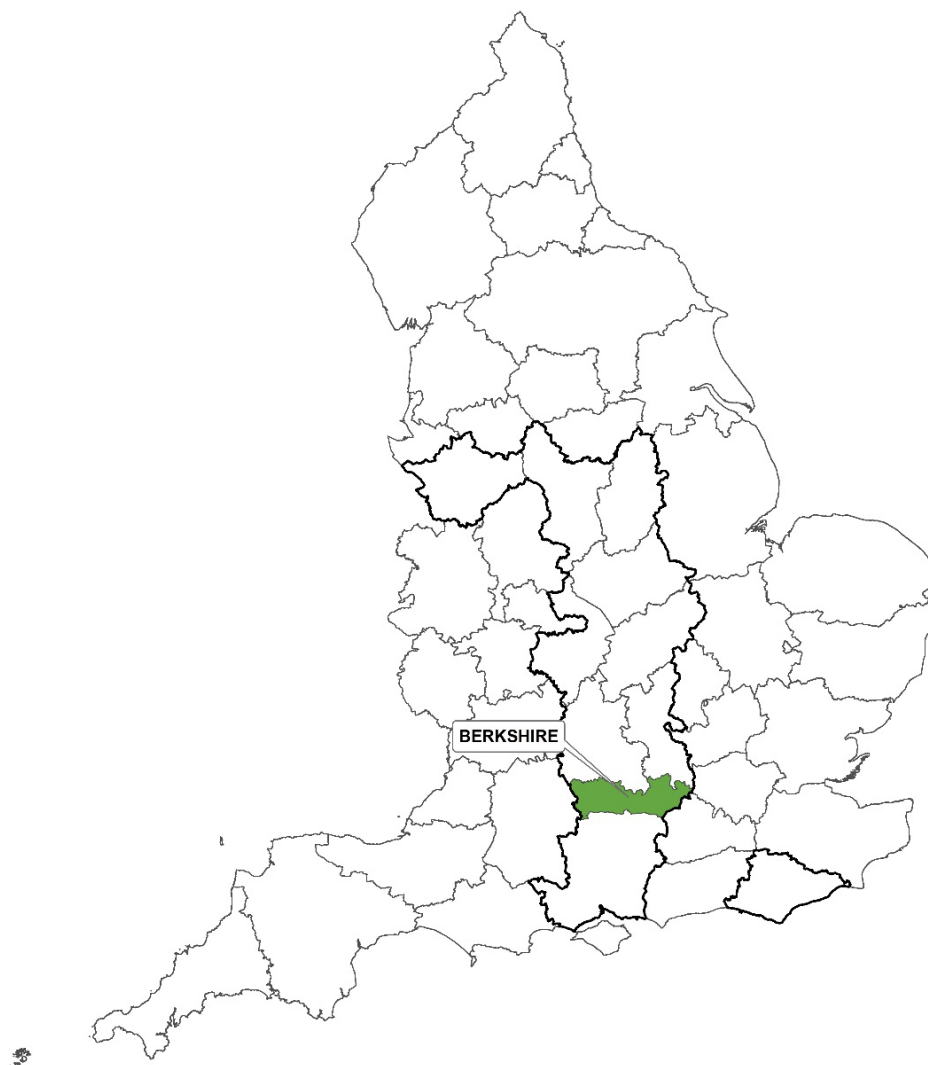




Animal &
Plant Health
Agency

Year-end descriptive epidemiology report: Bovine TB in the Edge Area of England County: Berkshire Year-end report for: 2020

TB Edge Area - BERKSHIRE



Contents

Executive summary	1
Reporting area	1
Local cattle industry	1
New TB incidents	1
Risk pathways for TB infection	1
Disclosing tests	1
Reactor numbers	2
Risks to the reporting area	2
Risks posed by the reporting area	2
Forward look	2
Introduction	3
Changes to the Edge Area	3
Changes due to COVID-19	4
Cattle industry	5
Herd types	5
Markets and abattoirs	5
Approved Finishing Units	6
Common land	6
Descriptive epidemiology of TB	7
Temporal TB trends	7
Geographical distribution of TB incidents	10
Other characteristics of TB incidents	14
Suspected sources, risk pathways and key drivers for TB infection	18
TB in other species	23
Detection of TB incidents	23

Skin test reactors and interferon gamma test positive animals removed	25
Summary of risks to Berkshire	26
Summary of risks from Berkshire to surrounding areas	26
Assessment of effectiveness of controls and forward look	27
Effectiveness of controls	27
Forward look	27
Appendices	28
Appendix 1: Overview of risk and surveillance areas of England and Edge Area objectives and controls	28
Appendix 2: Cattle industry in Berkshire.....	31
Appendix 3: Summary of headline cattle TB statistics	32
Appendix 4: Suspected sources of <i>M. bovis</i> infection for all the new OTF-W and OTF-S incidents identified in the report period.....	35

Executive summary

Reporting area

Berkshire is part of the Edge Area that was 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. This end of year report describes bovine TB in Berkshire.

Local cattle industry

The majority of herds in Berkshire are between 1 to 50 cattle (57%), with the overall number of cattle and herds continuing to fall from previous years. There are two commons in the county which are both grazed by cattle. There are no markets or abattoirs, but there are two Approved Finishing Units (AFUs).

New TB incidents

There was a decrease in the overall number of new TB incidents disclosed in Berkshire from 25 in 2019 to 16 in 2020. The number of Officially Tuberculosis Free Status Withdrawn (OTF-W) incidents decreased from 14 in 2019 to 11 in 2020, as did the number of new Officially Tuberculosis Free Status Suspended (OTF-S) incidents (from 11 in 2019 to 5 in 2020).

Risk pathways for TB infection

The most likely sources of infection for new OTF-W and OTF-S incidents in Berkshire in 2020 based on weighted risk pathways recorded were infected badgers (50%) followed by movements of undetected infected cattle (32%) and residual infection (11%).

Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents can be found in the main body of the report and in the [Explanatory Supplement](#) to the 2020 bovine TB epidemiology reports.

Disclosing tests

In Berkshire in 2020, 63% of new TB incidents were disclosed at routine whole herd surveillance tests (ten). Other disclosing test types were slaughterhouse surveillance (three) and six-month post incident testing (three).

Reactor numbers

There were 80 skin test reactors and 107 interferon gamma (IFN- γ) test positives in Berkshire in 2020. This represented a large decrease from 2019 (145 skin test reactors and 157 IFN- γ test positive cattle) but corresponded with the fall in the number of new TB incidents in 2020.

Risks to the reporting area

Risks to Berkshire continue to be through spread of endemic infection from neighbouring counties including the High Risk Area (HRA) county of Wiltshire, and purchase of undetected infected cattle, especially from markets such as Salisbury in the HRA.

Risks posed by the reporting area

The biggest risk posed by Berkshire to surrounding counties is the movement of undetected infected cattle. Future advance eastwards of the endemic area in the west of the county may be slowed by the presence of large urban conurbations. Therefore, infected wildlife does not pose an imminent risk to LRA.

Forward look

It is unlikely that the TB control objectives for Berkshire will be achieved unless infection in wildlife reservoirs is reduced, further measures for reducing the purchase of infected cattle are introduced, and the sensitivity of cattle testing is improved to prevent residual infection.

Introduction

This report describes the level of bovine tuberculosis in cattle herds in Berkshire in 2020. Bovine tuberculosis is caused by the organism *Mycobacterium bovis* (*M. bovis*) and will subsequently be referred to as TB.

This report explores the frequency and geographical distribution of TB in cattle herds. It examines what is likely to be driving TB in this area, and the risks the disease in this county may pose to neighbouring cattle.

Although other sources may refer to TB 'breakdown(s)', this report will use the term 'incident(s)' throughout. This report is intended for individuals involved in the control of TB, both in the local area and nationally. This includes, but is not limited to: farmers, veterinarians, policy makers and the scientific community.

In 2014 the UK government published its 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 vary the approach to control accordingly. To this end three management areas were established (refer to Appendix 1).

Berkshire forms part of the Edge Area. Control efforts are seeking to slow down and reverse geographic spread, and to reduce the incidence rate. The aim is to obtain OTF status for the Edge Area as soon as possible.

Changes to the Edge Area

On 1 January 2018 the Edge Area boundary was expanded westwards to absorb the former High Risk Area (HRA) parts of the five previously split counties. Cheshire, Derbyshire, Warwickshire, Oxfordshire, and East Sussex all moved fully into the Edge Area.

Furthermore, the routine TB testing frequency of herds in the counties in the west of the Edge Area adjoining the HRA (or parts thereof) was increased from annual to six-monthly. The respective descriptive TB epidemiology reports for those five counties of the Edge Area will focus on the whole county and key differences between the old and new parts will be highlighted where relevant.

The changes of January 2018 to the Edge Area boundary did not affect the county of Berkshire. However, at that time Defra introduced radial skin testing of herds located within a 3km radius of a new OTF-W incident to enhance the cattle TB surveillance regime in parts of Berkshire and all the other parts of the Edge Area that remained on annual testing. At the same time, herds in the western part of Berkshire moved to six-monthly surveillance testing.

Since May 2019, cattle herds in the six-monthly parts of the Edge Area that meet certain criteria are eligible to return to annual surveillance testing (earned recognition). These criteria are either:

- 1) the herd has been in existence for at least six years and has not had a TB incident in that six year period
or
- 2) the herd is registered to a bovine TB health scheme accredited under the Cattle Health Certification Standards (CHeCS) at level one or above

Changes due to COVID-19

During 2020, public health measures adopted by the government to contain the COVID-19 outbreak impacted the ability to carry out some TB testing due to social distancing and self-isolation guidelines, affecting both veterinarians and farmers.

In particular, from 23 March 2020, routine or targeted TB skin tests were not mandatory for cattle under 180 days old where, in the official veterinarian's judgement, the young stock could not be tested safely in line with social distancing guidelines. The temporary amendment allowing calves under 180 days old to be excluded from TB testing did not apply to short interval tests in TB incident herds (required to restore a herds OTF status) or pre- and post-movement testing.

Routine TB skin tests are required within a pre-defined window of time to maintain a herds OTF status. From 23 March 2020, for tests that were allocated until 30 June 2020, the Animal and Plant Health Agency (APHA) permitted an extension to the TB skin testing windows on a case by case basis, where testing had not been completed due to valid reasons associated with COVID-19. The testing window for short interval tests was also extended by up to 30 days, where tests were unable to be completed due to COVID-19.

Furthermore, on-farm epidemiological assessments carried out to establish the route of infection for a TB incident herd were carried out remotely, by telephone, for the majority of 2020.

Cattle industry

Herd types

Berkshire is one of the smallest Edge Area counties in size and cattle population. The number of registered herds continued to fall, from 220 in 2019 to 218 in 2020.

The majority of herds in 2020 were between 1 to 50 cattle (57%), with only 10% of herds with more than 200 cattle (Figure 1). The highest herd density was in the south and west of the county along the borders with Hampshire and Wiltshire.

Husbandry and feeding practices within Berkshire are very diverse and specific to the size and type of cattle unit. The majority of herds are winter housed (approximately October to April) and summer grazing on rented land is not uncommon.

