Animal &
Plant Health
Agency

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

Contents

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 Hampshire, 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 This includes both 'Officially Tuberculosis-Free Status Withdrawn' (OTF-W) and 'Officially Tuberculosis-Free Status Suspended' (OTF-S) incidents.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 carcases 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

Appendix 1 provides cattle industry demographics, and shows Hampshire is predominantly a beef county. The majority of herds are small; 59% of herds have fewer than 50 cattle.

There are no livestock markets in Hampshire. The markets predominantly used are in the High Risk Area (HRA), and there is a flow of cattle, especially for fattening, from the HRA into Hampshire. There is one medium-sized abattoir in Hampshire. There are grazing rights across the common area of the New Forest. There were no AFUs in Hampshire in 2022.

Cattle herds in the north-west of Hampshire routinely undergo 6-monthly TB surveillance testing. However, 34% 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

Figure 1 shows the total number of new TB incidents in Hampshire in 2022 was 22. This was an increase of one compared to 2021 when there were 21 incidents. This slight increase follows a downward trend in the county since 2018. The number of OTF-W incidents decreased to 6 in 2022, compared to 8 in 2021. There was an increase in the number of OTF-S incidents from 13 in 2021 to 16 in 2022. The proportion of herd type affected by new TB incidents in 2022 is representative of the overall herd proportions within the county. Of the 6 new OTF-W incidents, the majority of herds were beef (5/6) compared to dairy (1/6). For OTF-S, there were a slightly higher number of dairy herds affected (6/16) but the majority affected were beef herds (10/16).

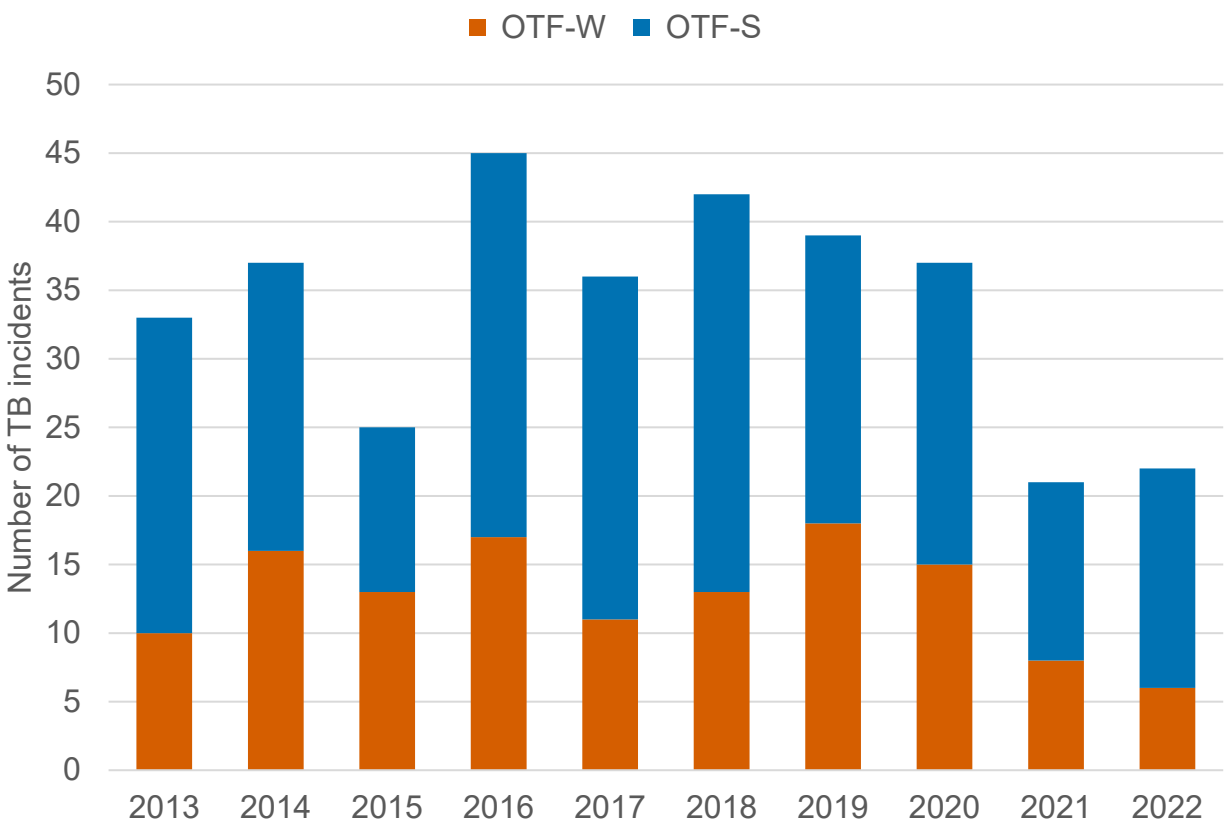

Figure 1: Annual number of new TB incidents in Hampshire, from 2013 to 2022.

Disclosing test types

As in previous years, whole herd testing continued to detect the most incidents of TB in Hampshire in 2022 (14). This was followed by pre-movement testing which detected 3 new incidents, as shown in Figure 2.

