

## DEBATE SUMMARY

Policy choices for the reduction of bovine tuberculosis (TB)

Held at The Royal Society on 2<sup>nd</sup> April, 2014

The hash tag for this debate is #bovinetb .

**Chair:** **The Earl of Selborne GBE FRS**  
Chairman, The Foundation for Science and Technology

**Speakers:** **Adam Quinney**  
Farmer and former Vice-President, NFU  
**Professor Rosie Woodroffe**  
Senior Research Fellow, Institute of Zoology, Zoological Society of London  
**Dr Miles Parker OBE FSB**  
Senior Research Associate, Centre for Science and Policy, University of Cambridge

**Panellist:** **Professor Chris Gaskell CBE**  
Principal, Royal Agricultural University

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MR QUINNEY summarized the history of TB infected cattle. In the 1980s less than 500 cattle had been infected and slaughtered per year, by the late 1990s, after the passing of the Badgers Act which protected badgers, the total was around 5,000, and by 2012, around 26,500 cattle were slaughtered in England costing £100 million/year. From the 1970s politicians took little interest in food production and put a low value on the economics of dairy and beef farming. But now the position is different. Politicians and the public realized that strong UK food production was essential economically and strategically; the value of cattle had risen and its export trade so vital that without it our herds would decline further. Cattle numbers have already dropped from 16 million to 10 million. It is crucial that we now tackle effectively the problem of TB infection of cattle from badgers. For this we need leadership, a partnership with the government and farmers; a plan and a budget that will deliver. The EU should be effectively engaged in these discussions.

A big problem was that farmers did not trust Defra (Department for Environment, Food and Rural Affairs). It was bureaucratic, inconsistent in its advice and had problems with the IT systems collecting statistics. Unless farmers bought into any plan and regulatory requirements, whatever proposals

came out from Defra would not work. There needed to be greater recognition of the different problems in different areas and different ways of treating them (culling in high risk areas, vaccination in edge areas and low risk ones) and what controls on movement were essential. Cattle vaccination should be trialled and more research undertaken. A better system for tracking movement and the farms of where cattle had been was needed. Farmers needed more and better information, confidence that their economic and practical problems were understood and a joint effort with Defra to develop a better regime. He felt that this could best be done by setting up an independent commission with all stakeholders on board. Lastly, the impact on farmers, their families and their staff of slaughtering TB infected cattle should not be forgotten.

PROFESSOR WOODROFFE said that there was no doubt that bovine TB is a huge problem for beef and dairy farmers, and that badgers were part of the problem. We must seek an effective solution. In order to do that we must understand disease dynamics, and what the effects of culling or vaccination would be on badgers and the spread of infection to cattle.

Briefly she described the relationship between infectious and susceptible hosts; how infections and immunity built up differentially depending on isolation or herding. The size and social structure of any group was important in understanding its susceptibility to infection, and the effects of control. Badgers lived naturally in close groups within a limited territory; therefore the ability to infect cattle over a wide area was limited. But if culling took place, while the number of badgers was reduced, they started to range more widely and could infect cattle over a wider area. Also the infected badger percentage in the remaining group was likely to go up. So, with large scale culling, badger numbers are much reduced, but the number with TB increased; fewer cattle within a culling area have TB, but more outside do. The cost per square kilometre for large scale culling is from around £300 to £2,500 plus £4,400 for policing.

The alternative, badger vaccination, is possible as injectable vaccines are available now. Vaccination reduces the risk of cubs becoming infected by 79% if 30% of adults are vaccinated. Badgers do not range more widely, as their social structure is maintained, so transmission to cattle is reduced. The cost per square kilometre is £1,330 to £4,000. So both culling and vaccination have the capacity to control disease from wildlife animals such as badgers. There are clearly benefits to badgers in vaccination rather than culling, but there are still problems to be solved. We do not know how effective vaccination is to control of TB infection in cattle without a properly conducted trial. We do know that after large scale culling, there was less TB in cattle in the cull area but increased TB in cattle outside the area.