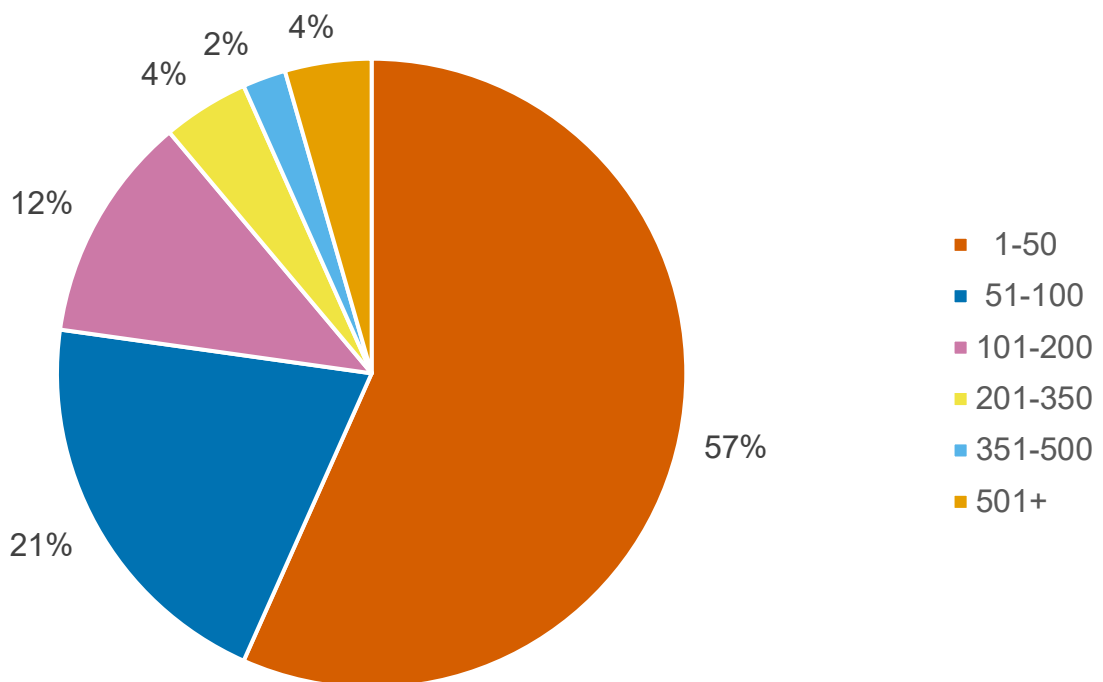


Figure 1: Proportion of cattle holdings in Berkshire, by herd size in 2020 (n=180). Note herds with an undetermined size are not shown.

Markets and abattoirs

Berkshire had no approved markets or abattoirs in 2020. Markets close to Berkshire are Salisbury market in the neighbouring HRA county of Wiltshire, and Thame market in Oxfordshire (Edge Area).

Approved Finishing Units

There were two Approved Finishing Units (AFUs) and no pre-movement testing Exempt Finishing Units (EFUs) in Berkshire in 2020.

Common land

There are two commons in Berkshire that are grazed by cattle. Hungerford common operates a system of graziers who purchase a single batch of stores to graze the main common and commoners who graze geographically and epidemiological separate parcels of the common with their own stock.

Greenham common has seven commoners who exercise their rights to graze. The cattle are run as one herd on the common, but a number of commoners do have fenced pasture and/or buildings at their home premises. The herd is self-maintaining with only occasional purchase of breeding bulls.

Descriptive epidemiology of TB

Temporal TB trends

Three analytical measures are used to describe the level of TB infection in these reports.

1. The number of new herd incidents that were disclosed in each year (Figure 2).
2. The annual herd incidence rate, reported as the number of new incidents per 100 herd-years at risk (100 HYR) (Figure 3). This is the number of new TB incidents detected in the year, divided by the time those herds were at risk of contracting TB. The 100 HYR incidence rate is used in this report as it accounts for different intervals between herd tests that other incidence measures do not (such as new TB incidents per number of herds or tests).
3. The annual end of year herd prevalence (Figure 4). This is the number of herds under restriction due to a TB incident, divided by the number of active herds at the same point in time. Prevalence provides a snapshot of the burden of TB on the local cattle industry.

All three measures include Officially Tuberculosis Free Status Withdrawn (OTF-W) incidents, and Officially Tuberculosis Free Status Suspended (OTF-S) incidents.

OTF-W incidents are those in which at least one animal was identified with typical lesions of TB at post-mortem (PM) inspection, and/or positive for *M. bovis* on culture from tissue samples.

OTF-S incidents are those with one or more reactors to the Single Intradermal Comparative Cervical Tuberculin (SICCT) skin test, but without full confirmation of *M. bovis* infection by PM inspection or bacterial culture.

TB incidents in non-grazing AFUs are not included in the prevalence and incidence calculations (excluding Figure 5) in this report due to the limited epidemiological impact of these cases.

Furthermore, herds restricted because of an overdue test rather than a TB incident are also excluded from calculations. Hence measures of incidence and prevalence in this report may be lower than those reported in the official TB statistics.

There were a total of 16 new TB incidents in Berkshire in 2020 (Figure 2). This represents a large reduction from 2019 (25). The decrease in OTF-S incidents from 11 in 2019 to five in 2020 was greater than that of OTF-W incidents (14 in 2019 to 11 in 2020).

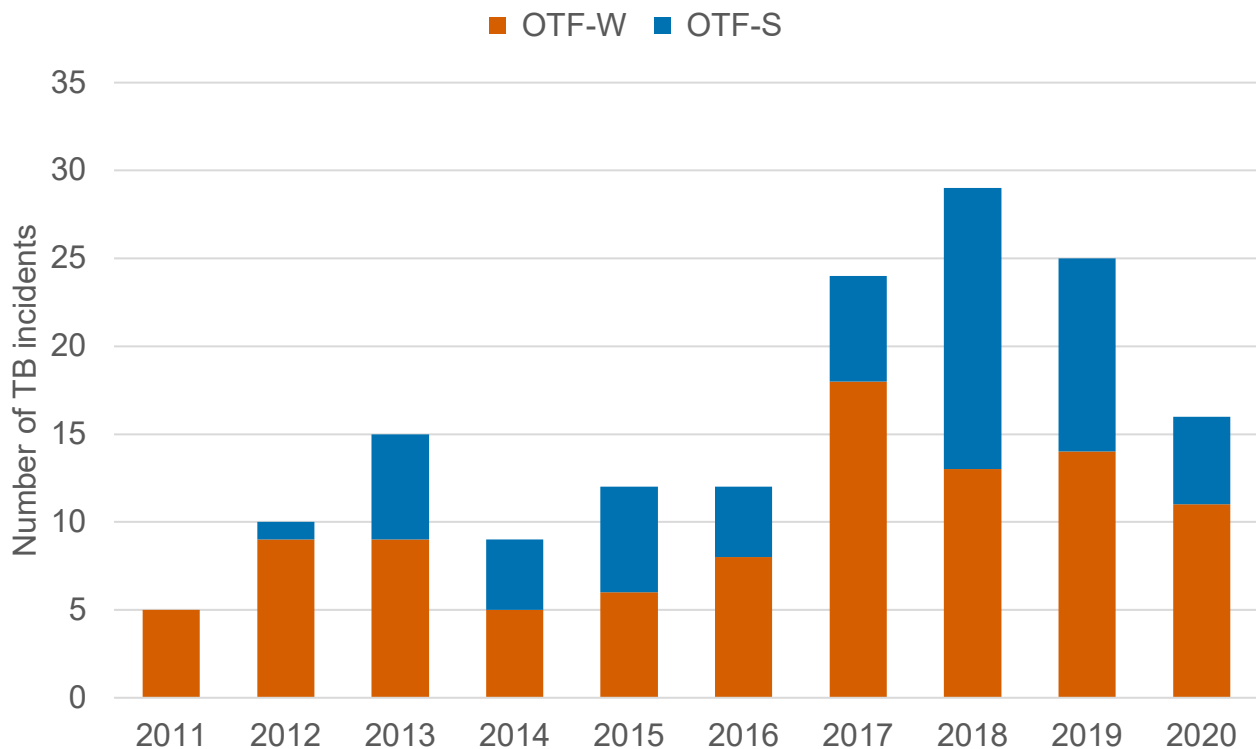


Figure 2: Annual number of new TB incidents in Berkshire, from 2011 to 2020.

This is probably explained by OTF-W incidents being more likely to be located in endemic areas than OTF-S incidents ([Downs et al., 2021](#)) and the apparent stability of the endemic area and less likely to be influenced by factors such as cattle purchasing behaviour and herd incidence in areas where cattle are purchased from.

Incidence reduced from 16.5 incidents per 100 herd-years at risk in 2019 to 10.6 in 2020 (Figure 3). This followed a period of increase since 2014 (3.2).

The prevalence rate reduced to 6.9% in 2020 from 9.2% in 2019 (Figure 4). Prevalence is the lowest since 2016. This can be explained by a reduction in incidence rate and a reduced duration of incidents.

Although incidence has fallen in the last year there is still a long way to reach OTF status in this county especially considering that the number of indigenous OTF-W incidents has changed much less from nine in 2019 to eight in 2020 (OTF status considered when crude incidence of indigenous OTF-W herd incidents less than 0.1%).

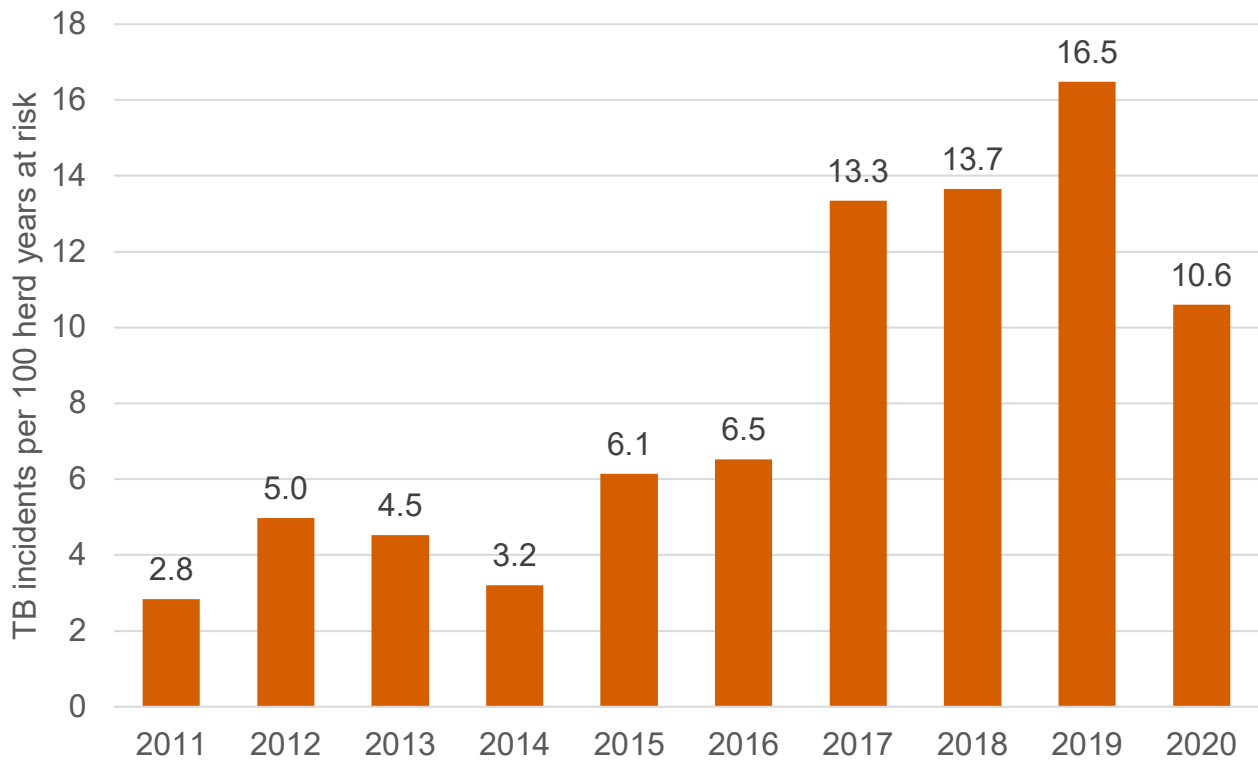


Figure 3: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Berkshire, from 2011 to 2020.