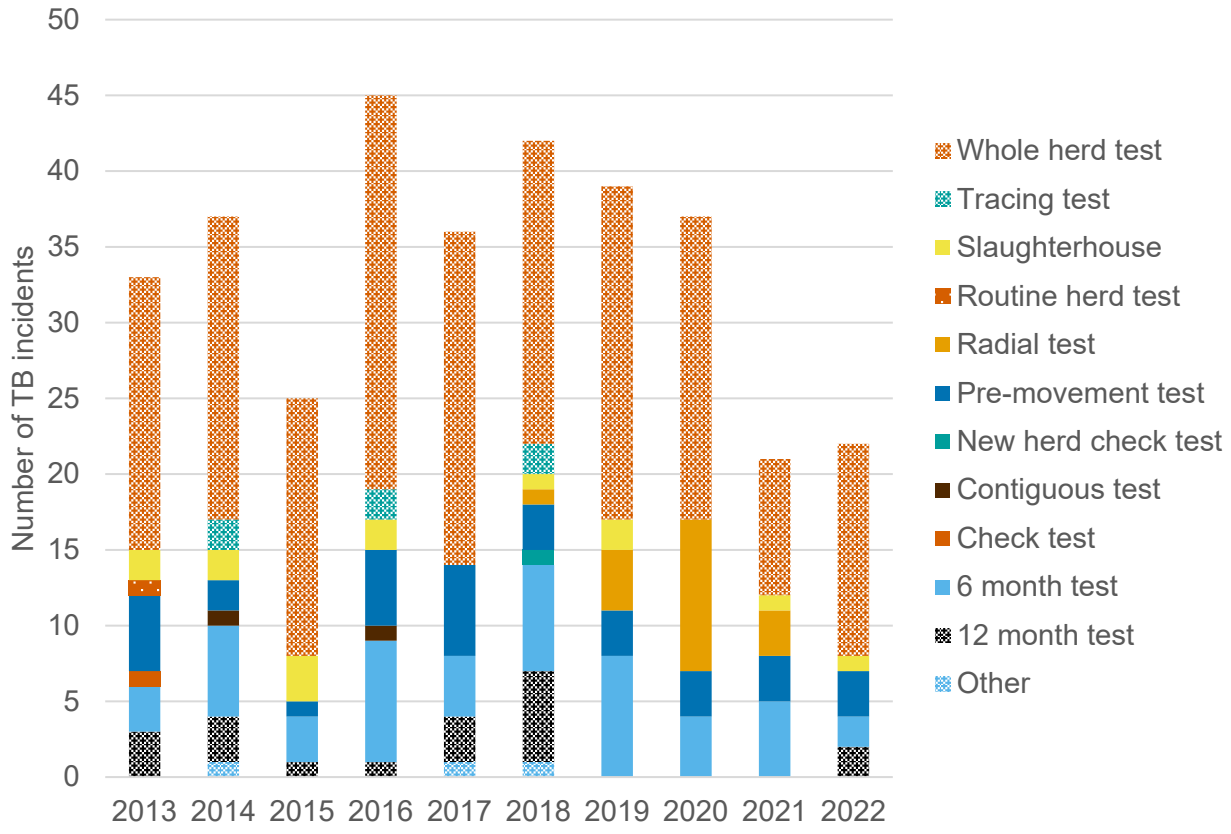

Figure 2: Number of new TB incidents (OTF-W and OTF-S) in Hampshire in 2022, according to the surveillance methods that detected them.

Duration of TB incidents

A total of 21 TB incidents were resolved in Hampshire during 2022. Of these, 10 were new TB incidents that started in 2022, 9 started in 2021 and 2 were from 2020.

The median duration for OTF-W incidents that ended in 2022 was 361 days (interquartile range (IQR) 210 to 476). One OTF-W incident took over 550 days to resolve, but the majority (8 out of 9) were ended in 550 days or less.

Most OTF-S incidents that ended in 2022 (9 out of 12) were resolved within 240 days, and 3 were resolved quickly, within 150 days. The median duration was 167 days (IQR 151 to 182.5).

There were no TB incidents still open at the end of 2022 that had been open for more than 550 days.

The median duration for all incidents that ended in 2022 was 185 days (IQR 167 to 348). This is shorter than the duration of incidents that ended in 2021; 215.5 days (IQR 166.5 to 338). 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

Two of the three dairy herds with open OTF-W incidents in 2022 had high numbers of reactors in the incident (44 and 63). This may correlate to these herds being some of the largest holdings within the ongoing incidents of 2022 and the county (between 630 and 700 animals per herd). One of these incidents had a previous incident in 2020 but resolved in 349 days after further SICCT testing and IFN-Gamma testing. The other holding took longer to resolve at 574 days, after 2 rounds of IFN-Gamma testing and multiple SICCT. The other 2 long duration incidents were both beef farms, taking between 476 and 536 days to resolve. All the incidents with a duration of over a year that were still ongoing in 2022 ended by the end of 2022.

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 incident of TB reported in wild fallow deer in Hampshire in 2022. The cultured *M. bovis* isolate from this case was Whole Genome Sequenced (WGS) as clade B6-62. The deer was found between 5 and 7km away from 3 other OTF-W incidents of B6-62 in cattle that were open during 2022. The deer was genetically linked to 2 local farms (1 SNP difference) that were OTF-W in 2019, with no movement links between the 2 holdings. This suggests that deer are involved in the local infection dynamics but whether as source for cattle or themselves infected from cattle or badgers is not possible to say. A high number of local cattle movements for one of those farms has occurred that may indicate undisclosed related infection elsewhere. More data is needed for conclusive evidence.

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 carcases. 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 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, 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 analyses have been completed. Its results will help develop a picture of the disease situation in the Southern Edge Area.

Incidence of TB

In 2022, the annual incidence rate (3.4 incidents per 100 herd-years at risk) was slightly higher than in 2021 (3.3), as shown in Figure 3. The increase in 2022 follows 2 consecutive years of reducing incidence, from a high of 5.6 in 2019.

Hampshire had the lowest incidence rate of TB out of the 11 Edge Area counties in 2022.