DR PARKER set out some of the trends in the incidence and prevalence of cattle TB since the resumption of testing after Foot and Mouth in 2001/2002. There had been steady increase of the disease over time but the rate had slowed down in recent years. Increased controls on movement of cattle and increased testing in high risk and edge areas may have contributed to this. High risk areas had also been increasing as the disease prevalence spread from the South West of England. Meanwhile, the cattle herd had been declining by 90,000 per annum. The decline is not related to TB; markets and global competition were more important. Badger numbers were increasing - the numbers of badger social groups has increased between 70% to 105% since observations over the

period 1985 to 1988 of main setts. Note that while badger to cattle transmission was estimated to be responsible for only 6% of cases, cattle to cattle transmission was thought to be responsible for around 50%. Observations of the past were not a good guide to the future.

He outlined various methods of managing the disease - containment, intensive testing, biosecurity, vaccination, and wildlife control. Containment means recognizing the difference between the high risk, low risk and edge areas, monitoring and limiting movement between them and devising different control mechanism for each area. Intensive testing using both tuberculin skin testing and gamma interferon (g-IFN) more proactively had helped early identification of infected herds. Pre-movement testing was particularly important. Biosecurity can be improved by controlling farm movement, dealing with infected cattle and general husbandry particularly design of farm buildings, early detection of problems at slaughter houses and risk based trading (knowledge of the history of animals being bought and sold). Vaccination was only 60% effective in uninfected animals and interfered with skin tests. It could be ten years before use of BCG would be allowed without trade restrictions. Wildlife control is possible but we require better understanding of badger movement habits and changes in their social structure when culling takes place. Lessons may be learned from other countries who face disease control where wildlife and domesticated animals infect each other.

PROFESSOR GASKELL opened the following discussion. Cattle TB from badgers was a serious problem needing understanding of natural science, economics, social sciences, veterinary science and the political impact of any action. As an example of the last, he noted that simultaneously Wales had stopped culling and England had started using the same evidence base. The call was always for evidence based policy, but what was the strength of the evidence and who evaluated it?

He analysed the following categories of evidence - evidence which commanded universal consensus from an evidence base; evidence which experts accepted; evidence which the majority of stakeholders accepted as "common sense"; and evidence for which there was little support, but was worthy of further consideration. There was consensus on bovine TB on the following (a) there must be a mix of controls - there is no silver bullet

- we are not sure which works best, (b) different areas (High risk, Low risk and Edge) need different controls, (c) there is an association between badgers and bovine TB, but cattle to cattle infection is the dominant element, (d) culling reduces badger numbers and reduces contact between badgers and cattle, (e) vaccination will not affect badger population but preserves their social structure and (f) no system of control will be effective without the confidence and involvement of farmers.

A key consensus point was that the eventual decision on what control measure to implement was a political one.

There is evidence, but less consensus, that cattle vaccination is the right approach in certain areas; and there is no consensus on how to control disease in wildlife areas (to cull or not); how stringent the controls on cattle movement should be; what is the cost effectiveness of controls; whether they need to be more site specific; what is the role of the vet; and, finally, have we overlooked some other control option or subtlety in the ecosystem?

Participants endorsed Mr Quinney's view that a major problem was lack of trust and confidence in Defra by farmers. They distrust its motives, and see it over influenced by wildlife enthusiasts. Defra sometimes seem to be supporting the polarization of issues, and did not act always in a transparent way for example holding back publication of advisory reports such as the *Pilot badger culls in Somerset and Gloucestershire: report by the Independent Expert Panel*<sup>1</sup>.

Farmers want more information on the way decisions are made. A key task for Defra should be to educate people, to get them to understand about the importance of cattle herds and how TB can be controlled while still preserving wildlife. It is wrong to assume farmers are anti-badger; they welcome healthy badgers on their land. Vets could play a major role in implementing policies as they are trusted by farmers. One participant, however, gave a vivid account of the reaction of farmers in Somerset to the issue - they

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<sup>1</sup> The Independent Expert Panel report was published the day after this debate together with the Government response – see [www.gov.uk/government/publications/pilot-badger-culls-in-somerset-and-gloucestershire-report-by-the-independent-expert-panel](http://www.gov.uk/government/publications/pilot-badger-culls-in-somerset-and-gloucestershire-report-by-the-independent-expert-panel)

don't believe science can help; they consider the NFU is not helpful; believe badgers are worthless, no farmer wants them on his land, and controls on movement will be evaded.