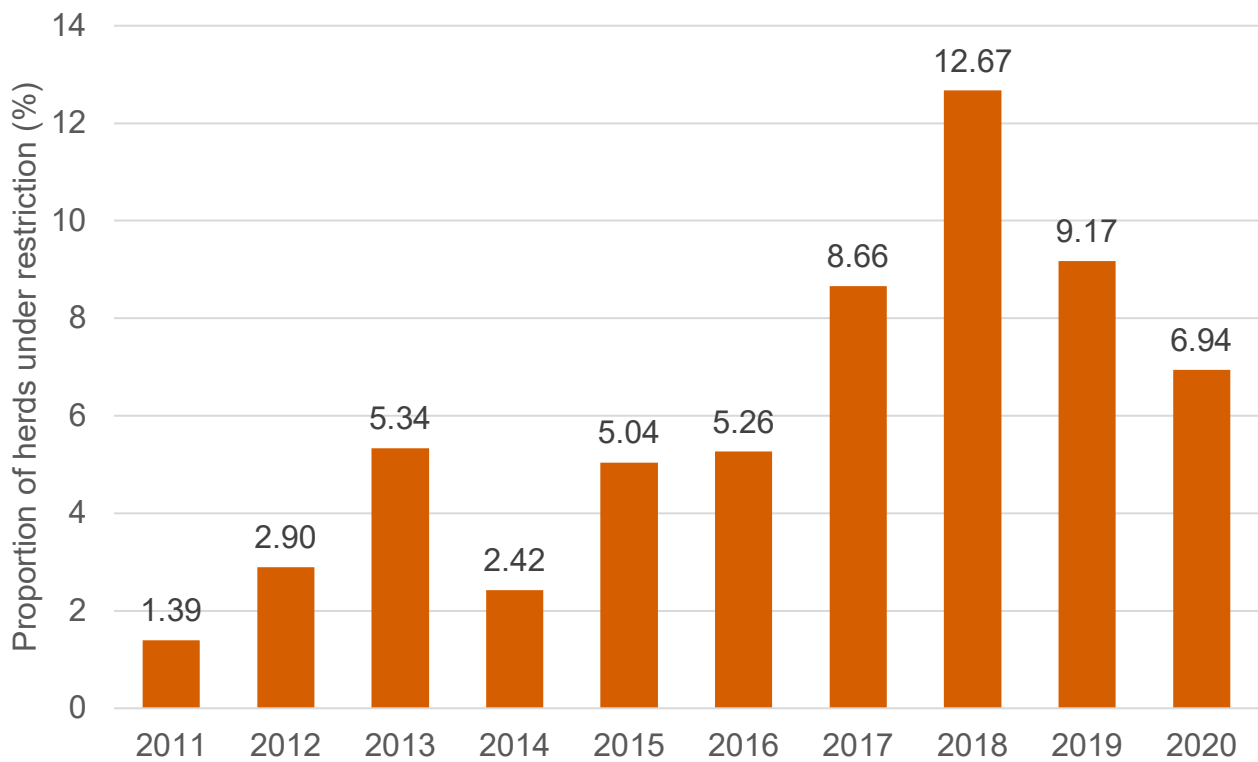


Figure 4: Annual end of year prevalence in Berkshire, from 2011 to 2020.

Geographical distribution of TB incidents

In 2020 Berkshire had a TB incidence rate of 10.6 incidents per 100 herd-years at risk. This was lower than its northern and western neighbours: Oxfordshire (19.4, Edge Area) and Wiltshire (18.8, HRA) as shown in Figure 5, but much higher than the Edge Area counties to the north-east and south of Berkshire: Buckinghamshire (5.4) and Hampshire (5.2).

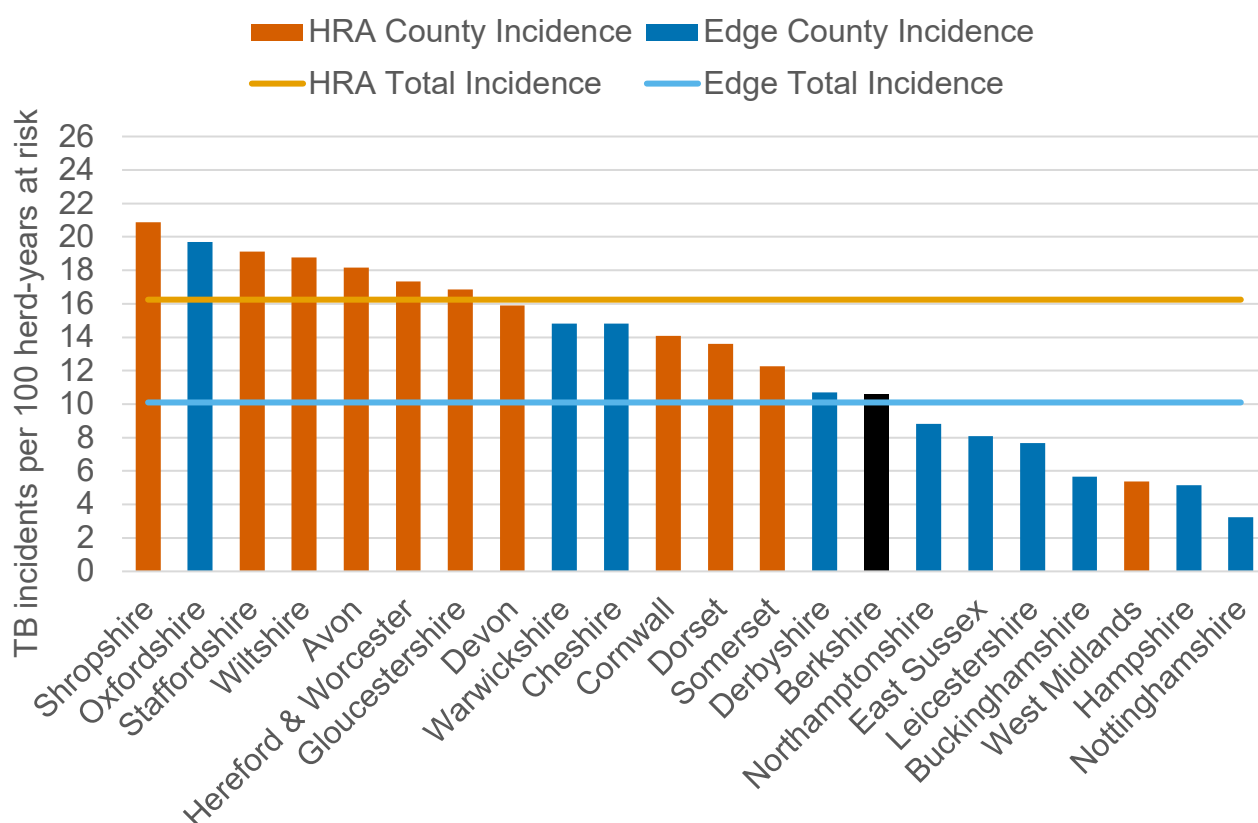


Figure 5: Incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S including finishing units) in 2020, by HRA and Edge Area county, highlighting the county of Berkshire.

New TB incidents in Berkshire in 2020 were distributed across the western half of the county, mostly within the zones of higher cattle density (Figure 6). This largely corresponds with the six-monthly surveillance testing half of the county. In the eastern half of the county (annual surveillance testing, lower cattle density), there was only one new OTF-S incident in 2020. Cattle population density corresponds to cattle holding density, with more holdings situated towards the centre of the county.

The majority of OTF-S incidents in Berkshire during 2020 were attributed to movements of undetected infected cattle, whereas most of the OTF-W incidents were attributed to non-introduced sources.

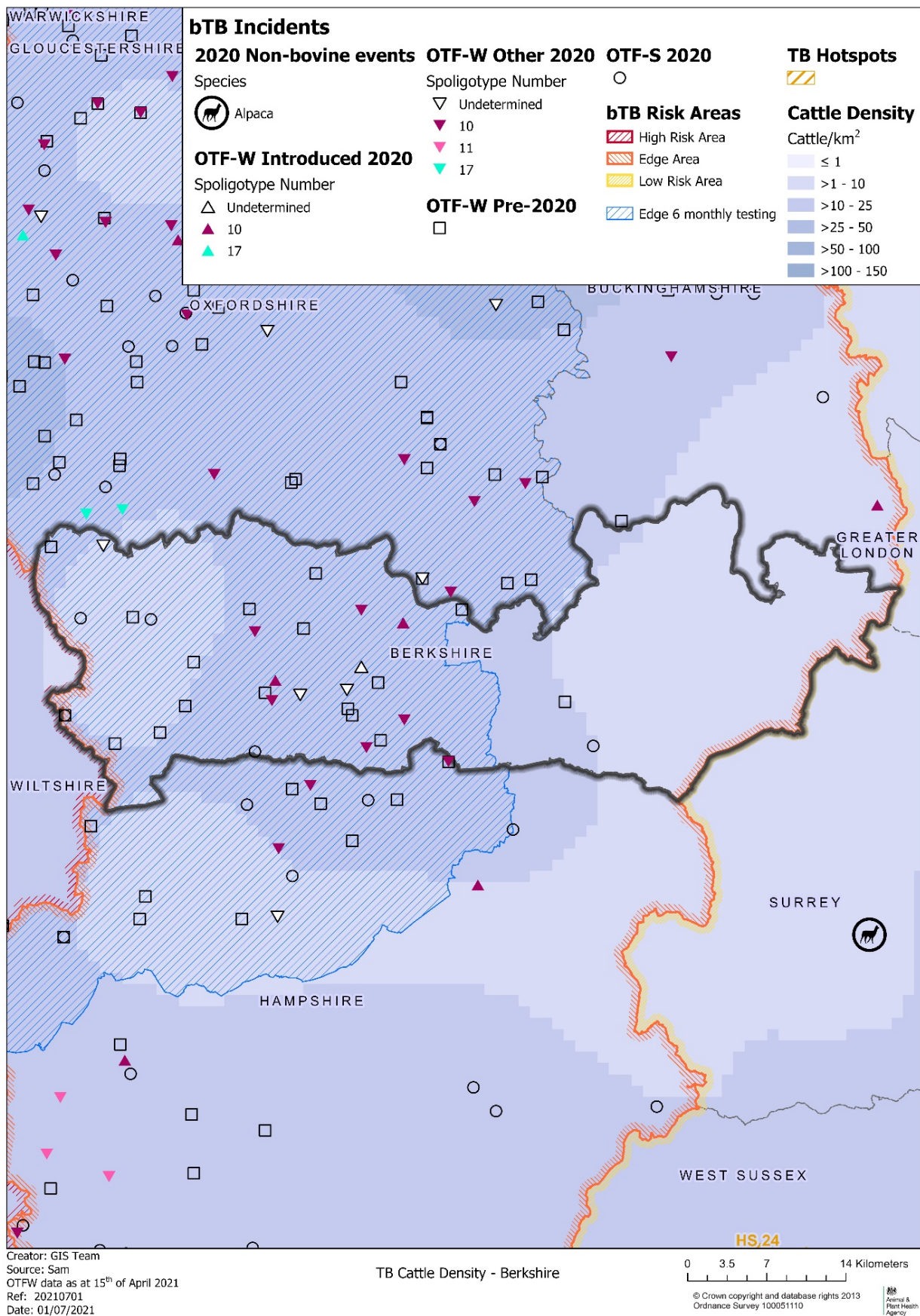


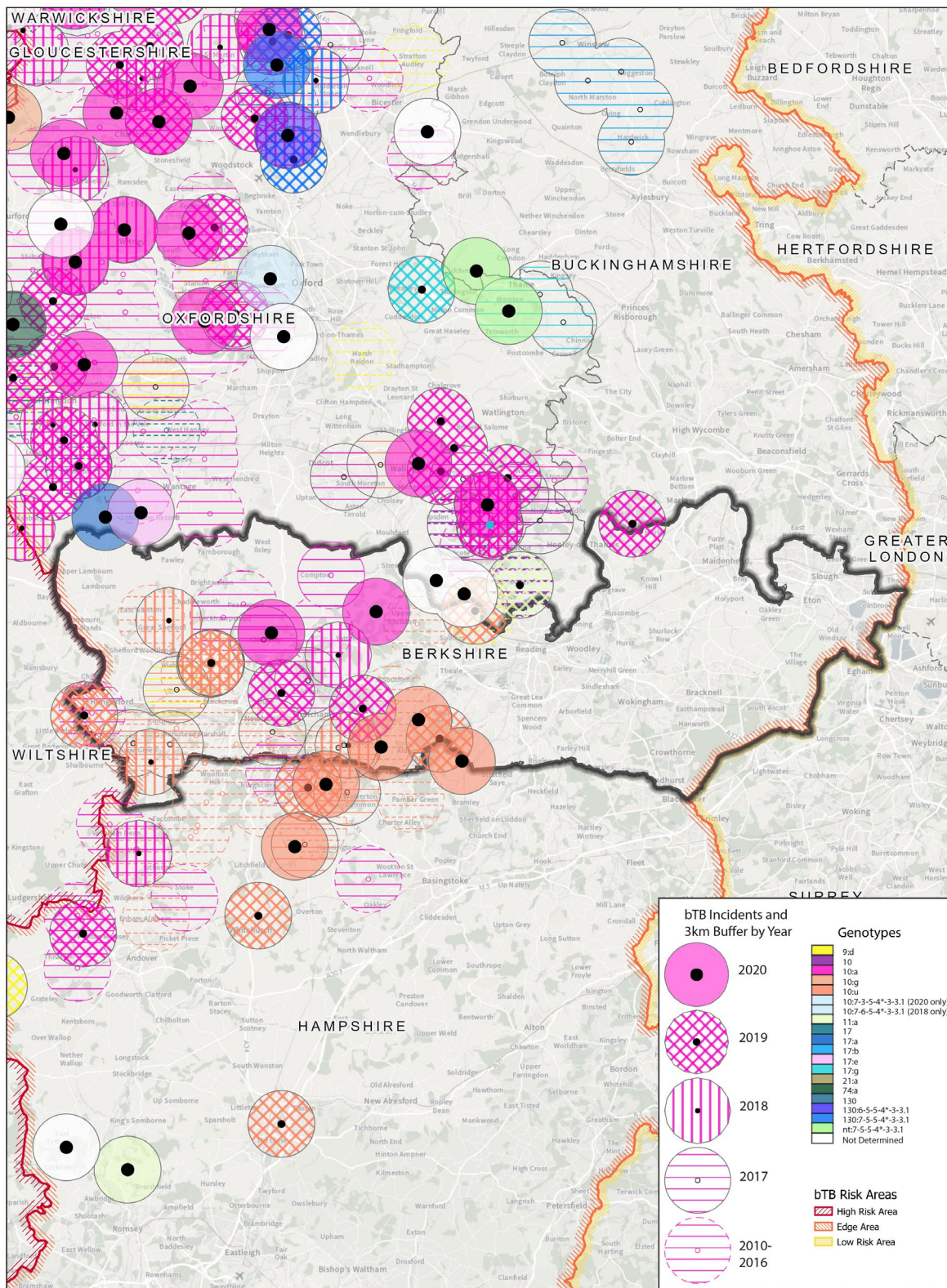
Figure 6: Location of cattle holdings in Berkshire with new TB incidents (OTF-W and OTF-S) in 2020, and cattle holdings with pre-2020 OTF-W incidents still ongoing at the beginning of 2020, overlaid on a cattle density map. Note 'OTF-W Introduced 2020' refers to OTF-W incidents in which cattle movements were the most likely source of infection