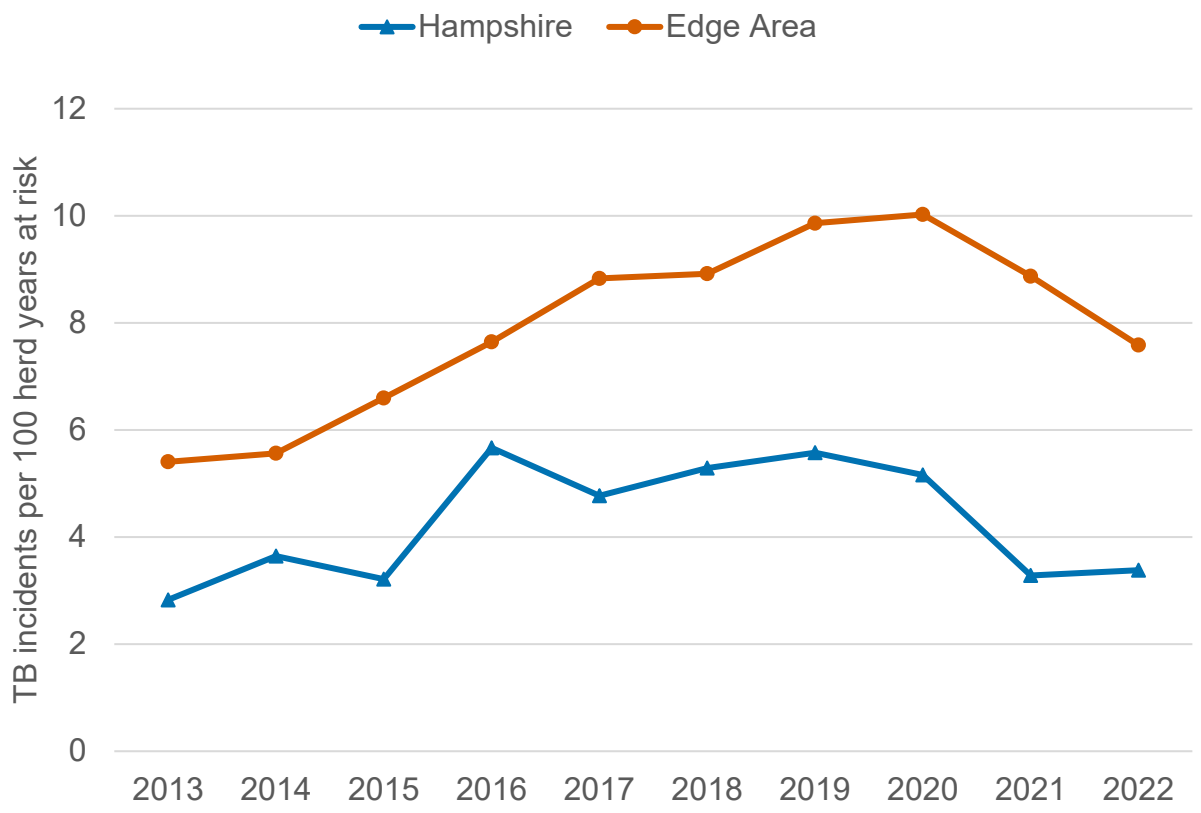

Figure 3: Annual incidence rate (per 100 herd-years at risk) for all new incidents (OTF-W and OTF-S) in Hampshire, from 2013 to 2022.

Prevalence of TB

Figure 4 shows the herd prevalence of TB in Hampshire at the end of 2022 (1.6%) which was very similar to 2021 (1.5%) and remains below the reported annual prevalence between 2014 and 2020 for the county (1.8-3.0%).

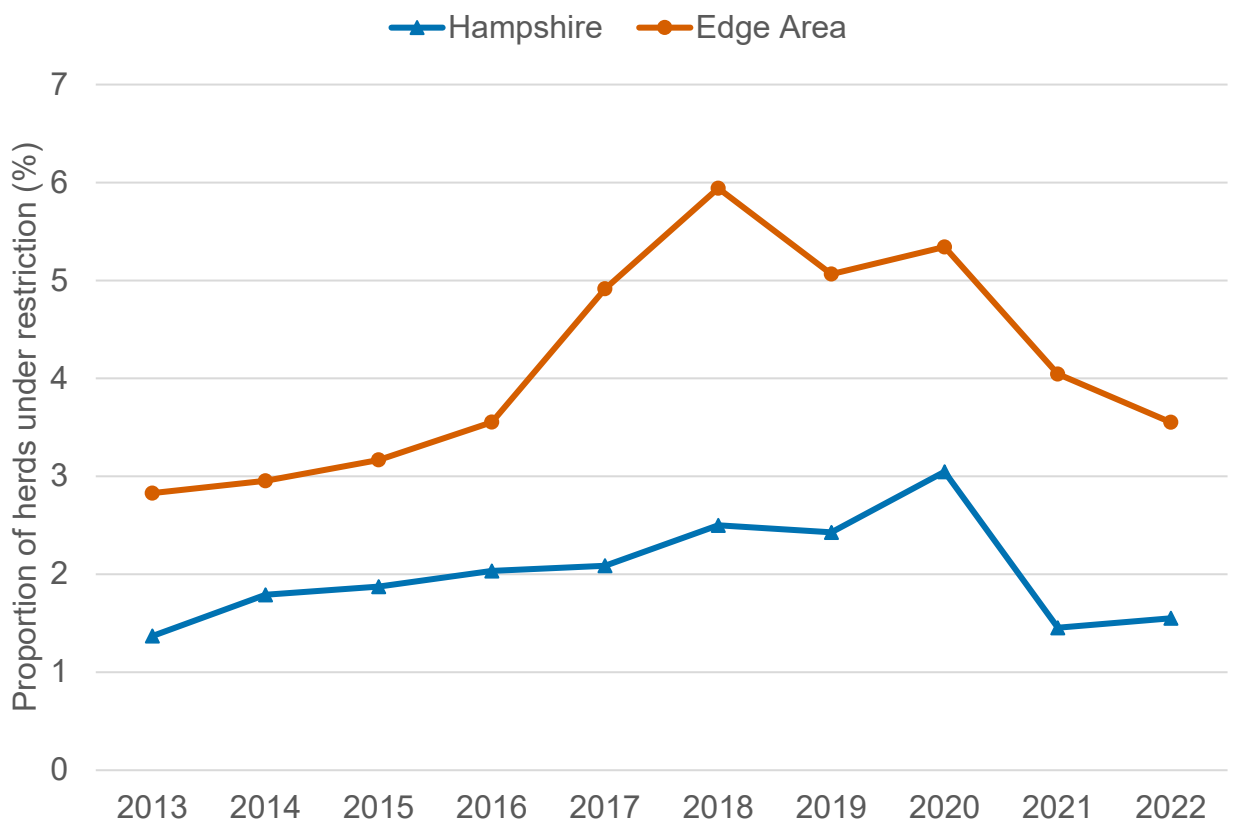

Figure 4: Annual end of year prevalence in Hampshire, from 2013 to 2022.

Re-occurring TB incidents

In Hampshire, 5 of the 16 (31%) herds with a new OTF-S TB incident in 2022 had a history of TB (experienced another incident in the past 3 years), see Figure 5. For OTF-W incidents, only one of the 6 (17%) had a history of TB. Combined, this equates to 27% of new TB incidents in Hampshire in 2022 having a history of TB, which is lower than the Edge Area overall (50%). This is also lower than neighbouring Edge Area counties where re-occurring TB incidents contributed to a higher proportion of new TB incidents in 2022: Berkshire (67%), Buckinghamshire (35%) and Oxfordshire (52%).