Participants were concerned that the issue had been too narrowly addressed. Had there been studies about the effect of low selenium levels in soils leading to increased TB infection rates in cattle because of reduced immunity? Others said that the evidence of this showed no strong link. Had sufficient account been taken of the great variation in types of TB in cattle? Had sufficient attention been given to the general health of the herds and how specific factors, such as poor husbandry, or unsuitable feedstock, had played out in considering susceptibility and immunity.

Indeed, one of the problems of bovine TB was that it tended to dominate farmers' attitudes, and demote other health and husbandry issues in their minds. A particular issue was the possibility of latent TB in the herds, which would not be captured by tests, but later affect cattle in the herd. It was accepted this was a problem as disease may take a long time to develop, as was the possibility that infection was so low that it was not captured by tests. Had consideration been given to increasing the resilience of cattle to TB by selective breeding? There was some circumstantial evidence that certain breeds were more resistant, but there were other factors involved. But inherited resistance is important and more research is needed.

Participants believed the speakers had not given sufficient prominence to the role of public opinion and its influence on politicians. People disliked the idea of killing badgers and politicians must consider this - which was no doubt why Defra was seen as seeking ways to justify culling. The welfare argument also should not be discounted. It was not absurd to be concerned with the welfare of badgers, whether and how they should live, and what would be effects of vaccination. The public would almost certainly consider that vaccination ought to be the first option.

The different policies in Ireland and Wales were discussed. Crucially, in Ireland, there had not been an increase in badgers with TB because of the local ecology, and smaller population. In Ireland the trials were not randomised and were not controlled.

A participant suggested that the increase in high risk areas came from other factors, such

as tourism. A broader question was the whole countryside issue - farming was only one source of income for farmers - tourism and recreation were important and the countryside must be available for those purposes. Piles of dead badgers would be no way to improve the allure of the countryside.

How wide was the knowledge of Defra on badger ecology here and in other countries? Defra was informed on these issues, and still considered that, at any rate at present, culling was essential. But they were aware that small scale culling was ineffective; the question then was would farmers buy into large scale culling. We do not really understand why badger populations have increased, nor whether they are the sole wildlife carriers of TB which could affect cattle. More research was essential, but Defra was not able in current conditions to release additional resources for research.

Participants stressed the need for farmers to become more actively involved in cattle management on their farms - they need to think proactively about the consequences of even minor movements, and how cattle can

be prevented from contact with badgers, by, for example, more use of better building practices to keep badgers and cattle apart.

Crucial points arising from the discussion were: First, build policies on points where there was universal consensus; it was the means to stop the polarizing of the issue into pro or anti badger, or farmers against the rest. Second, education of the public was vital, starting in schools. Third, there were a mix of methods for containing the problem; there was no silver bullet. Fourth the distrust of farmers for Defra must be addressed. No solution could work without partnership between government and the agricultural community. Fifth, there were still unanswered questions - more research was urgently needed, in particular into the transmission pathways of the disease from badgers to cattle and cattle to cattle, the development of better testing methods for bovine TB and TB in badgers, and tagging systems to measure badger habits.