M. bovis genotypes identified in western Berkshire during 2020 did not change, as expected in an area with a probable local reservoir of *M. bovis* (Figure 7). Genotype 10:a and 10:u were first disclosed in Berkshire in 2010 and have been present and spreading in the intervening years.

Genotype 10:a was present prior to 2010 in the area of Wiltshire bordering Berkshire, suggesting spread from the west, possibly via north-west Hampshire. Genotypes 10:a and 10:u were the only two genotypes found in western Berkshire during 2020. This suggests local sources of infection, which could include: residual infection in cattle herds, purchase of undetected infected stock (from 10:a or 10:u homerange), or wildlife infection.

Genotype 10:u continued to be identified from incidents in central Berkshire during 2020, near to the Hampshire border, forming a cluster in the Aldermaston area. Genotype 10:a continued to be identified in disparate locations throughout the western endemic area of Berkshire. A cluster of TB incidents has developed around the Thatcham area over the past three years.

There is a risk of introducing out of homerange *M. bovis* genotypes via beef fattener units sourcing stock from HRA markets. However, in the TB incidents disclosed on beef fattening premises in Berkshire in 2020, only the two local genotypes 10:a and 10:u were identified. This suggests that wildlife, residual cattle infection, or local purchase of cattle were the likely sources of the majority of TB incidents.



Creator: GIS Team
 Source: Sam
 OTFW data as at 15th of April 2021
 Ref: 20210929
 Date: 29/09/2021

Berkshire Endemic bTB Incidents

0 3.75 7.5 15 Kilometers

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 Ordnance Survey 100051110



Figure 7: Selected genotypes of *M. bovis* detected in Berkshire between 2010 and 2020, as an indication of a local *M. bovis* reservoir in wildlife. From 2018 onwards genotypes are displayed where combined residual and wildlife sources were attributed with a 75% certainty or above according to the DRF calculation. One 2019 incident was deselected from this criteria. Prior to 2018, genotypes were selected by veterinary judgement where the chance of a wildlife source was judged to be high. Only OTFW incidents are displayed.

Other characteristics of TB incidents

Incidents by herd type

As shown in Figure 8, in Berkshire during 2020, 44% of TB incidents were disclosed in beef suckler herds (7 out of 16) - a smaller proportion compared to 2019 - 60% (15 out of 25). In 2020, beef fattener herds disclosed a higher proportion of new TB incidents than dairy herds (37% and 18%, respectively).

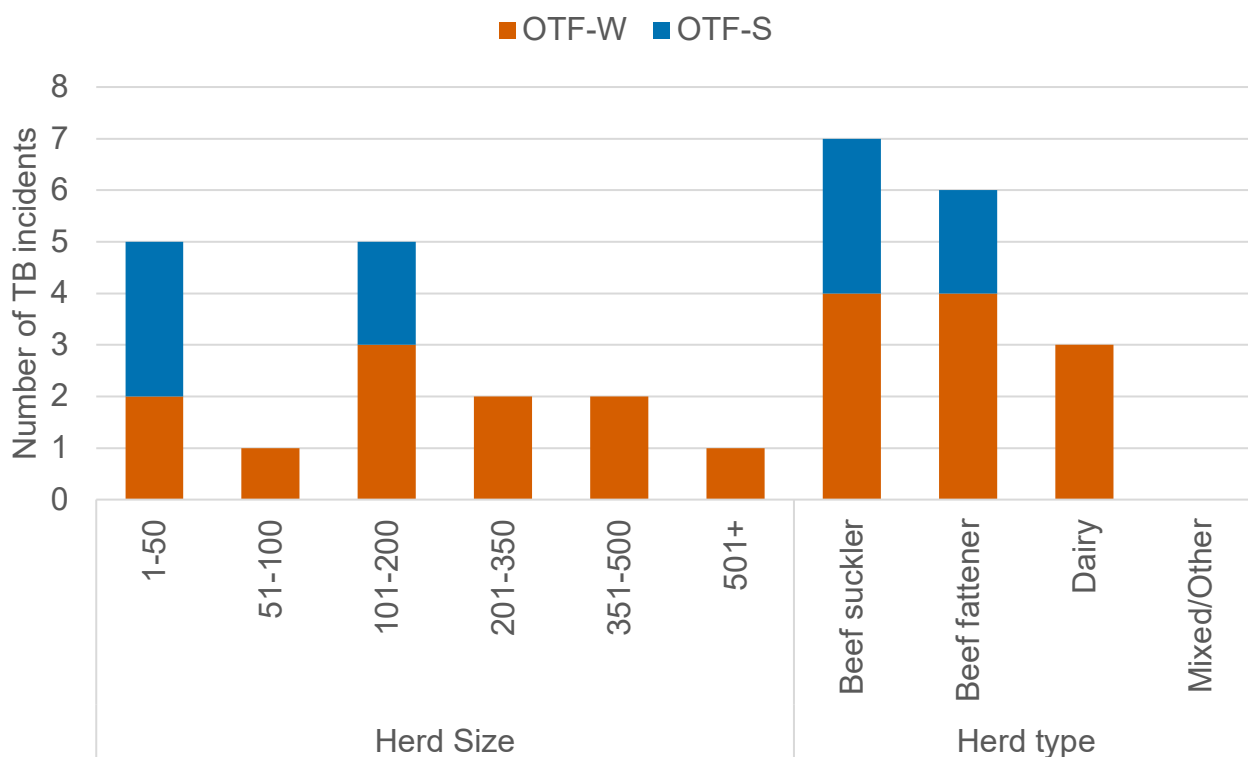


Figure 8: Number of TB incidents (OTF-W and OTF-S) in Berkshire in 2020, by cattle herd size and type.

There was a correlation with herd size, with 63% of incidents in herds larger than 100 (Figure 8), when 78% of herds contained 100 or less cattle (see Figure 1).

The impact of TB movement restrictions on farms vary according to their cattle management systems. For dairy herds, the issue is often finding an outlet for rearing calves which would normally be sent to market.

Those who usually sell stores rather than finished fat cattle are limited in where these cattle can be sold (usually with less of a return) or are forced to change business practices and continue rearing them.

Beef finishers can sell direct to slaughter but have to apply for licences to buy in replacement stock.

Incidents by month of disclosure

There was clear seasonality peak in the disclosure of new TB incidents in Berkshire, with most (6 out of 16) disclosed in November (Figure 9) which was not associated with timing of testing (Figure 10).

This may be associated with detection during the housing period of cattle that acquired infection during summer grazing when exposed to infection from wildlife at pasture.

The COVID-19 pandemic did not appear to have impacted on the number of skin tests performed in 2020 when compared to 2019.

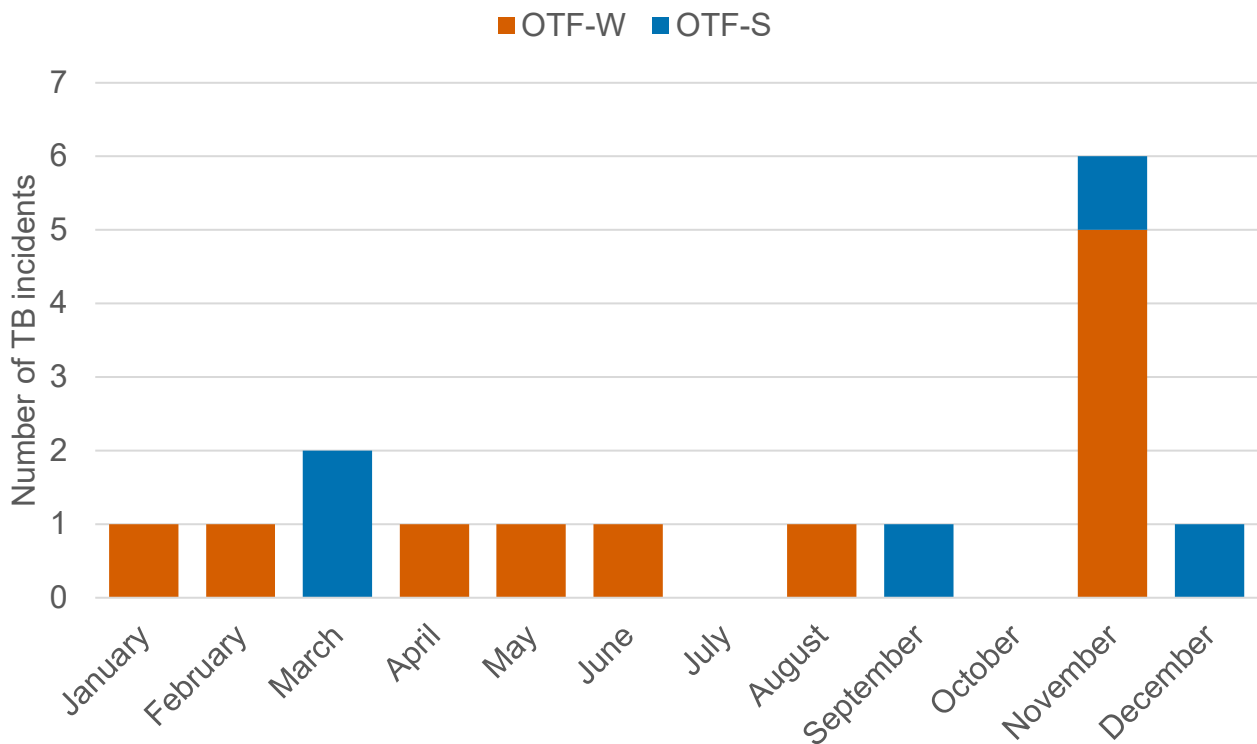


Figure 9: Number of TB incidents (OTF-W and OTF-S) in Berkshire in 2020, by month of disclosure.

