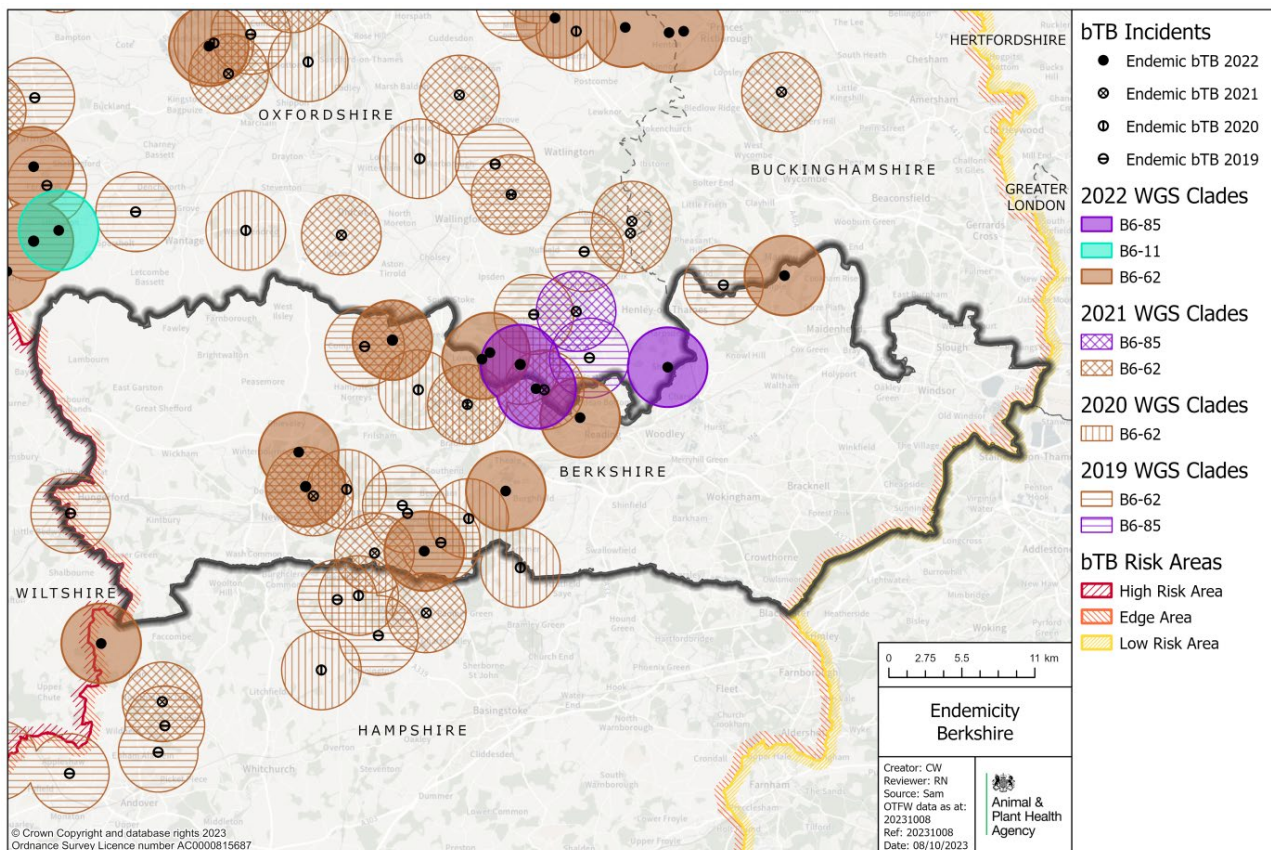


Figure 10: WGS clades of *M. bovis* detected in Berkshire between 2019 and 2022, where the WGS identified in the infected herd was within 3 SNPs of another TB incident in the past 4 years and 9km (OTF-W incidents only).

Forward look

The number of new TB incidents in the county decreased slightly in 2022 compared to 2021, continuing the downward trend from the peak of OTF-W incidents in 2017. In the east of Berkshire, there were 3 TB incidents in 2022. No cattle moves associated with a high likelihood of TB infection were identified by the algorithm, but a veterinary investigation found that the most likely source of infection was movements from the Edge Area. There were no new incidents detected in this part of Berkshire the year before. The spread of infection eastwards from west Berkshire appears to have stalled; with the caveat of less cattle herds to act as sentinels for detection of infection in wildlife.

Six-monthly surveillance testing of cattle herds in west Berkshire has likely helped to reduce the spread of TB through earlier detection of disease in past years. This should lead to shorter incidents with fewer reactors by reducing the available period for cattle-to-cattle spread within herds.

