

A bovine tuberculosis policy conundrum in 2023

On the scientific evidence relating to the Animal and Plant Health Agency/ DEFRA policy concept for '*Epidemiological*' badger culling.

APRIL 2023

An Independent report by researchers and veterinarians to DEFRA and the UK Parliament.

Are the ‘targeted badger intervention’ Defra 14th March consultation proposals reasonable? We intend to show in this Addendum that the experience of Low Risk Area culling to date has shown that they are not.

With its 14th March 2024 consultation (GOV UK 2024), Defra has decided to propose expansion of a form of large-scale badger culling over an extended period. This resembles Low Risk Area or LRA culling, otherwise known as epidemiological culling: (EC). The consultation proposes limitless use of this method, renamed as ‘targeted badger intervention’, to include targeted culling (TC) across England, indefinitely. The problems around the reasoning of such a proposal with respect to the evidence base of two trial areas, are considered as follows, using further data since April 2023.

Why does the policy avoid the use of the terms ‘LRA ‘or ‘epidemiological’ culling?

The proposed ‘targeted culling’ being advocated in the current Defra consultation is an ‘evolution’ from ‘LRA culling’, that was introduced in 2018 for bovine TB (bTB) breakdown clusters in the Low Risk Area (LRA). Its use as a model for a limited aspect of future policy, as advocated by the 2020 ‘Next Steps’ policy, was presented to parliament by the Minister for deployment in ‘very exceptional’ circumstances (Eustice 2018). LRA badger culling commenced in cull area 32 in Cumbria south of Penrith from 2018. The culling of 1115 badgers in area 32 was analysed in a detailed technical report by a team of independent scientific researchers and veterinary experts in April 2023. It was presented to Defra and the government (Griffiths et al 2023), although no response has been received to-date.

Nevertheless, in line with the findings in Griffiths et al (2023), the use of a highly inaccurate process known as ‘Risk Pathways’ was abandoned/disregarded (APHA 2023). Risk pathways describes the process, now accepted as deeply flawed, where inspecting vets were directed to attribute herd breakdowns to local badgers by default, where no other cause had been identified. Often simply because farmers knew of the presence of badgers in an area. There is a need for Defra to distance itself from its attribution of breakdowns to badgers both because of this superficial and unscientific approach, and due to the outcomes of the extensive experiences with disease control and badger culling in Cumbria Area 32 over the last ten years.

In 2017, independent researchers began to question Defra about the clearly inadequate level of testing of cattle in the bovine TB epidemic (caused by *Mycobacterium bovis* or *M. bovis*) in the Low

Risk Area. The LRA was still under bTB testing but only every four years, allowing ample time for any infection from traded infected cattle to spread. Following the discovery of a strain of the bTB Pathogen *M.bovis* genotype 17:z (also termed clade B6-23) in Cumbria and the need for annual testing within the LRA, researchers contacted Defra in August 2017 and received the following response:

“Extending annual testing to all cattle herds in the LRA, which is on track to achieve TB free status by 2018, would significantly increase TB control costs for industry and the general taxpayer with only negligible disease control benefits.”

Not only has this TB free target been missed by six years, new bTB clusters are springing up in the LRA due to further trading of diseased cattle, for example in the area north of Area 32.

Genetic evidence

Published genetic studies show that 4-yearly testing with the standard tuberculin skin (SICCT) test had resulted in a reservoir of undetected disease within Cumbria for at least 6 years prior to 2018 (Rossi et al. 2022), and potentially longer, escaping the attention of Defra and APHA, who finally introduced what they called ‘exceptional surveillance’ from 2016/2017.

APHA’s annual bTB epidemiological reports for 2017 and 2018 for Northwest England reveal the areas such as Cumbria have many individual farms which utilize grazing fields (holdings) dotted around the landscape, resulting in considerable cattle movements, and with frequent mixing of grazing stock on common land, with ample opportunity for the spread of disease. With only 4-yearly testing up to 2016, incoming infection in the LRA can rapidly spread.

During 2014, the index case (first ID) of strain 17:z was detected at an abattoir upon slaughter of a young calf. It should be noted that infections may arise during pregnancy, during and in the few weeks and months after birth, from a range of potential respiratory and faecal routes, when cows are in indoor confinement. Mother to calf transmission is a factor. It is also important to note that not all incidents in Cumbria are attributed to 17:z. Other strains, notably strains 9a, and 25a, have been detected in holdings, also brought in via cattle trading.

APHA’s delayed response to increasing infection in 2016/17 was to bring in a raft of stringent measures including more frequent cattle testing and movement control. This immediately began

to reveal that bTB had spread widely and 'Hotspot' No. 21 was established to increase the detection and removal of infected cattle at an early stage. Measures, over and above those implemented in the HRA and Edge area are shown below:

Enhanced testing in Cumbria Hotspot 21 .