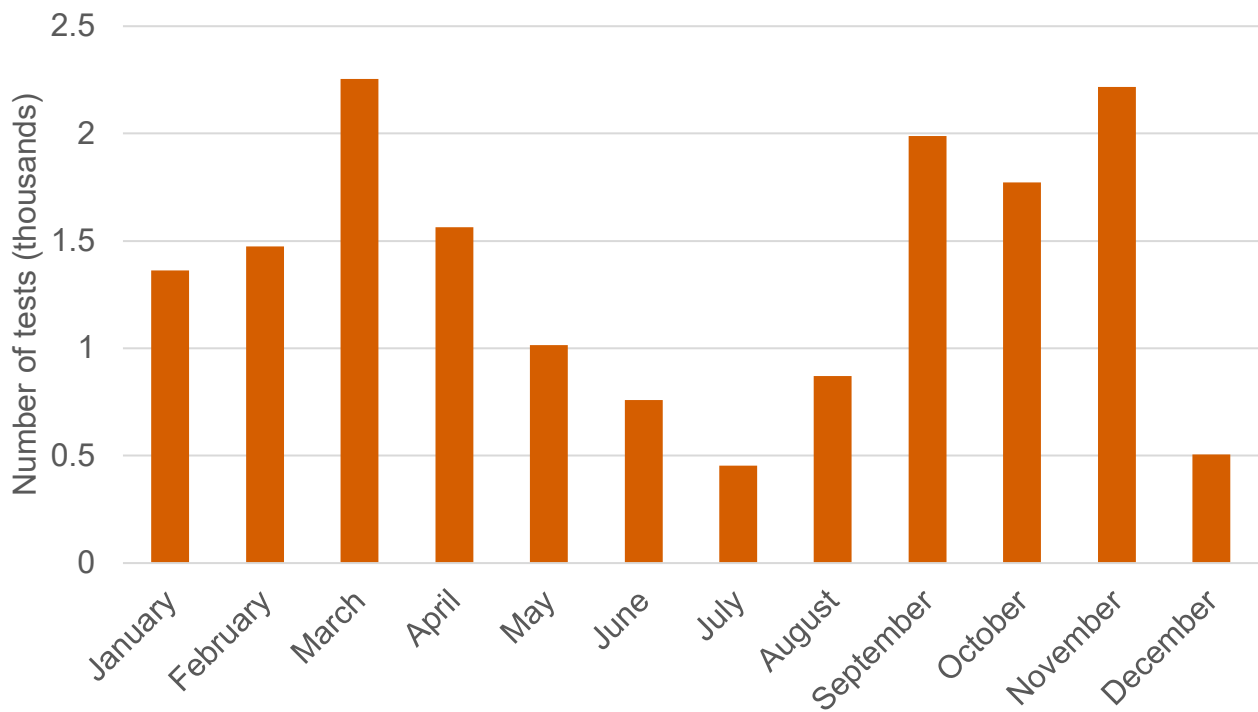


Figure 10: Number of tests undertaken in OTF herds in Berkshire in 2020, by month.

Duration of incidents

Incidents have tended to last over 151 days duration (Figure 11). Four ongoing incidents have remained persistent (longer than 18 months) in 2020, two incidents started in 2012 and two started in 2013.

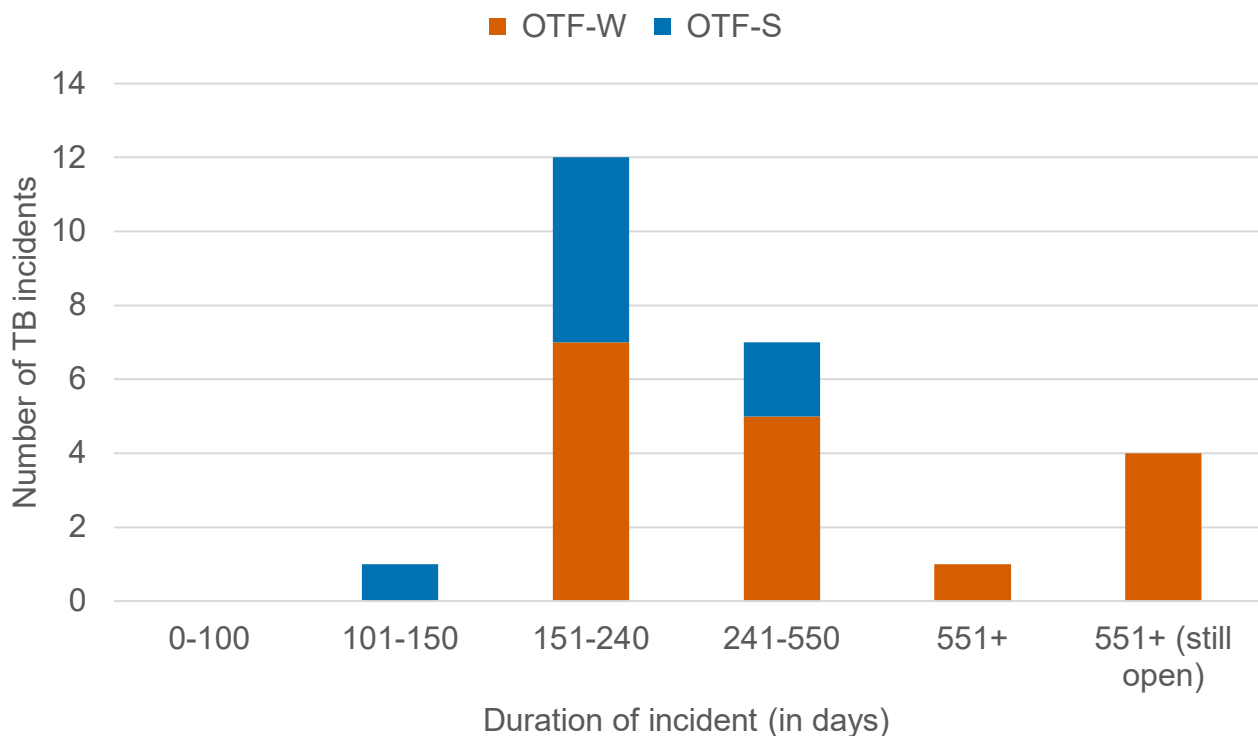


Figure 11: Duration of all TB incidents (OTF-W and OTF-S) that ended in 2020, and the number of persistent TB incidents (551+ days) that were unresolved at the end of 2020 in Berkshire. Note that Approved Finishing Units (AFUs) have been excluded.

Genotypes associated with TB incidents

Genotyping of *M. bovis* isolates has been used to trace the origin of TB infection. It is particularly useful in identifying where spread has occurred through cattle movements. Stable genotype clusters tend to be found in areas where there is a persistent local reservoir of infection.

APHA implemented whole genome sequencing (WGS) in place of genotyping from April 2021. During 2020 however, genotyping was still performed on *M. bovis* samples isolated from all OTF-W herds in the Edge Area.

Incidents confirmed in Berkshire in 2020 were of 10:a and 10:u *M. bovis* genotypes (Figure 12). Berkshire is considered to be part of the homerange of genotypes 10:a and 10:u, so it is not surprising that these are the genotypes most commonly found in the county.

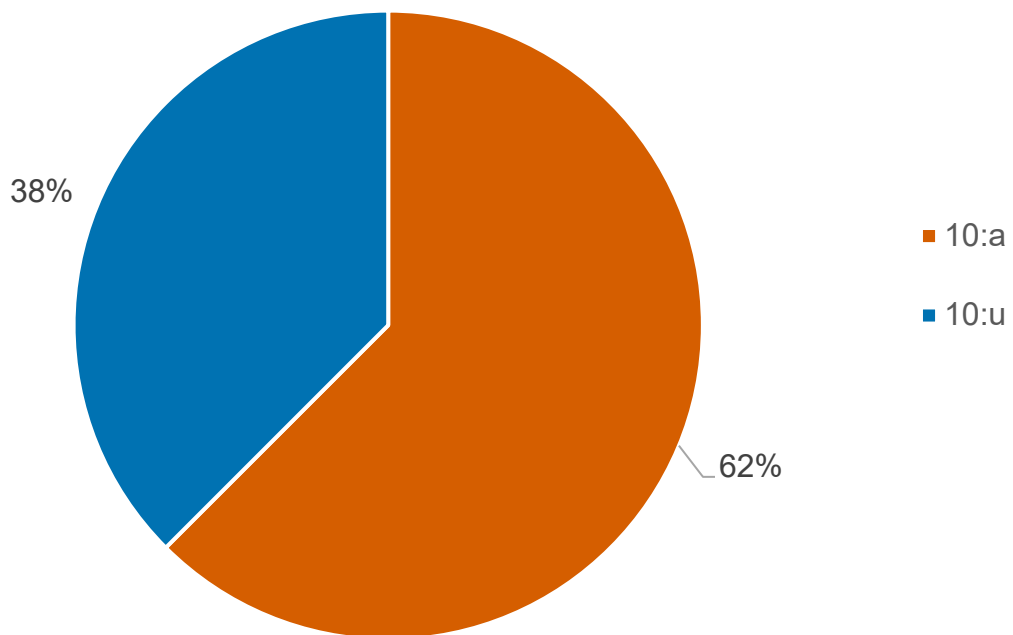


Figure 12: Genotypes of *M. bovis* identified in herds with OTF-W incidents in Berkshire that began in 2020 (n=8).

Unusual TB incidents

There were four persistent herds that had been under restrictions for longer than 551 days (18 months). All four were dairy herds. Two of these were large dairy herds, with incidents commencing in 2012 and 2013.

Both these farms were selected for wildlife surveillance in 2018 and useful information was imparted to the farmers to assist in reducing cattle-badger interactions such as exclusion measures in cattle housing and feed stores.

However, the incidents had still not resolved by the end of 2020, indicating the difficulty in implementing biosecurity measures that are totally effective on premises with a large number of animals spread over a number of sites and multiple grazing areas.

Suspected sources, risk pathways and key drivers for TB infection

Key drivers of infection

The key drivers of the TB epidemic in Berkshire during 2020 were as follows:

- Probable infected local wildlife.
- Purchase of undetected infected cattle.
- Residual infection from previous incidents.

Infected wildlife was a source attribution in 57% of weighted risk pathways for OTF-W incidents in Berkshire in 2020. The *M. bovis* genotype 10:a and 10:u incidents were all in the six-monthly surveillance testing area (western) of Berkshire where a local reservoir of infection in wildlife and cattle is considered to be present.

Improvements in on-farm biosecurity to reduce wildlife to cattle transmission are needed to break the cycle of infection. Additionally, control measures to reduce transmission from badgers through vaccination and/or culling could be advantageous.

Sources of infection and risk pathways

It can be challenging to retrospectively establish the route of infection for a TB incident herd. APHA aims to complete an epidemiological assessment for all TB incidents in the Edge Area (both OTF-W and OTF-S).

This includes a thorough on-farm investigation and scrutiny of routinely collected data, such as, cattle movement records, and the results of molecular analyses where available. This information is captured on the Disease Report Form (DRF).

During the assessment up to three risk pathways of infection are selected for each herd. Each risk pathway is given a score that reflects the likelihood of that pathway bringing TB into the herd.

The score is recorded as either definite (score 8), most likely (score 6), likely (score 4) or possible (score 1). Risk pathway data are explored both at the herd and county level.

The most likely source of infection in individual TB incidents

The most likely source identified by the APHA veterinary assessment is explored spatially for individual TB incidents. The most likely source of infection for individual TB incidents discounts additional risk pathways identified with a lower level of certainty.

Where two sources were ranked equally as the most likely source for an incident, both sources are reported for the incident using a split symbol in the map.

In Berkshire in 2020, only one OTF-W and four OTF-S incidents were most likely attributed to purchase of undetected infected cattle, compared to four OTF-W incidents where the most likely source was attributed to infected wildlife.

Incidents attributed to infected wildlife were spread throughout west Berkshire in the six-monthly surveillance testing part of the county and included a new cluster in the Aldermaston area close to the border with Hampshire (Figure 13).

The absence of *M. bovis* genotypes in 2020 out of their homerange may reflect a change in farmer behaviour to purchasing cattle from lower TB risk herds with no recent history of TB, or as an impact of the COVID-19 pandemic where farmers sourced cattle more locally.

This compares with three incidents in 2018 with *M. bovis* genotypes out of their homerange and one in 2019.