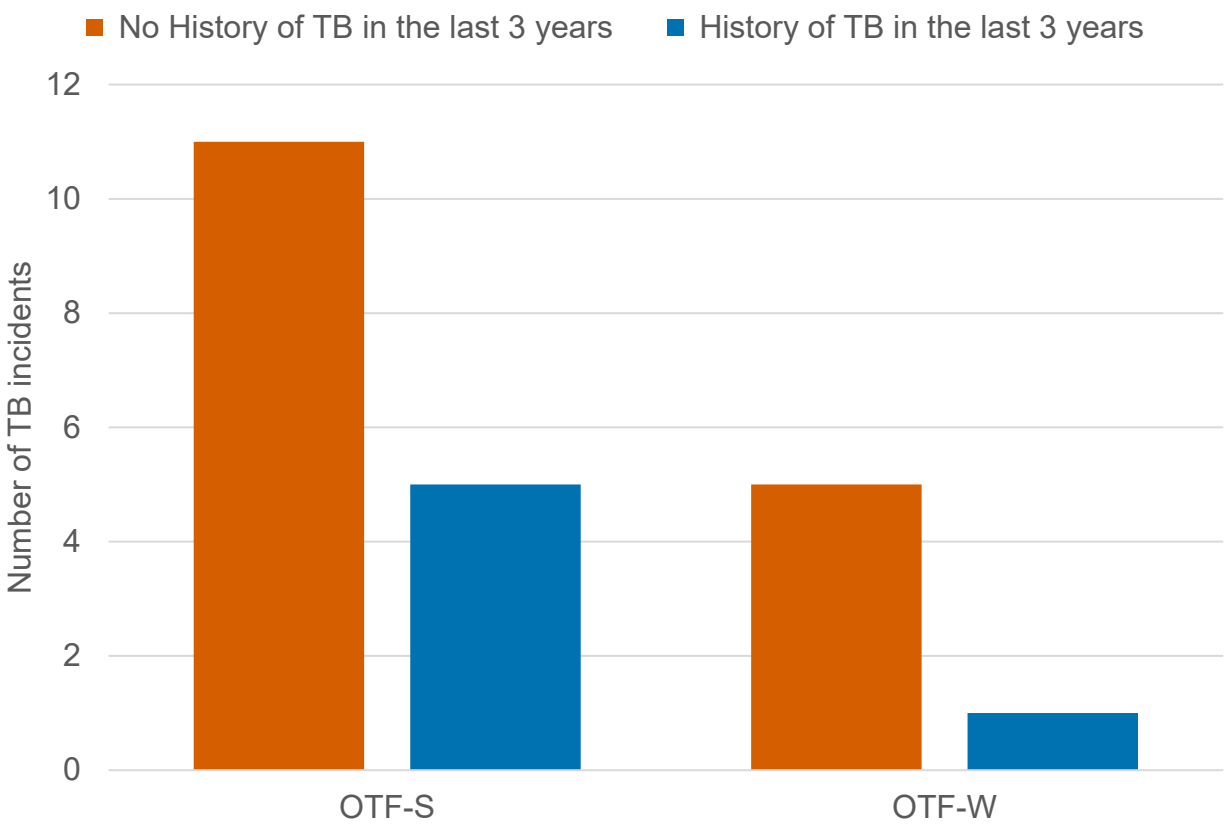

Figure 5: Number of herds with a TB incident (by OTF-W and OTF-S) in Hampshire in 2022, with and without a history of any TB incident in the previous 3 years

Geographical distribution of TB incidents

Figure 6 shows that most of the new and ongoing OTF-W TB incidents were located in the central-western part of Hampshire (approximately 69%, 9 of 13 incidents) and within the 6-monthly surveillance testing area in the north-west of the county (approximately 23%, 3 of 13 incidents). OTF-S incidents were more widely spread across the county, within both the 6 monthly testing area but radiating east from the central-west OTF-W incidents and further south-west in the county near to the Dorset border. This is similar to the distribution seen in 2021 for both OTF-W and OTF-S. The year 2020 depicted less of a pattern when compared to 2021 and 2022.

Most OTF-W incidents were caused by *M. bovis* WGS clade B6-62. Two OTF-W incidents that occurred in the central-western area were caused by clade B6-85 and there was a single incident on the Hampshire-Surrey border caused by B4-11.

The case of B4-11 was unusual due to the affected herd being closed, having no movements in the last 5 years, and the closest genetically related incidents, within 1 to 3 Single Nucleotide Polymorphisms (SNPs) were 3 TB incidents in Devon. The closest geographical OTF-W incident was in Surrey, 17km away, but there was no culture available for this incident. It is therefore difficult to conclude any relationship between

these incidents in the local area or a possible cause for the B4-11 TB incident in Hampshire.

As discussed above, the majority of the new and ongoing OTF-W incidents are located in the central-western part of the county. Whilst the distance between these incidents ranges from 12km to 20km, there were 3 holdings located within 5km of each other that had all been caused by *M. bovis* WGS clade B6-62. These incidents were also genetically identical, showing a SNP difference of 0 SNPs between each isolate. There was also no evidence of cattle movements between these holdings within the last 5 years, raising a strong case for local, wildlife-driven spread of infection between these holdings. It is worth noting, that these are the 3 holdings that were closest (5-7km) to the B6-62 deer isolate from 2022, although as discussed above, the deer isolate does only appear genetically similar to historical incidents (from 2019). The investigation of future incidents in this area could be important in establishing the role of wildlife within this cluster.

The remaining incidents within central-western Hampshire appear to hold less genetic similarity to these 3 incidents, with on average 5 SNPs difference between them. Missing data, such as the lack of WGS data for some TB incidents, and the paucity of wildlife isolates in this area, makes further analysis into the genetic relatedness between the remaining incidents within this area limited at present for both the B6-62 and B6-85 incidents. The evidence we do have is further highlighted in Figure 10.

For the 2 OTF-W incidents located within the 6-monthly testing area for which we have complete data for 2022, there is evidence of genetic relatedness between current and historical infections and to holdings within Hampshire and Berkshire of between one and 3 SNPs. Both holdings have had high numbers of movements from holdings within the Edge Area that have had incidents within the last 3 years, one of the holdings has also moved a number of cattle from the HRA from holdings that had also experienced TB incidents in the last 3 years.