1. **Six monthly whole-herd check testing of all cattle herds**, with pre-movement testing of all cattle over 42 days old moving out of these herds. By the end of 2018, many herds had completed their third six-monthly herd test under this regime (although many had also been under radial zone testing before this). Under each round of testing, approximately 30,000 cattle were tested in approximately 180 herds.
2. **Movement restrictions (OTF status suspended)**: in herds with 'inconclusive' reactors only, pending the 60-day re-test of those animals.
3. **Mandatory interferon-gamma blood testing** for all the OTFW herds and discretionary blood testing of OTFS breakdown herds.
4. **Severe interpretation of skin tests** for both OTFW and OTFS breakdown herds.
5. **Better lesion checking**. Samples from all cattle with visible lesions of TB at postmortem submitted for culture and genotyping.
6. **Wider surveillance**: Ad hoc surveillance of camelids (skin testing followed by serology) and goats (SICCT testing only) herds.

This enhanced surveillance brought an immediate response. In the four-year period from November 2014 to December 2018, the Hotspot or cluster had 29 bTB breakdowns within 25 separate cattle holdings. During 2018 a further five breakdowns were disclosed. Four of these were disclosed under the enhanced HS21 herd testing regime, whilst a further one, just outside HS21, was detected at a 3km radial test from an OTFW 17:z bTB breakdown herd. By the end of 2018, (and before any badger culling could possibly have any discernable effect) only two of the herds remained under movement restrictions due to an ongoing TB breakdown.

Badger culling.

Badger Cull Area 32 lies within Hotspot 21. As a result of increasing cattle infection since 2011, from September 2016 an ad-hoc TB survey of 'found-dead' badgers and wild deer was carried out across a defined area of East Cumbria (HS21). In 2017, three badger carcasses that had been collected from the central area within HS21, were found to be culture positive for *M. bovis* genotype 17:z. This finding was hardly surprising, since the strain had been disseminated among herds in the area via infected cattle since 2011, with the inevitable dissemination of bacteria into the environment.'

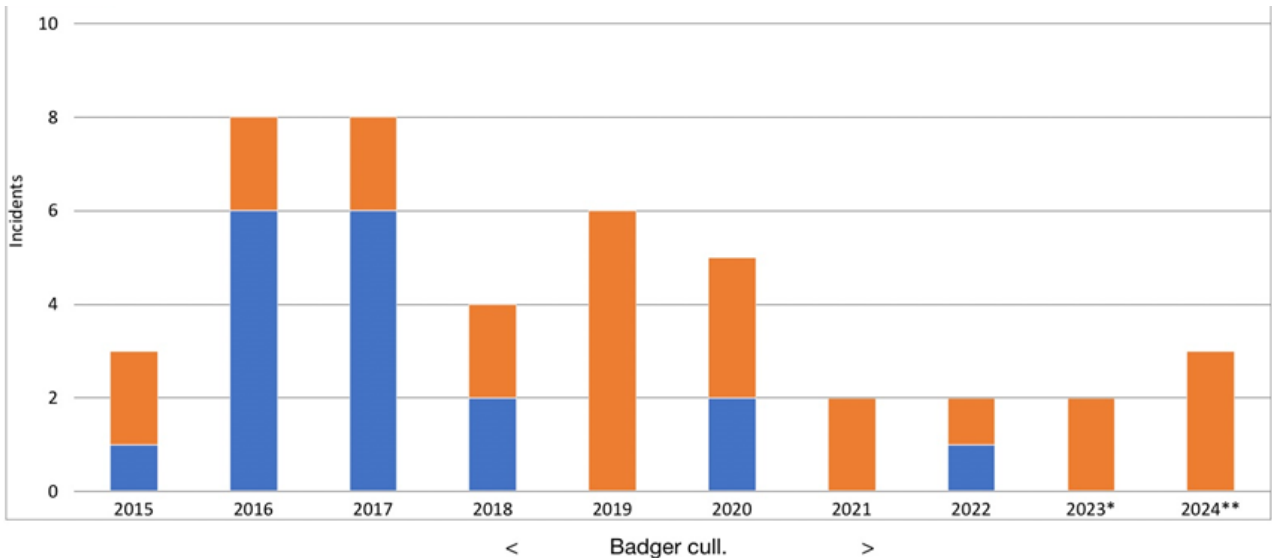
By September 2018 all bTB breakdown incidents in an area identified for badger culling (within Hotspot 21) in Cumbria had been resolved. The almost total elimination of bTB in Cull Area 32 took

place before badger culling began in September 2018. For this reason, it cannot be claimed that culling badgers contributed to the herd incidence peaking in 2017, and subsequently reducing from 2018 onwards. Disease continued to reduce with OTFS incidents replacing OTFW incidents, revealing earlier detection of disease from enhanced testing and showing that testing measures even at enhanced level are still leaving residual infection. Residual infection is due to low test sensitivity, which Defra has consistently failed to adequately address due to incorrect veterinary advice.