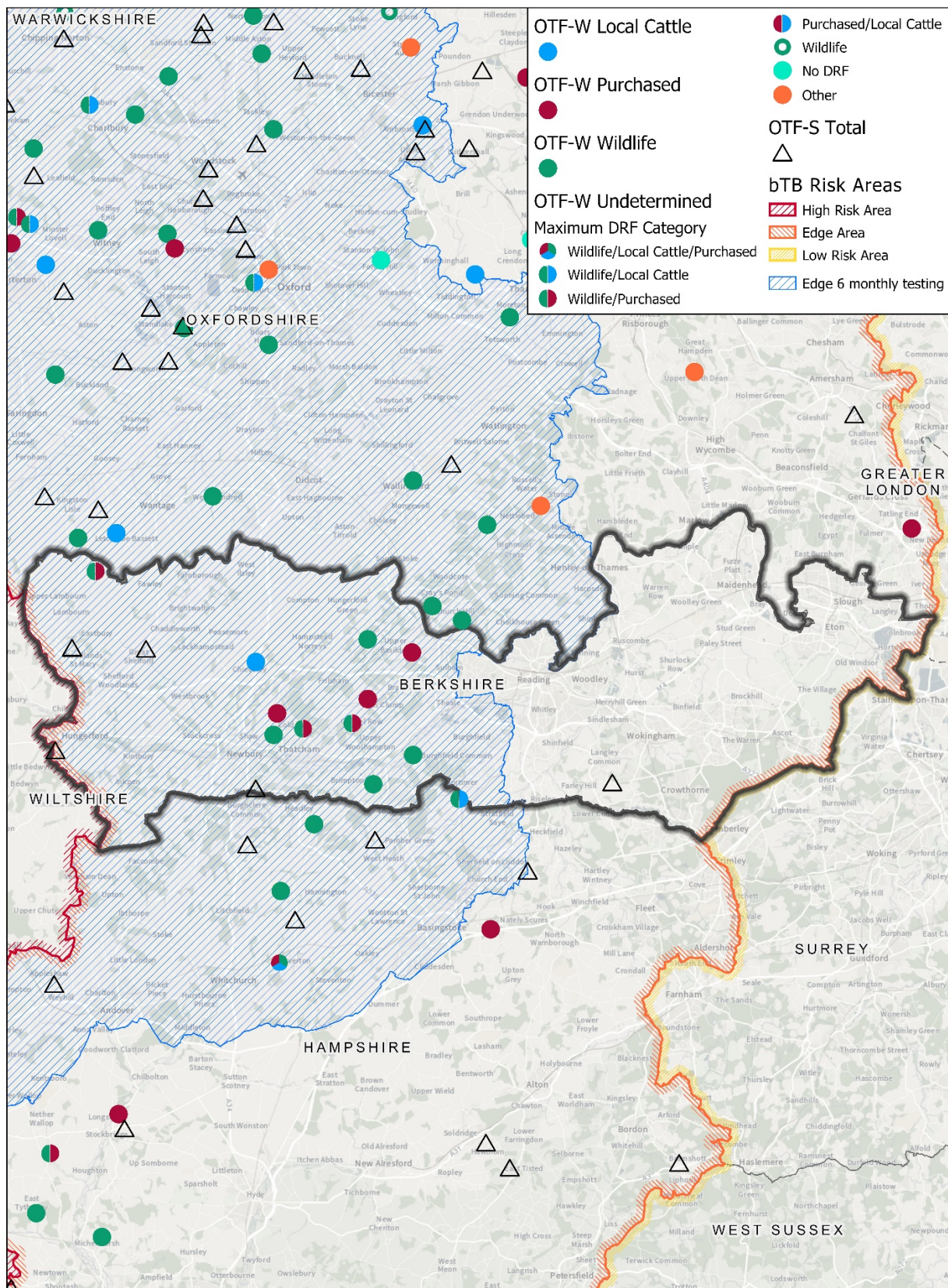


Figure 13: Map of the source of infection pathway recorded with the highest level of certainty, for all TB incidents (OTF-W and OTF-S) in Berkshire which started in 2020. Where none of the sources of infection were identified with greater than 50% certainty, the highest ranking source is displayed with an OTF-W undetermined 'maximum DRF category' symbol.

The weighted source of infection at county level

To consider the contribution of all sources of infection within an area, the source(s) for each incident are weighted by the certainty ascribed. Any combination of definite, most likely, likely, or possible sources can contribute towards the overall picture for possible routes of introduction into a herd.

If the overall score for a herd is less than six, then the score is made up to six using the 'Other/Unknown Source' option. Buffering up to six in this way helps to reflect the uncertainty in assessments where only 'likely' or 'possible' sources are identified.

The weight of infection outputs in Appendix 4 are produced by combining the data from multiple herds. This presents the overall proportion of pathways in which each source was identified, weighted by the level of certainty each source caused the introduction of TB. The outputs do not show the proportion of herds where each pathway was identified (this is skewed by the certainty calculation).

Genotyping of *M. bovis* isolates can be a powerful tool in identifying a likely source of infection, however genotypes are not determined for OTF-S herds. The inclusion of OTF-S herds in these calculations increase the uncertainty in the outputs. As a result, the relative proportions of each risk pathway is very approximate and only broad generalisations should be made from these data. A more detailed description of this methodology is provided in the [Explanatory Supplement](#).

Approximately 70% of the weighted risk pathways for OTF-W incidents in Berkshire that started in 2020 were attributed to wildlife or residual infection with only 30% due to cattle movements (Figure 14a), reflecting probable existence of a local reservoir of *M. bovis* infection in western Berkshire.

The same comparison for OTF-S incidents in 2020 (Figure 14b) showed a similar picture with 36% of weighted risk pathways to cattle movement and 48% attributed to wildlife sources or residual infection.

There was a lower uncertainty in weighted risk pathways for OTF-W incidents compared to many other Edge Area counties, probably because of the likely presence of an infection reservoir in wildlife in Berkshire, which is supported by culture confirmed incidents of *M. bovis* in a badger submitted privately for laboratory analysis in 2020 and a muntjac deer in 2018.

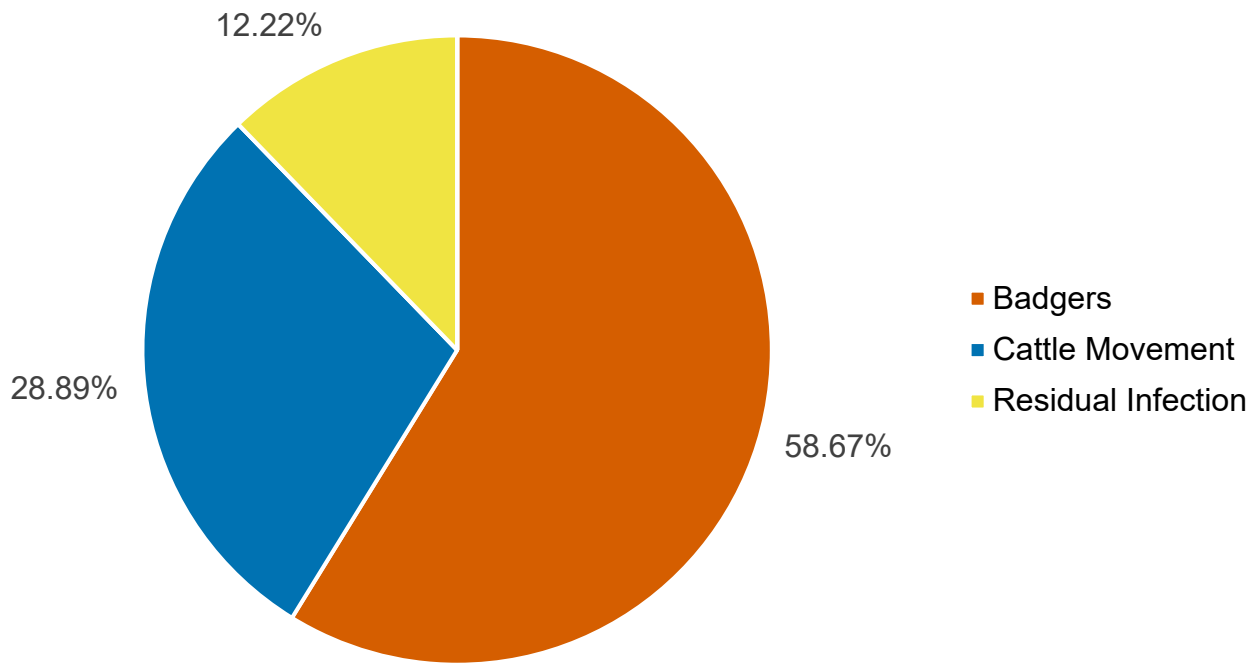


Figure 14a: Summary of the weighted source of infection pathways attributed for OTF-W TB incidents that started in 2020 in Berkshire, that had a completed DRF (n=9).

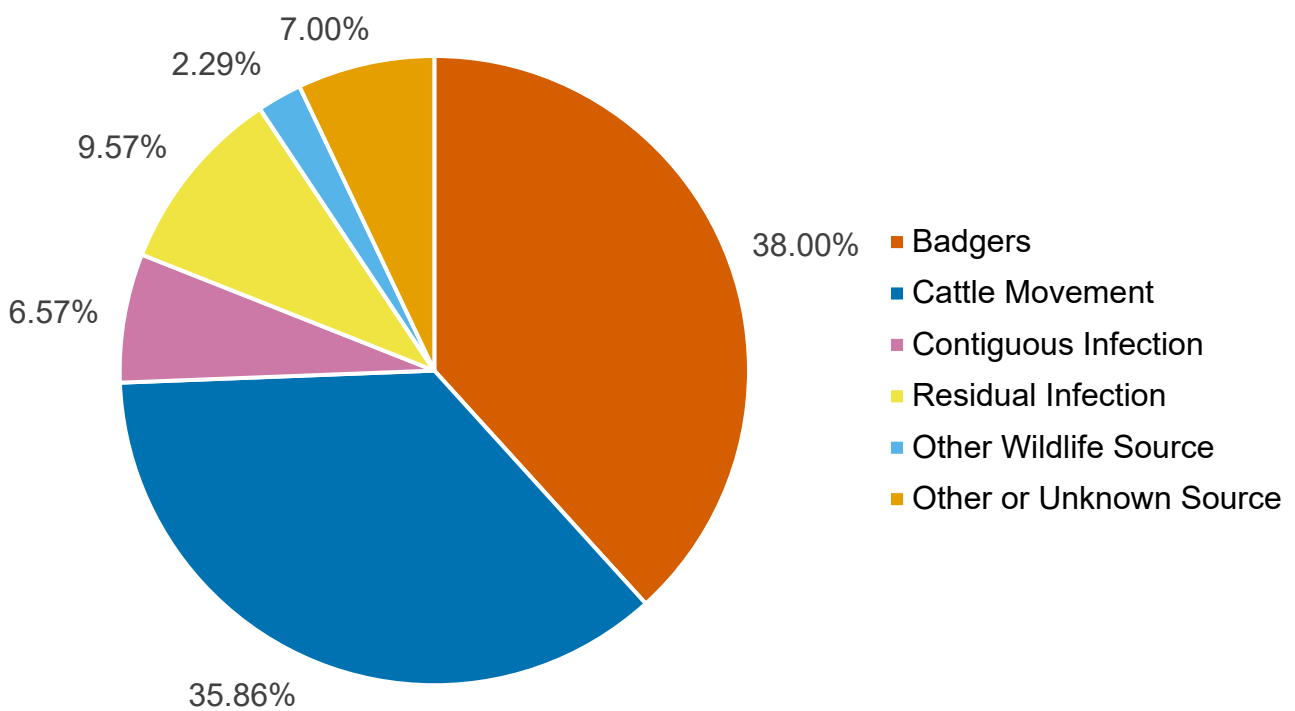


Figure 14b: Summary of the weighted source of infection pathways attributed for OTF-S TB incidents that started in 2020 in Berkshire, that had a completed DRF (n=7).

TB in other species

There is no statutory routine TB surveillance of live non-bovine species. Post mortem examination (PME) is performed on suspected clinical cases reported to APHA. Furthermore, post mortem meat inspection is carried out on all captive animals (for example sheep, goats, pigs or deer) slaughtered for human consumption.

A single isolation of *M. bovis* genotype 10:u was confirmed in a badger in the Newbury area. This genotype has a homerange in west Berkshire providing evidence of *M. bovis* infection in wildlife in this area. Whole Genome Sequence (WGS) analysis suggests that this badger *M. bovis* isolate was very closely related to 14 *M. bovis* samples isolated from cattle in the nearby geographical area. It was only two single nucleotide polymorphisms (SNPs) different to two samples isolated from cats in 2013 that formed part of a cluster of incidents in the Newbury area.

The majority of these *M. bovis* samples (cattle, badger, and cat) were located within a 10km radius. Five were in a wider radius of 20km. Such close genetic relatedness of *M. bovis* samples isolated from a variety of species in a relatively small geographical area where cattle movement was mostly eliminated as source pathways, is a strong indication of local spread, most likely mediated by infected wildlife.

Anecdotally, badger and deer populations are at an all-time high in Berkshire, offering a large potential wildlife reservoir of TB infection.