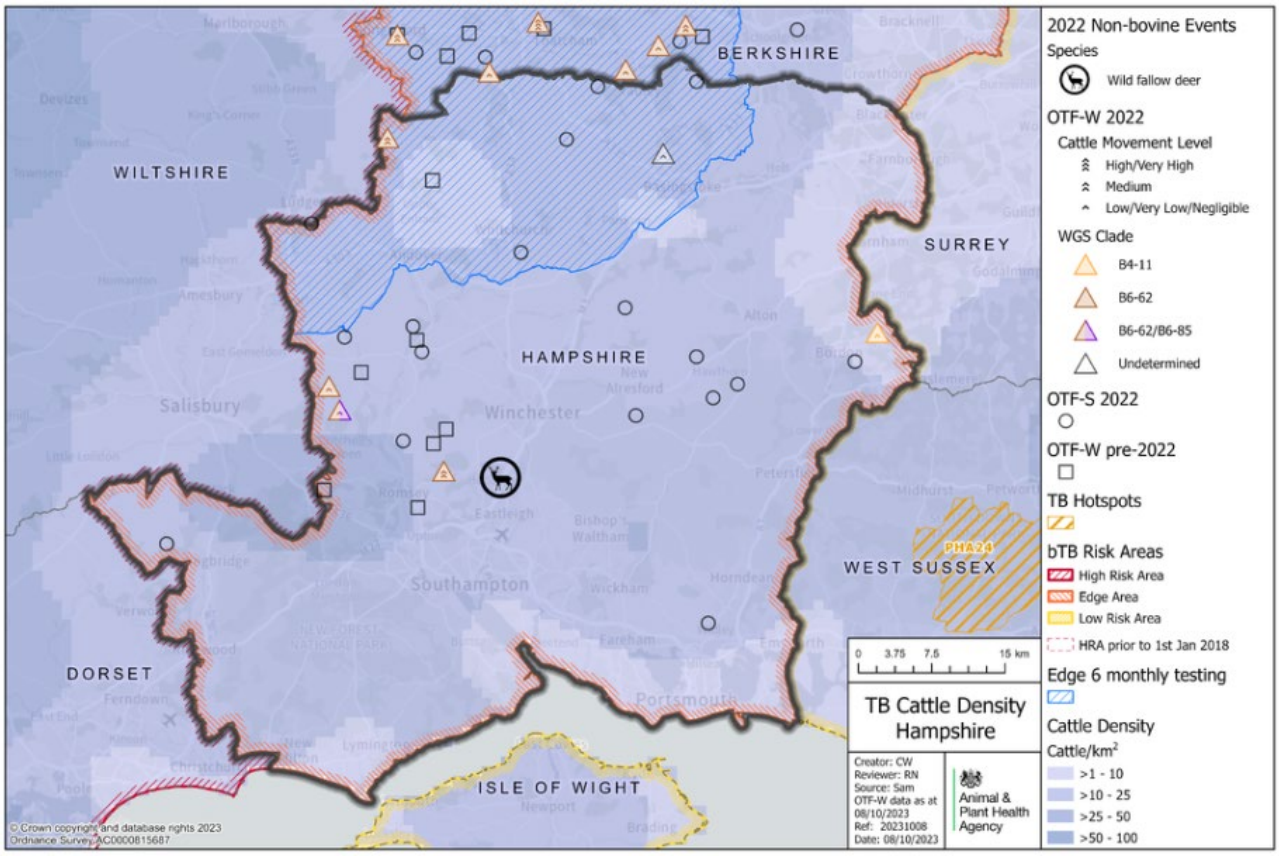

Figure 6: Location of cattle holdings in Hampshire with new TB incidents (OTF-W and OTF-S) in 2022 and cattle holdings with pre-2022 OTF-W incidents still ongoing at the beginning of 2022, overlaid on a cattle density map. The movement score for each farm is symbolised with 3 chevrons for cattle movements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

In 2022 there was a total of 140 test positive animals in Hampshire, as shown in Figure 7. This was the lowest number of test positive animals removed from herds in Hampshire since 2014. Of the test positive animals in 2022, 119 (85%) were skin test reactors, compared to 50% in 2021. Only 21 (15%) of animals removed in 2022 were interferon gamma (IFN-γ) test positive, compared to 50% in 2021. There was a 73% reduction in the number of animals receiving an IFN-γ test in 2022, from 3,016 tests in 2021 to 801 in 2022.

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 discrepancy between 2022 and 2021. Furthermore, the reduction in OTF-W TB incidents in 2022 would have also reduced the number of herds eligible to receive supplementary IFN-γ testing.