Sir Geoffrey Chipperfield KCB

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**Click on the underlined links below to go to the page.**

**Government Publications on the Control of Bovine TB published on 3<sup>rd</sup> April, 2014 after this debate:**

Pilot badger culls in Somerset and Gloucestershire: report by the Independent Expert Panel

[www.gov.uk/government/policy-advisory-groups/badger-culling-pilots-independent-expert-panel](http://www.gov.uk/government/policy-advisory-groups/badger-culling-pilots-independent-expert-panel)

Government response to the Independent Expert Panel report

[www.gov.uk/government/publications/pilot-badger-culls-in-somerset-and-gloucestershire-defra-response-to-the-report-by-the-independent-expert-panel](http://www.gov.uk/government/publications/pilot-badger-culls-in-somerset-and-gloucestershire-defra-response-to-the-report-by-the-independent-expert-panel)

Defra Secretary of State, Owen Paterson's announcement on control of bovine TB

[www.gov.uk/government/news/plans-to-eradicate-bovine-tb-in-england-unveiled](http://www.gov.uk/government/news/plans-to-eradicate-bovine-tb-in-england-unveiled)

Defra bovine TB control strategy:

[www.gov.uk/government/publications/a-strategy-for-achieving-officially-bovine-tuberculosis-free-status-for-england](http://www.gov.uk/government/publications/a-strategy-for-achieving-officially-bovine-tuberculosis-free-status-for-england)

Defra Reducing Bovine Tuberculosis Policy

[www.gov.uk/government/policies/reducing-bovine-tuberculosis](http://www.gov.uk/government/policies/reducing-bovine-tuberculosis)

**Other Useful Links:**

Animal Health and Veterinary Laboratories Agency (AHVLA) – bovine TB surveillance reports

[www.defra.gov.uk/ahvla-en/publication/pub-survreport-tb/](http://www.defra.gov.uk/ahvla-en/publication/pub-survreport-tb/)

Biotechnology and Biological Sciences Research Council

[www.bbsrc.ac.uk](http://www.bbsrc.ac.uk)

Defra Archive Pages on Bovine TB control

[www.defra.gov.uk/animal-diseases/a-z/bovine-tb/](http://www.defra.gov.uk/animal-diseases/a-z/bovine-tb/)

Economic and Social Research Council

[www.esrc.ac.uk](http://www.esrc.ac.uk)

Engineering and Physical Sciences Research Council  
[www.epsrc.ac.uk](http://www.epsrc.ac.uk)

The Foundation for Science and Technology  
[www.foundation.org.uk](http://www.foundation.org.uk)

Government Office for Science  
[www.bis.gov.uk/go-science](http://www.bis.gov.uk/go-science)

Professor Rosie Woodroffe, Institute of Zoology, Zoological Society of London  
[www.zsl.org/users/rosie-woodroffe](http://www.zsl.org/users/rosie-woodroffe)

Natural Environment Research Council  
[www.nerc.ac.uk](http://www.nerc.ac.uk)

National Farmers' Union  
[www.nfuonline.com](http://www.nfuonline.com)

Parliamentary Briefing Note including the Randomised Badger Culling Trial Results  
[www.parliament.uk/briefing-papers/sn05873.pdf](http://www.parliament.uk/briefing-papers/sn05873.pdf)

Research Councils UK  
[www.rcuk.ac.uk](http://www.rcuk.ac.uk)

Royal Agricultural University  
[www.rau.ac.uk](http://www.rau.ac.uk)

The Royal Society  
[www.royalsociety.org](http://www.royalsociety.org)

Science Advisory Council for Wales; Report of the Bovine TB Science Review Group, November 2011  
<http://wales.gov.uk/docs/sacw/publications/130201tbreporten.pdf>

Welsh Government badger vaccination programme  
<http://wales.gov.uk/topics/environmentcountryside/ahw/disease/bovinetuberculosis/intensive-action-area/badger-vaccination-iaa/?lang=en>

Reference:

A restatement of the natural science evidence base relevant to the control of bovine tuberculosis in Great Britain  
H. Charles J. Godfray, Christl A. Donnelly, Rowland R. Kao, David W. Macdonald, Robbie A. McDonald, Gillian Petrokofsky,  
James L. N. Wood, Rosie Woodroffe, Douglas B. Young, and Angela R. McLean  
*Proc. R. Soc. B* 2013 280, 20131634, published 7 August 2013  
[www.rspb.royalsocietypublishing.org/content](http://www.rspb.royalsocietypublishing.org/content)

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