Detection of TB incidents

As shown in Figure 15, all new TB incidents in Berkshire during 2020 were disclosed by three surveillance methods: routine whole herd testing (WHT), six-month post-incident testing (6M) and slaughterhouse detection (SLH). Of these incidents, 63% (ten) were detected by whole herd test (WHT).

Post-incident six-month testing (6M) disclosed 18% of incidents. Although this is a small number of incidents, this may suggest an issue with recurrence in Berkshire. There were three SLH cases, one within an AFU, and the other two most likely introduced either through cattle movements or local wildlife.

As shown in Figure 16, 68% of incidents occurred in herds with a history of TB within the previous three years. It should be noted that in the six-monthly testing area of Berkshire, it was difficult to differentiate between recurrence due to residual infection in the cattle herd and potential re-infection by wildlife where the *M. bovis* genotype isolated from cattle was endemic to the locality and there was recent history of TB in the herd.

Figure 16 shows the number of new OTF-W and OTF-S incidents in 2020, that had experienced an OTF-W incident in the previous three years. It excludes new incidents that were also on restrictions in the first four or more months of 2020 due to an incident that started before 2020. The [Explanatory Supplement](#) (see section 4.3) provides more details on the reporting of recurrent TB incidents.

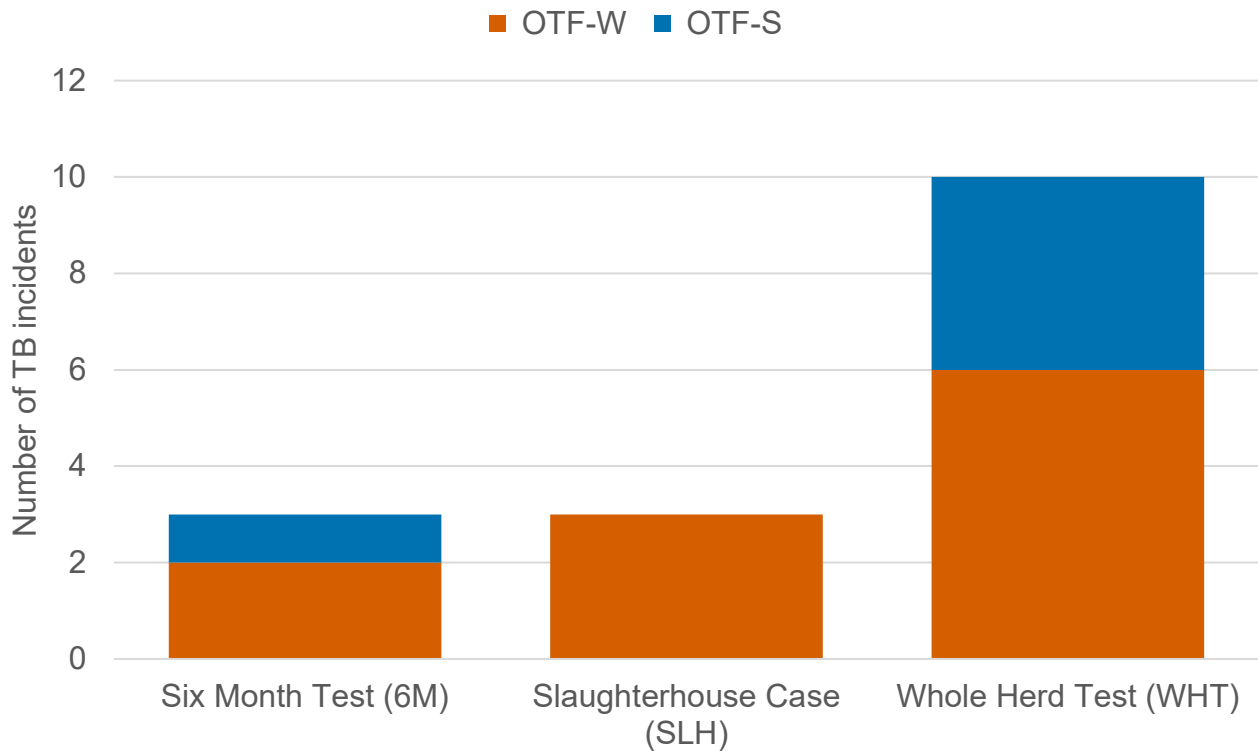


Figure 15: Number of TB incidents (OTF-W and OTF-S) in Berkshire in 2020, disclosed by different surveillance methods.

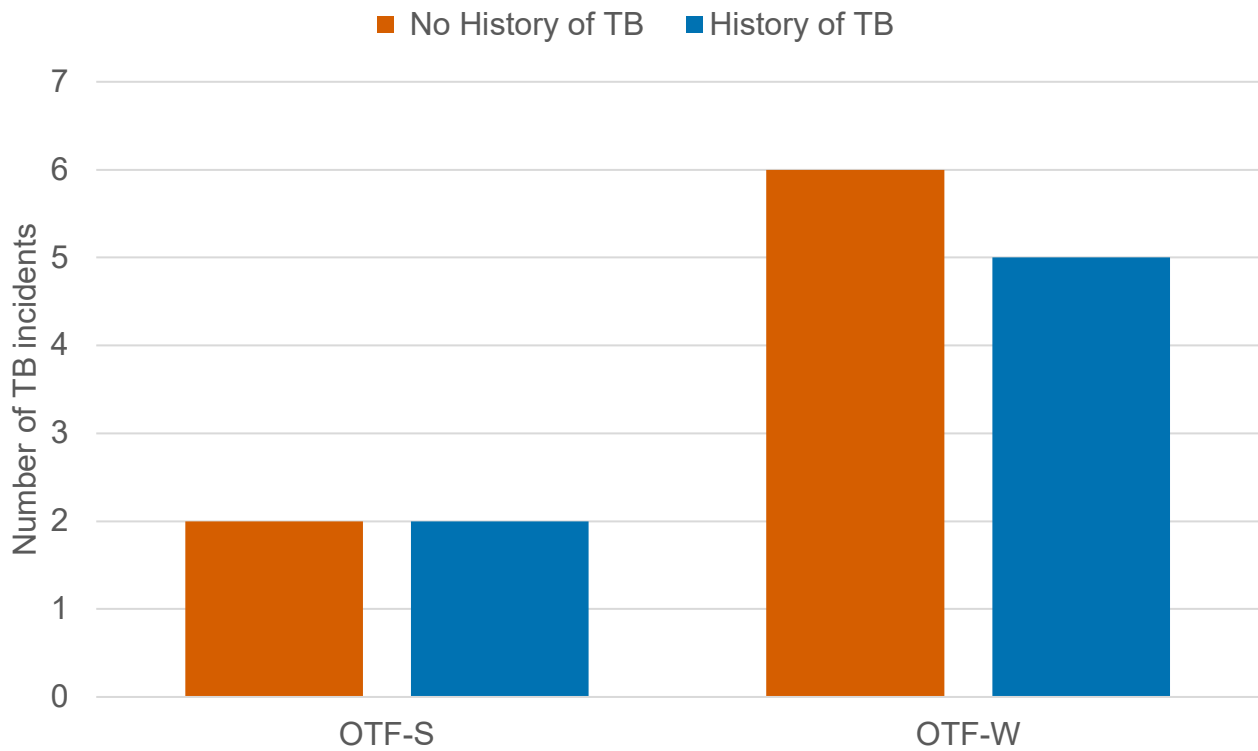


Figure 16: Number of herds with a TB incident (OTF-W and OTF-S) in Berkshire in 2020, with a history of TB (herds that experienced an OTF-W incident in the previous three years), and holdings without a history of TB in the previous three years.

Skin test reactors and interferon gamma test positive animals removed

The reduction in the number of cattle identified by skin test (107) or IFN- γ (80) during 2020(Figure 17), compared to the numbers disclosed in 2019 (145 and 157, respectively) correlated with the reduction of new TB incidents during 2020 in Berkshire (see Figure 2).

Using number of animals slaughtered for TB control as a proxy for relative costs to taxpayers, costs remained similar to 2019, but lower than 2016 and 2017.

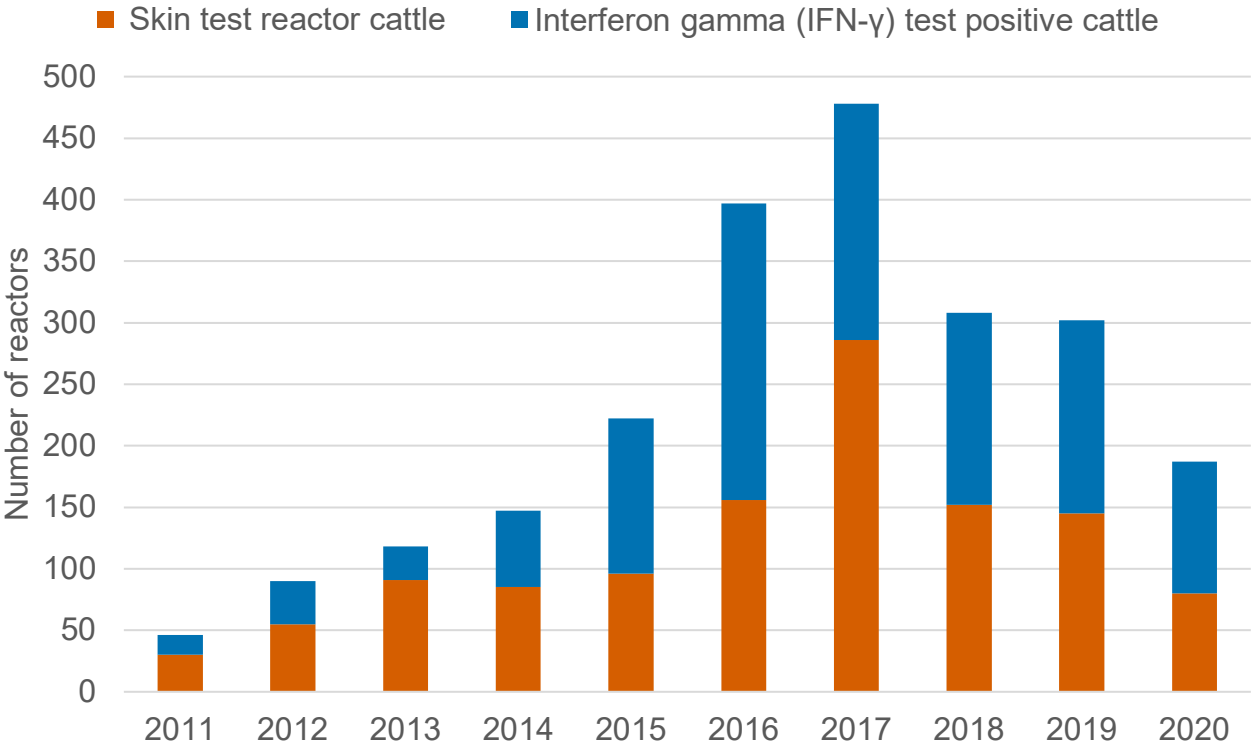


Figure 17: Number of skin test reactors and interferon gamma (IFN- γ) test positive cattle removed by APHA for TB control reasons in Berkshire, 2011 to 2020.

Summary of risks to Berkshire

Nearby HRA counties pose a risk to Berkshire, both from cattle movements, especially from Salisbury market in Wiltshire, and endemic wildlife infection from the adjacent county of Wiltshire.

Berkshire's position with three of its neighbours (Wiltshire, Oxfordshire, and Hampshire) harbouring endemic areas near the county borders points at the low likelihood of the wider area achieving OTF status in the short-term.

Summary of risks from Berkshire to surrounding areas

The area of west Berkshire which is deemed likely to contain a reservoir of *M. bovis* infection in wildlife is not judged to have expanded during 2020. It remains approximately 15 to 20km from the nearest LRA county of Surrey. Its possible future advance eastwards may be slowed by the presence of large urban conurbations (Reading, Caversham, Wokingham, and Bracknell).

Also, on the eastern and south-eastern boundaries of Berkshire the M3 and M25 motorways may act as a barrier to reduce future spread of disease through wildlife towards the LRA. Therefore, infected wildlife does not pose an imminent risk to LRA.

To the north, the River Thames and M4 may act as a physical barrier to slow down future introduction of wildlife infection into the lower incidence county of Buckinghamshire.