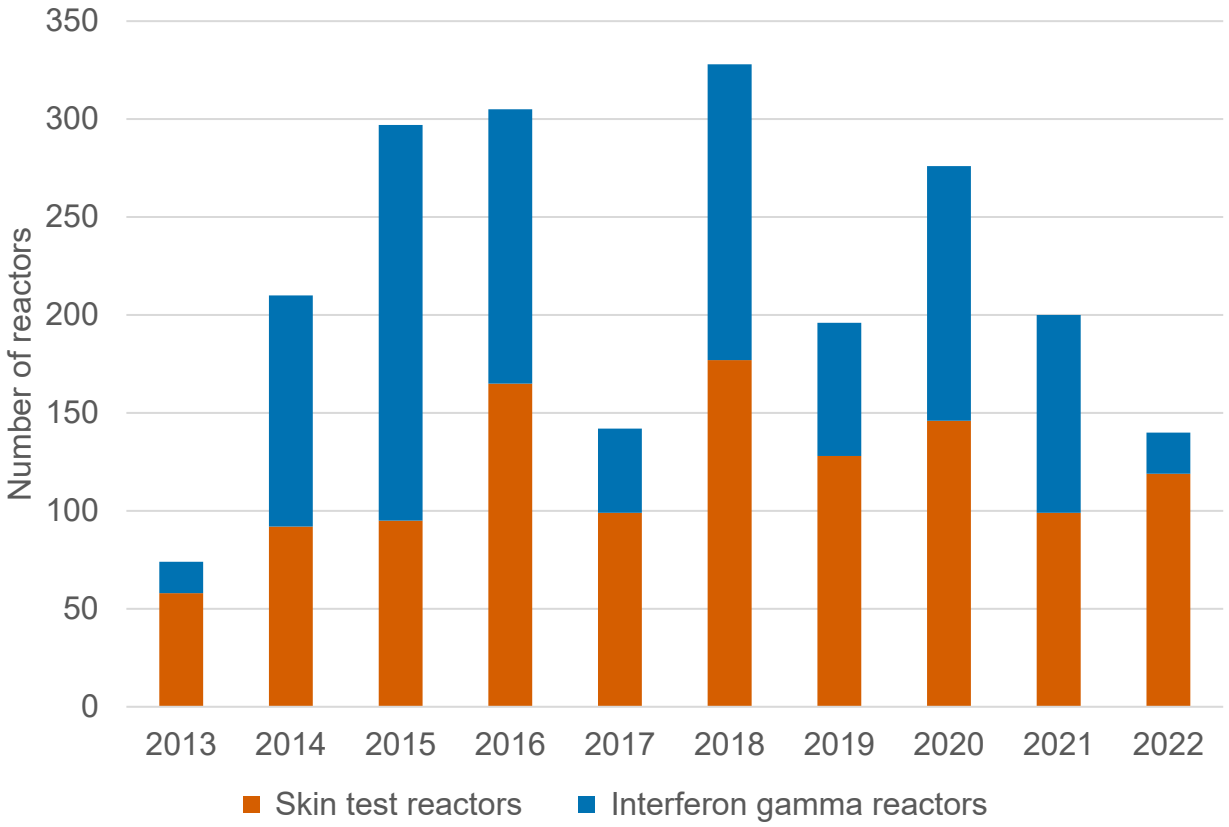

Figure 7: Number of skin test reactors (SICCT) and interferon gamma (IFN-γ) test positive cattle removed by APHA for TB control reasons in Hampshire, from 2013 to 2022.

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, none of the 22 new TB incidents in Hampshire received a preliminary or final APHA veterinary investigation to identify the source of infection. This was mainly due to the diversion of field resource to the large AI outbreaks which occurred in 2021 and 2022.

New data driven methods to quantify the likelihood of risk pathways for TB infection 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 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 highest ranked animal 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 indicate a local reservoir of infection:

- it has a WGS with no more than 3 single nucleotide polymorphism (SNP) differences relative to the TB incident of interest
- it is within 4 years before or 6 months after the start 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 variable 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 of the categories is described in greater detail in the following text.

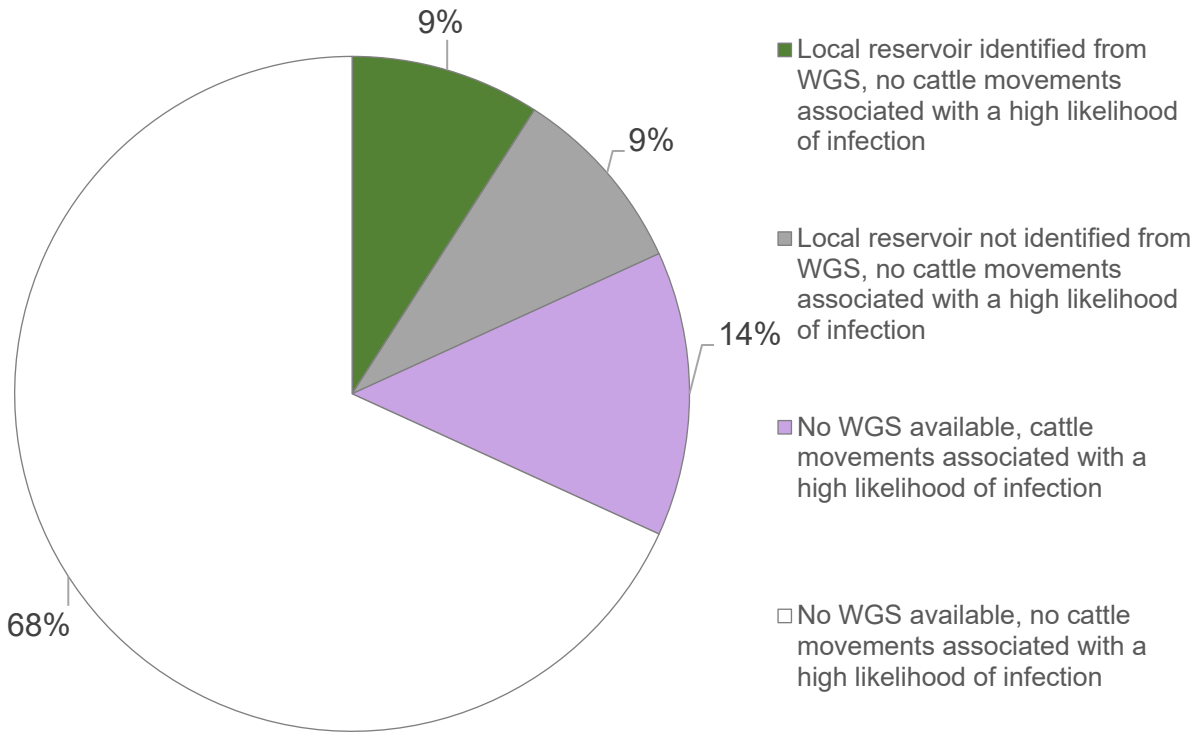

Figure 8. Risk pathway combinations identified by the WGS local reservoir indicator and cattle movement algorithm for all 22 new TB incidents in Hampshire in 2022

WGS data with a suitable quality to analyse for a reservoir indicator was available for 4 (18%) of all new TB incidents in Hampshire. The WGS Local Reservoir Indicator identified a local reservoir of infection for 2 (9%) new TB incidents in 2022 without strong evidence of cattle movements. 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.

In Hampshire, 3 TB incidents (14%) had evidence of cattle movements associated with a high or very high likelihood of TB infection, but no WGS evidence with which to assess the local reservoir. For those herds it was considered likely that cattle movements played a part in the introduction of infection, however the presence of a local reservoir has not been assessed (purple symbols, Figure 9).

For 2 (9%) TB incidents, the WGS Local Reservoir Indicator did not find evidence of a local reservoir, and there was no evidence of cattle movements with a high likelihood of TB infection. The source of infection is unclear for these incidents (grey symbols).

There was no strong evidence of cattle movements and no WGS available to explore the presence of a local reservoir for 15 of the 22 (68%) TB incidents. These are shown as white dots in Figure 9, as there is insufficient evidence to determine a likely infection pathway.