In September 2020, culling also commenced in cull area 54 in the LRA in Lincolnshire, following the establishment of a second small Hotspot. However, surprisingly there were no bTB incidents in 2020 when badger culling began. In Lincolnshire cull area 54, where 469 badgers have been shot, bTB OTFW incident rate has not changed although, as in Cumbria, cases with visible lesions reduced as testing caught infections at an earlier stage (figures 2, Table 2.).

Year (calendar)	Total breakdowns	OTF-S	OTF-W	Badgers shot
2015	3	2	1	
2016	8	2	6	
2017	8	2	6	
2018	4	2	2	602
2019	6	6	0	317
2020	5	3	2	134
2021	2	2	0	62
2022	2	1	1	
2023*	2	2		
2024**	2	3		

Table 1. Number of bovine TB incidents (OTFS suspended + OTFW withdrawn) per year and badgers shot in Cumbria Cull Area 32, 2015-2024. Figures for 2023 and 2024 are minimum figures where the division into OTFW and OTFS has not yet been established and reported.



*2023 Estimated from ibtb. OTF-W/S status not yet published.

**2024 Estimated to 27/3/2024 from ibtb. OTF-W/S status not yet published.

Figure 1. Cumbria Badger cull area no.32 Herds in existence bovine TB herd breakdown incidents per calendar year. (Source APHA Badger Control Monitoring report). Blue bar OTF-W, Orange bar OTF-S