In west Berkshire, there is evidence of infected wildlife acting as a reservoir and potential source of infection for cattle. *M. bovis* WGS clade B6-62 has been isolated over several years in clusters of cattle incidents and infected wildlife which are closely genetically related. Further improvements in on-farm biosecurity to reduce transmission between wildlife and cattle are needed to break the cycle of infection, alongside continued wildlife disease control measures including badger culling or vaccination, and local control of the wild deer population, where appropriate.

Cattle movements remain an important source of TB in this county. Careful, informed purchasing by cattle keepers should be encouraged, including the use of the online tool [ibTB](#).

The likelihood of achieving a herd prevalence of less than 1% OTF-W incidents in Berkshire by 2025 is low.

Appendix 1: cattle industry demographics

Table 1: Number of cattle herds by size category in Berkshire as of 31 December 2022 (RADAR data)

Size of herds	Number of herds in Berkshire
Undetermined	4
1 to 50	87
51 to 100	31
101 to 200	20
201 to 350	14
351 to 500	2
501+	7
Total number of herds	162
Mean herd size	106
Median herd size	38

Table 2: Number (and percentage of total) of animals by breed purpose in Berkshire as of 31 December 2022

Breed purpose	Number (and percentage of total) cattle in Berkshire
Beef	13,210 (76%)
Dairy	3,610 (20%)
Dual purpose	381 (2%)
Unknown	8 (0.046%)
Total	17,209

Appendix 2: summary of headline cattle TB statistics

Table 3: Herd-level summary statistics for TB in cattle in Berkshire between 2020 and 2022

Herd-level statistics	2020	2021	2022
(a) Total number of cattle herds live on Sam at the end of the reporting period	218	210	214
(b) Total number of whole herd skin tests carried out at any time in the period	288	278	283
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	168	170	169
(d) Total number of OTF cattle herds at the end of the report period (herds not under any type of Notice Prohibiting the Movement of Bovine Animals (TB02) restrictions)	196	186	193
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	202	194	200
(f.1) Total number of new OTF-S TB incidents detected in cattle herds during the report period (including all Finishing Units)	5	8	7
(f.2) Total number of new OTF-W TB incidents detected in cattle herds during the report period (including all Finishing Units)	11	11	11
(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?	2	1	N/A

Herd-level statistics	2020	2021	2022
(g.2) Of the new OTF-W herd incidents, how many were triggered by skin test Reactors or 2xIRs at routine herd tests?	6	7	6
(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	3	4
(g.4) Of the new OTF-W herd incidents, how many were first detected through routine slaughterhouse TB surveillance?	3	1	1
(h.1) Number of new OTF-W incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	0	0	1
(h.2) Number of new OTF-S incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	0	0	1
(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, but not including non-grazing Approved Finishing Units)	12	10	11
(j) New confirmed (positive <i>M. bovis</i> culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	1 wild fallow deer	1 wild muntjac deer
(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	2	2	2
(k.3) Number of grazing exempt finishing units active at end of the period	0	0	0

Herd-level statistics	2020	2021	2022
(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 Berkshire between 2020 and 2022

Animal-level statistics (cattle)	2020	2021	2022
(a) Total number of cattle tested in the period (animal tests)	39,862	34,162	34,843
(b.1) Reactors detected by tuberculin skin tests during the year	80	97	109
(b.2) Reactors detected by additional IFN- γ blood tests (skin-test negative or IR animals) during the year	107	80	4
(c) Reactors detected during year per incidents disclosed during year	11.7	9.3	6.3
(d) Reactors per 1,000 animal tests	4.7	5.2	3.2
(e.1) Additional animals slaughtered during the year for TB control reasons (dangerous contacts, including any first time IRs)	15	19	21
(e.2) Additional animals slaughtered during the year for TB control reasons (private slaughters)	1	0	0
(f) Slaughterhouse (SLH) cases (suspect tuberculous carcasses) reported by Food Standards Agency (FSA) during routine meat inspection	5	1	10
(g) SLH cases confirmed by culture of <i>M. bovis</i>	4	1	10

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

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

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

In 2022, 1 out of 18 (6%) new TB incidents in Berkshire received a preliminary or final APHA veterinary investigation to identify the source of infection. The small number of investigations carried out in 2022 was mainly due to the diversion of field resource to the large avian influenza outbreak which occurred in 2021 to 2022.

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 2022](#).

Table 5: Suspected sources of *M. bovis* infection for the one incident with a preliminary or a final veterinary assessment in Berkshire, in 2022

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	1	0	0	0	14.3%
Cattle movements	0	0	1	0	85.7%
Contiguous	0	0	0	0	0%

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Residual cattle infection	0	0	0	0	0%
Domestic animals	0	0	0	0	0%
Non-specific reactor	0	0	0	0	0%
Fomites	0	0	0	0	0%
Other wildlife	0	0	0	0	0%
Other or unknown source	0	0	0	0	0%

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



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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.