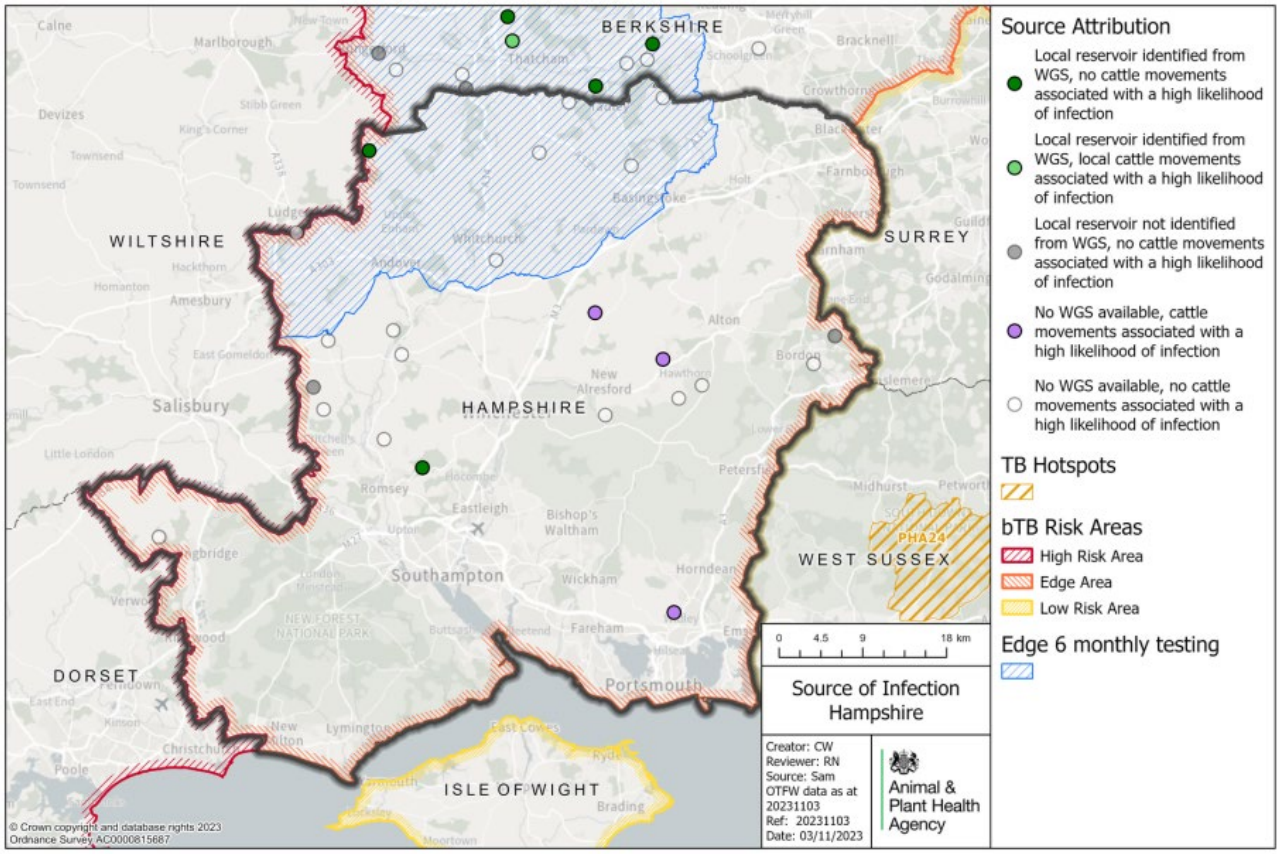

Figure 9: Map of the available evidence for risk pathways of TB infection into the herd, for all TB incidents (OTF-W and OTF-S) in Hampshire that started in 2022.

In the central-western and north-west of the county close to the Berkshire and Wiltshire border, there were numerous OTF-W incidents with *M. bovis* WGS clade B6-62 isolated. This clade has historically also been detected in these areas and is the most common cause of incidents in the county. WGS investigation has shown that 3 of the incidents within the central-western part of the county, which were within 5kms of each other, had *M.bovis* isolates that were genetically identical to each other (0 SNPs difference).

The incidents within the north-west 6-monthly testing area have more limited genetic data available, but for those with this data, there is evidence that *M. bovis* isolates for both current and historical incidents have close genetic relationships of one to 3 SNPs. This also included incidents across the border into Berkshire. These levels of genetic relatedness could suggest a common source of infection within the local wildlife, especially in the incidents with 0 SNP difference. 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 incidents disclosed in 2022.

The more widespread nature of OTF-S incidents will need to be continually monitored, especially at the Dorset border because of a number of OTF-S incidents in this area in previous years, to assess for any across-border spread of new clades in the future.

Figure 10 shows that new incidents in 2022 occurred in areas where TB was previously detected.