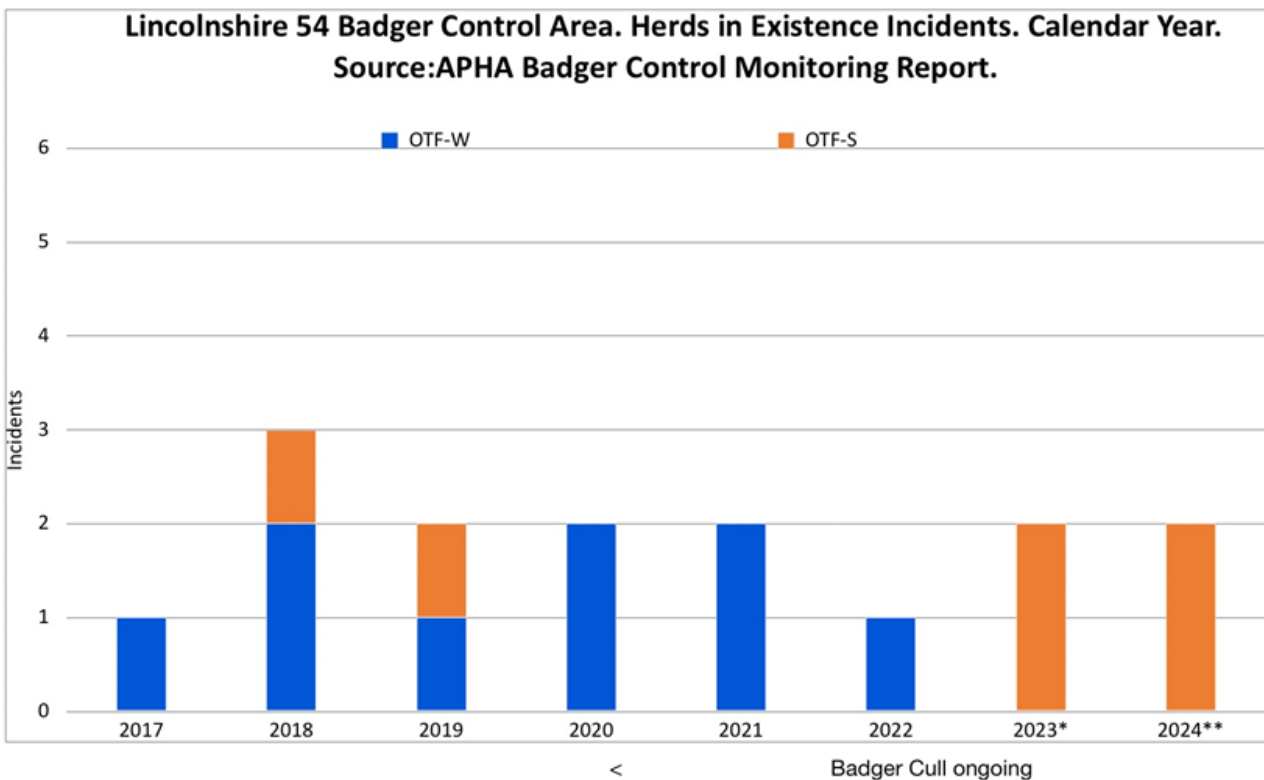


Figure 2. Lincolnshire Badger cull area no.54 Herds in existence bovine TB herd breakdown incidents per calendar year. (Source APHA Badger Control Monitoring report). Note in August 2021 badger cull area 54 increased from 102 sq. km to 122 sq km.

Year (calendar)	Total breakdowns	OTF-S	OTF-W	Badgers shot
2017	1	0	1	
2018	3	1	2	
2019	2	1	1	
2020	2	0	2	139
2021	2	0	2	161
2022	1	0	1	80
2023*	2	2		89
2024**	2	2		TBA

Table 2. number of bovine TB incidents (OTFW withdrawn and OTFS suspended) per year and badgers shot in Lincolnshire Cull Area 54, 2017-2024. Figures for 2023 and 2024 are a minimum figure and the division into OTFW and OTFS has not yet been declared. This is an estimate because the exact cull boundaries of this cull area are not available.

Discussion: why LRA/targeted culling has had no effect on bTB control.

1,115 badgers were shot in Cumbria Area 32 over the 4-years 2018-2021. Over this period, 17 herd incidents were recorded, although just four resulted in breakdowns with herds being withdrawn (OTF-W) from trading. After 4 years of culling and with some badger vaccination, by the first quarter of 2024 there were no significant differences in the number of bTB herd incidents, with a change from two per year to three, although it is not yet known how many incidents went on/will go on to be declared a full breakdown and further incidents in 2024 cannot be ruled out.

APHA have indicated that they believe anecdotally that reductions in OTF-W breakdowns reflect badger culling (Duncan 2024, Birch 2024). However, incidence of OTF-W in Cumbria cull area 32 was reduced from 6 breakdowns in 2016 and 2017 to two in 2018, prior to the commencement of badger culling, presumably because of increased testing, so this theory is unlikely and the trend since removing nearly all badgers is that the disease persists. Evidence gathered suggested badger culling is peripheral and most likely irrelevant to disease trends in cattle, which are reduced by more determined testing.

As presented in the main2023 report, the issue with disease control in Cumbria, as elsewhere, is the resolving of OTFW and OTFS cases prematurely when the disease is still present, resulting in the same herds breaking down after 60-day tests, and the persistence of disease even once badgers have been removed.

There is now strong, hard -won evidence that despite intensive badger culling in the LRA in response to clusters of bTB breakdowns, bTB persists in an area. This reflects a growing recognition that even under intensive cattle testing, the continued use of insensitive tests (SICCT and Gamma) result in a proportion of infected cattle remaining undetected. This is now widely understood and discussed by leading experts. Prevention of the more flexible use of more sensitive tests (such as the Enferplex and Actiphage tests) that have become available in recent years is now preventing disease control at high cost to the public and industry and at high human and animal welfare cost.

To date, in Cumbria Hotspot 21, there has been no improvement in the incidence of bTB since culling ceased in 2021. Culling and some vaccination of remaining/recolonizing badgers has had no significant impact and has not resulted in or contributed to the elimination of bTB in this part of Cumbria. Meanwhile, cattle testing is also failing in other parts of Cumbria. The LRA epi-culling strategy, which is the basis for the 'targeted badger intervention' strategy proposed in Defra's 14th March consultation, is a failure not to be repeated.

Badger culling in Cumbria and Lincolnshire can be seen to have had no effect on bTB OTF-W breakdowns since 2018 for the reasons explained. It would be unreasonable to continue this costly and distracting approach in the Low-Risk Area in the absence of any detectable disease reduction or economic benefit. Introducing it to the High-Risk Area or Edge Area is also not justified from the Low Risk Area experience. If it has no value in areas infected over the last 10 years, then it is unlikely to have effect in areas which have experienced bTB for often much longer.

Anyone looking at and considering the Cumbria and Lincolnshire results could not possibly find a credible argument that badger culling should continue, as intimated in the current Defra consultation (Gov.UK 2024). The experience in Cumbria and Lincolnshire clearly demonstrates yet again that badger culling has had no demonstrable effect, and that efforts should instead be focused on tougher approaches to cattle testing and associated cattle movement restrictions.

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