There are no known business or land (temporary land association) links that could facilitate long range spread to the LRA through cattle movements. There are no markets in Berkshire but infected cattle from the county could be sold through markets in Oxfordshire, Wiltshire, and Somerset to buyers in the LRA.

Assessment of effectiveness of controls and forward look

Effectiveness of controls

Using the measure of annual number of incidents, the epidemic in western Berkshire appears to have plateaued in 2018 and 2019, followed by a decline in 2020. At present, the spread of endemic infection eastwards has halted around the Reading area of central Berkshire.

The fact that only one OTF-S incident was disclosed in the annual testing area of the county in 2020 also indicates a change in the trend and supports the conclusion that there has been a slowdown in the spread of endemic infection.

Forward look

The six-monthly surveillance testing of cattle herds in the west of Berkshire is likely contributing to the reduction in herd incidence through the earlier detection of disease. This should lead to shorter incidents with fewer reactors by reducing the time for cattle-to-cattle spread within herds.

It may also reduce the potential cyclical infection of wildlife from infected cattle in the endemic area in the west of the county. Appropriate wildlife disease control measures should help to reduce the burden of endemic TB in the western part of the county. No badger control areas were licensed in Berkshire in 2020.

The possibility of wild deer acting as a reservoir of *M. bovis* infection cannot be ruled out. A muntjac deer was culture confirmed with *M. bovis* infection, genotype 10:a in the Buckleberry area in 2018.

It is unlikely that the TB control objectives in Berkshire will be achieved using one single measure. Use of multiple controls such as: addressing infection in the wildlife reservoir is reduced, further measures for reducing the purchase of undetected infected cattle are introduced, increasing the take-up of farm biosecurity and targeted use of cattle testing to prevent residual infection.

Appendices

Appendix 1: Overview of risk and surveillance areas of England and Edge Area objectives and controls

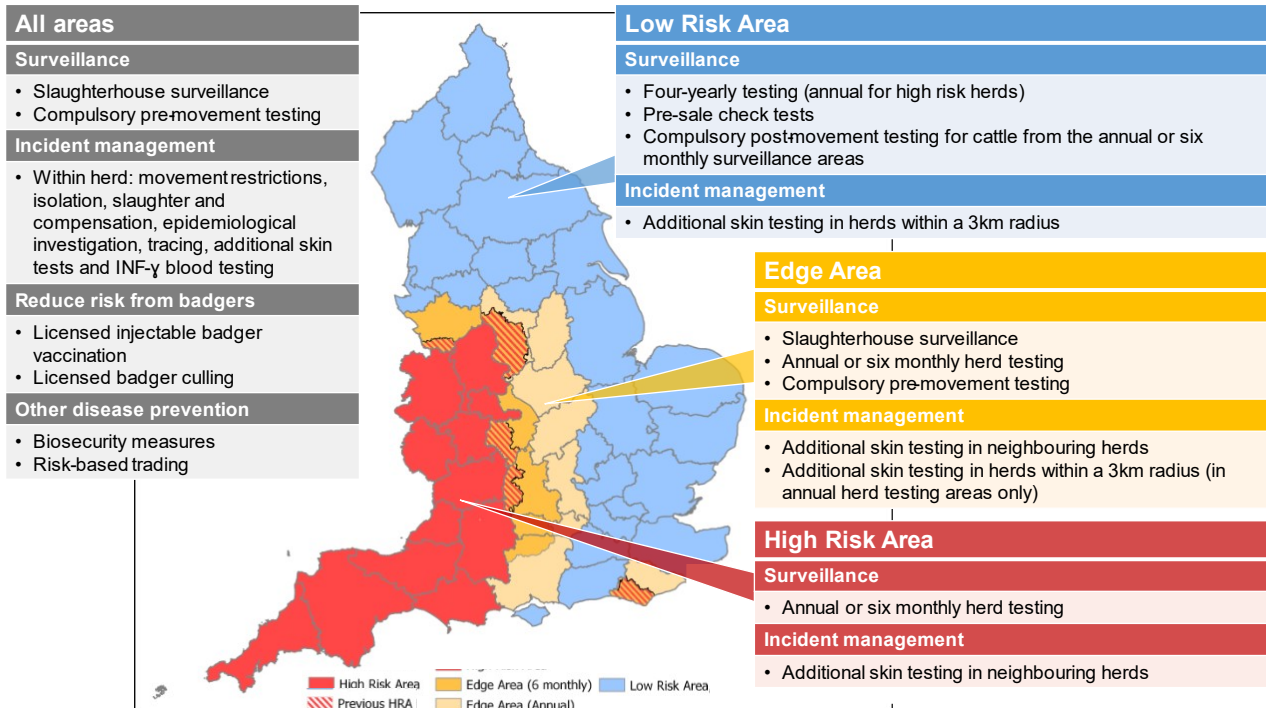


Figure A1: TB risk and surveillance areas of England effective since January 2018, as set out in the UK government’s Strategy for Achieving Officially Tuberculosis-Free Status for England. The map is described in more detail in the [Explanatory Supplement for England 2020](#).

Policy objectives for the Edge Area

- slow down geographic spread of endemic infection
- maintain crude herd incidence of OTF-W incidents less than 2% overall by 2019
- begin to reduce the incidence rate

Longer term:

- reduce geographic spread of TB and push the Edge Area boundaries westward
- reduce OTF-W herd incidence to less than 1% by 2025
- attain OTF status (crude incidence of indigenous OTF-W herd incidents less than 0.1%) for the lowest incidence counties in the Edge Area

For more information about the governments approach to controlling TB, visit the strategy for achieving Officially Bovine Tuberculosis Free status for England, published in 2014 and independently reviewed in 2018, see:

- [A strategy for achieving officially bovine tuberculosis free status for England](#)
- [Government sets out next phase of strategy to combat bovine tuberculosis](#)

Key Control Measures

Surveillance:

- six monthly or annual routine whole herd testing
- additional targeted surveillance of cattle herds located within a 3km radius of new OTF-W incidents in annual testing sections of the Edge Area (radial testing)
- slaughterhouse (SLH) surveillance

Management of cases ('incidents'):

- increased sensitivity of incident herd testing:
- all incident herds must pass two consecutive short interval skin tests at severe interpretation to regain OTF status, irrespective of PM and bacteriological findings
- mandatory IFN- γ parallel testing of herds with OTF-W incidents
- enhanced management of herds with persistent incidents
- enhanced epidemiological investigation and data analysis
- information sharing - location of incident herds publicly available (using [ibTB](#) online interactive mapping tool)
- restriction for life of all inconclusive reactors (IRs) that give a negative result on a re-test was introduced in November 2017 ('resolved IRs' policy). The only permitted movements of these animals are to slaughter or an Approved Finishing Unit, or after being subjected to a private IFN- γ test with negative results

TB controls in the wildlife reservoir (badgers):

- licensed badger culling in high incidence sections of the Edge Area
- Government grants for licensed voluntary badger vaccination projects using injectable badger BCG (Badger Edge Vaccination Scheme (BEVS))

Other measures:

- compulsory pre-movement skin testing of cattle moved between herds
- promotion of herd biosecurity measures to reduce the risk of new incidents

Summary of enhanced TB control measures in Berkshire

Edge Area testing policy

- No incidents were disclosed by 3km radial testing in Berkshire in 2020.
- Slaughter of inconclusive reactors (IRs) and direct contacts (DCs) was used as a management tool to remove infection from the herd.
- No exemptions were applied to the deployment of the IFN- γ test in OTF-W incidents in 2020.
- There were no issues with radial surveillance testing in the single radial zone in Berkshire in 2020

Other testing measures

- No testing exemptions were given for fattener herds in Berkshire in 2020
- No contiguous testing was carried out in relation to the only *M. bovis* incident in non-bovines in Berkshire in 2020, a wild badger found near Newbury.
- Overdue testing continued to be at a very low level and was intensively managed.

Other control measures

- The [TB Advisory Service \(TBAS\)](#) was used by a number of Berkshire farmers
- Official Veterinarian (OV) quality assurance audits of skin testing were carried out in both random and targeted manners.
- The local TB eradication group did not meet in 2020 because of COVID-19 public health restrictions.
- Liaison continued with local authorities as enforcement bodies and Public Health England as necessary.

Appendix 2: Cattle industry in Berkshire

Table A2.1. Number of cattle premises by size band in Berkshire at 1 January 2020. (RADAR data)

Size of herds	Un*	1-50	51-100	101-200	201-350	351-500	501+	Total number of herds	Mean herd size	Median herd size
Number of herds	2	102	37	21	8	4	8	182	99	36

*The number of herds with an undetermined size.

Table A2.2 Number of animals by breed purpose in Berkshire at 1 January 2020.

Breed purpose	Beef	Dairy	Dual purpose	Unknown	Total
Number of cattle	13,546 (75%)	4,025 (22%)	438 (2%)	0	18,009

Appendix 3: Summary of headline cattle TB statistics

Table A3.1 Herd-level summary statistics for TB in cattle in Berkshire between 2018 and 2020.

Herd-level statistics	2018	2019	2020
(a) Total number of cattle herds live on Sam at the end of the reporting period	223	220	218
(b) Total number of whole herd skin tests carried out at any time in the period	324	328	286
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	180	171	166
(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)	187	196	196
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	194	199	202
(f) Total number of new TB incidents detected in cattle herds during the report period, (including all FUs)	29	25	16
• OTF-S	16	11	5
• OTF-W	13	14	11
(g) Of the 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?	5	1	2

Herd-level statistics	2018	2019	2020
<ul style="list-style-type: none"> New OTF-W incidents triggered by skin test Reactors or 2xIRs at routine herd tests 	8	10	6
<ul style="list-style-type: none"> New OTF-W incidents triggered by skin test Reactors or 2xIRs at other TB test types (such as, forward and back-tracings, contiguous or check tests) 	3	4	0
<ul style="list-style-type: none"> New OTF-W incidents first detected through routine slaughterhouse TB surveillance 	2	0	3
(h) Number of new incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds			
<ul style="list-style-type: none"> OTF-S 	0	4	0
<ul style="list-style-type: none"> OTF-W 	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, but not including non-grazing Approved Finishing Units)	16	14	12
(j) New confirmed (positive <i>M. bovis</i> culture) incidents in non-bovine species detected during the report period (indicate host species involved)	1 deer 2 cats	1 cat	1 badger
(k) Number and type of finishing units active at end of the period:			
<ul style="list-style-type: none"> Approved Finishing Units: Grazing 	0	0	0
<ul style="list-style-type: none"> Approved Finishing Units: Non-Grazing 	2	2	2
<ul style="list-style-type: none"> Exempt Finishing Units: Grazing 	0	0	0
<ul style="list-style-type: none"> Exempt Finishing Units: Non-Grazing 	0	0	0

Table A3.2 Animal-level summary statistics for TB in cattle in Berkshire between 2018 and 2020.

Animal-level statistics (cattle)	2018	2019	2020
(a) Total number of cattle tested in the period (animal tests)	41,031	45,911	39,834
(b) Reactors detected in tests during the year:			
• Tuberculin skin test	152	145	80
• Additional IFN- γ blood test reactors (skin-test negative or IR animals)	156	157	107
(c) Reactors detected during year per incidents disclosed during year	10.6	12.1	11.7
(d) Reactors per 1000 animal tests	7.5	6.6	4.7
(e) Additional animals slaughtered during the year for TB control reasons:			
• DCs, including any first-time IRs	54	27	15
• Private slaughters	1	5	1
(f) SLH cases (tuberculous carcasses) reported by Food Standards Agency (FSA)	3	5	5
(g) SLH cases confirmed by culture of <i>M. bovis</i>	2	2	4

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

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

Appendix 4: Suspected sources of *M. bovis* infection for all the new OTF-W and OTF-S incidents identified in the report period

Table A4 Suspected sources of *M. bovis* infection for all the new OTF-W and OTF-S incidents identified in Berkshire, in 2020.

Source of infection	Possible (1)	Likely (4)	Most likely (6)	Definite (8)	Weighted contribution
Badgers	3	7	5	0	49.7%
Cattle movements	0	5	3	0	32.1%
Contiguous	0	0	1	0	2.9%
Residual infection	1	1	2	0	11.1%
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	1	0	0	0	1.0%
Other or unknown source	0	0	0	0	3.1%

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

Details of the methodology used to calculate the weighted contribution of the different suspected sources of *M. bovis* infection for all new incidents can be found in the main body of the report and in the [Explanatory Supplement](#).



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