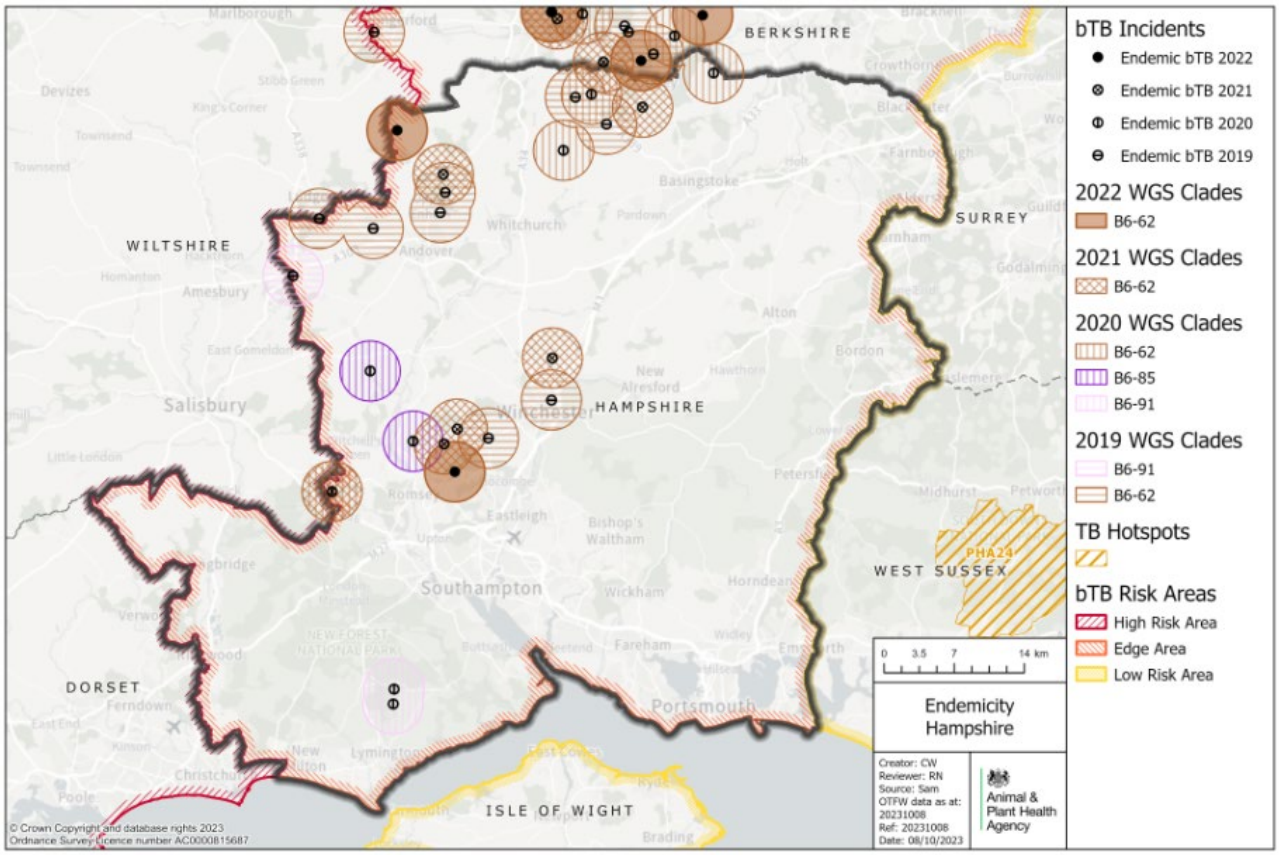

Figure 10: WGS clades of *M. bovis* detected in Hampshire between 2019 and 2022, where the WGS identified in the infected herd was within 3 SNPs of another TB incident in the past 4 years and 9km (OTF-W incidents only).

Forward look

Despite a slight increase in incidence and prevalence for Hampshire between 2021 and 2022, the county remains at its lowest incidence since 2016 and lowest prevalence since 2014. Remaining well below the Edge average for both of these measures, maintaining optimism that Hampshire is heading towards OFT status.

In Hampshire, there is growing evidence of a local reservoir with clustering of incidents in the central-western area of the county, which could prove a potential future source of infection for cattle. *M. bovis* WGS clade B6-62 has been isolated over several years in cattle incidents and infected wildlife in this area and there are a number of isolates that show very close genetic relatedness (0-3 SNPs) both between cattle incidents with no known movements, and between cattle and wildlife isolates.

Despite the lower proportion of new OTF-W incidents disclosed in the 6 monthly testing area in the north-east of the county, the increased testing frequency will continue to detect infection earlier, reduce the spread of infection both within herds and to other herds through movements and to wildlife

Measures that would help address the most common risk pathways for TB infection in Hampshire have been highlighted in previous reports, however they remain important in 2022 if both incidence and prevalence are to return to a more consistent downward trend. These 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
- continuation and further adoption of control measures to prevent the spread of TB between cattle and wildlife, including on-farm biosecurity, badger culling or vaccination, and local control of the population of wild deer, were appropriate
- additional measures taken during TB incidents to prevent residual cattle infection in herds after the end of incidents

Appendix 1: cattle industry demographics

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

Size of herds	Number of herds in Hampshire
Undetermined	5
1 to 50	415
51 to 100	119
101 to 200	85
201 to 350	39
351 to 500	18
Greater than 500	21
Total number of herds	702
Mean herd size	85
Median herd size	32

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

Breed purpose	Number (and percentage of total) cattle in Hampshire
Beef	37,667 (63%)
Dairy	18,880 (31%)
Dual purpose	2,948 (4%)
Unknown	(0%)
Total	59,495

Appendix 2: summary of headline cattle TB statistics

Table 3: Herd-level summary statistics for TB in cattle in Hampshire 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	886	825	838
(b) Total number of whole herd skin tests carried out at any time in the period	956	888	840
(c) Total number of OTF cattle herds having TB whole herd tests during the period for any reason	692	680	670
(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)	834	802	801
(e) Total number of cattle herds that were not under restrictions due to an ongoing TB incident at the end of the report period	859	813	825
(f.1) Total number of new OTF-S TB incidents detected in cattle herds during the report period (including all Finishing Units)	22	13	16
(f.2) Total number of new OTF-W TB incidents detected in cattle herds during the report period (including all Finishing Units)	15	8	6
(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?	1	1	N/A
(g.2) Of the new OTF-W herd incidents, how many were triggered by skin test Reactors or 2xIRs at routine herd tests?	8	5	5

Herd-level statistics	2020	2021	2022
(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)?	6	2	0
(g.4) Of the new OTF-W herd incidents, how many were first detected through routine slaughterhouse TB surveillance?	0	1	1
(h.1) Number of new OTF-W incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	6	0	0
(h.2) Number of new OTF-S incidents revealed by enhanced TB surveillance (radial testing) conducted around those OTF-W herds	4	3	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)	13	7	4
(j) New confirmed (positive *M. bovis* culture) incidents in non-bovine species detected during the report period (indicate host species involved)	0	1 cat	1 wild fallow 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	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 2020 and 2022

Animal-level statistics (cattle)	**2020**	**2021**	**2022**
(a) Total number of cattle tested in the period (animal tests)	111,161	99,773	94,391
(b.1) Reactors detected by tuberculin skin tests during the year	146	99	119
(b.2) Reactors detected by additional IFN-γ blood tests (skin-test negative or IR animals) during the year	130	101	21
(c) Reactors detected during year per incidents disclosed during year	7.5	9.5	6.4
(d) Reactors per 1,000 animal tests	2.5	2.0	1.5
(e.1) Additional animals slaughtered during the year for TB control reasons (dangerous contacts, including any first time IRs)	7	0	10
(e.2) Additional animals slaughtered during the year for TB control reasons (private slaughters)	6	8	2
(f) Slaughterhouse (SLH) cases (suspect tuberculous carcases) reported by Food Standards Agency (FSA) during routine meat inspection	3	1	2
(g) SLH cases confirmed by culture of *M. bovis*	0	1	1

Note (c) Reactors detected during year per incidents disclosed during year, reactors may be from incidents disclosed in earlier years, as any found through testing during the report year count 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, none of the 22 new TB incidents in Hampshire 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 AI outbreaks which occurred in 2021 to 2022.

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.

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