

# **Bovine TB**

**Time for a Rethink**



**'Chronic and debilitating'**

**'Wrecking families'**

**'Putting people out of business'**

**'Destroying livelihoods'**

**- the DISEASE or the POLICY?**

Rethink Bovine TB is an independent research group funded by people with an interest in examining public policy as it affects agriculture, animal diseases, animal welfare and the financial viability of farming.

Rethink Bovine TB gratefully acknowledges original research and evidence offered by academic and industry experts and information and data provided by the Department for Environment, Food and Rural Affairs.

We hope that this report will serve to stimulate discussion and bring Bovine TB policy, essentially unchanged for many decades, rapidly into the twenty first century. We look forward to and welcome comments and criticism from all who read it.

Please contact Michael Ritchie, Press Officer, on 0207 993 5404 or email: [farming@rethinkbtb.org](mailto:farming@rethinkbtb.org) with your comments and feedback.

For more information visit [www.rethinkbtb.org](http://www.rethinkbtb.org)

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*Great care has been taken to ensure accuracy of content based on the information available but the authors do not accept responsibility or liability for any errors or omissions.*

# 1. Introduction

In this discussion paper we consider current Bovine TB policy in England and Wales, and propose alternatives that we believe to be both practical and cost effective.

We have drawn our evidence from a variety of sources, but in particular from Defra (the Department for Environment Food and Rural Affairs) and from earlier work by Professor Paul Torgerson <sup>18</sup> and Professor David Torgerson <sup>19</sup>.

Where numerical or statistical arguments are necessary to show what is actually happening on farms, we have explained the argument as clearly as possible. We have also explained that some widely held views are supported only by statistical correlation (open to many alternative explanations), rather than any evidence of a physical link between effect and presumed cause.

## 2. Summary

### 2.1 Human Health

In the UK, human infection with the bacterium responsible for Bovine TB, *Mycobacterium bovis*, is almost non-existent, principally because of pasteurisation of milk and cooking of meat. Most of the few cases were contracted abroad or before pasteurisation of milk.

### 2.2 Animal Health

Infected cattle have little probability of developing the disease and seldom show symptoms during their (often short) economic lives. The principal animal welfare implication is not the disease but premature slaughter under the current 'test and cull' policy. The effect of the policy is worse than the disease.

### 2.3 Current Policy

Defra's stated reasons for the current policy, principally protection of human health, exports and animal welfare, do not stand examination.

The policy relies on a flawed diagnostic test that even Defra describes as 'imperfect' <sup>11</sup>. It leaves potentially infected animals in the herd, and falsely condemns large numbers of healthy animals.

The policy is causing widespread losses and distress to farmers, and is a burden on the taxpayer. After 60 years of cattle testing and culling, further decades of compulsory slaughter separate us from an uncertain chance of TB free status. Defra admits the policy is failing and that the reasons are not known.

### 2.4 The Solution

According to Defra cattle vaccination will be licensed next year (2012). Only the EU prevents us from using vaccination and from allowing farmers the freedom to choose the most suitable means of Bovine TB control for their circumstances.

*Transmission  
to humans is  
virtually zero*

Whatever aspect is considered - farming profit, cost effectiveness for the taxpayer, animal welfare, human health, conservation or food security - the current policy is a resounding failure.

This discussion document proposes solutions.

### **3. What is Bovine TB?**

Bovine TB is caused by the bacterium *Mycobacterium bovis* (*M. bovis*). It is difficult to diagnose, particularly in the early stages. The very rare clinical signs may include emaciation, lethargy, weakness, anorexia, low-grade fever, pneumonia with a chronic moist cough, lymph node enlargement and visible or microscopic lesions in infected organs.

Any mammal can contract Bovine TB, but surprisingly little is known about how it is spread, what makes animals susceptible to it and how it develops in the host animal.

It is very unusual for humans to catch Bovine TB in the UK. In 2009, for example, it accounted for only 0.5% or about 45 of the 9,040 human cases of TB in the UK <sup>1</sup>. Most cases of TB in humans are caused by a different bacterium, *Mycobacterium tuberculosis*.

Virtually all the few human cases of Bovine TB are either in older people who have reactivated old lesions acquired before widespread pasteurisation of milk, or in people who were infected overseas. Thus transmission to humans actually taking place in the UK is negligible <sup>2</sup>.

The test used for TB in humans is similar in mechanism and function to the skin test used on cattle. Interestingly humans who react to it are classed as immune unless signs of disease can be detected, whereas cattle are classed as reactors and slaughtered, whether symptoms exist or not.

In the case of cattle, most authorities on the subject (including Defra) believe that Bovine TB is most likely to enter previously uninfected areas as a result of cattle movement, and then primarily spread between cattle in respiratory secretions<sup>3</sup>.

There is some evidence of a statistical link between the prevalence of Bovine TB infection in cattle and in badgers but no direction or means of transmission has been established with any certainty<sup>4</sup>. Possible explanations for the statistical correlation include cross infection between the species (either cattle to badger or badger to cattle) or a locally occurring common risk factor, causing both species to be independently susceptible. The matter is likely to remain shrouded in uncertainty and controversy. Even less is known about whether other domestic and wild mammal species are implicated in cattle infection.

Even in areas where it is rife, most wild and domestic animals fight off the disease. This is the natural and correct

response of the immune system. A few animals may succumb to infection and develop symptoms (i.e. become 'ill').

The economic lifespan of cattle varies but, with the exception of breeding stock, tends to be relatively short. Following initial challenge by *M. bovis* bacteria, infection may be held in a dormant state by the immune system for many years or indefinitely. Hence the fact an animal is a 'reactor' does not mean it will go on to develop the symptoms of having the disease Bovine TB, be infectious, or become ill. It may simply have immunity.

#### **4. Reasons for current Bovine TB policy**

Every policy and action of government must have a reason. Defra offers diverse reasons in its publications <sup>5,6,7</sup>, the only consistency being that they are significantly different in every document. They attempt to justify many of these reasons with circular, self-fulfilling arguments. We will consider the version in Defra's 'Bovine Tuberculosis Evidence Plan 2011/12' <sup>6</sup>.

***'Protect the health of the public and maintain public confidence in the safety of products entering the food chain.'***

This seems a powerful and compelling argument until the evidence is considered. Defra and the Health Protection Agency admit that the risk of humans catching Bovine TB from meat is negligible. So negligible that potentially infected cattle slaughtered after failing a TB test, and cattle found at abattoirs to be infected, are sold for human consumption (with any TB lesions, which happen to be visible, removed).

Defra and the Health Protection Agency admit pasteurisation of milk kills *M. bovis* bacteria, removing any danger of infection. Raw milk is only sold from TB free herds.

***'Protect and promote the health and welfare of animals.'***

Slaughtering animals because they might develop a disease for which vaccination is possible is hardly conducive to their welfare, particularly when the test and slaughter policy relies, as we shall explain below, on an inaccurate, if not dysfunctional test.

***'Meet our international (in particular EU) and domestic legal commitments and maintain the UK's reputation for safe and high quality food,' and 'Maintain productive and sustainable beef and dairy sectors in England securing opportunities for international trade and minimising environmental impacts.'***

Meeting legal commitments is not a reason for having those legal commitments.

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The UK's reputation for safe and high quality food is not enhanced by a failed policy. The present policy is doing nothing to make farming productive, rather the opposite. How such a policy can be sustainable or minimize environmental impacts is a complete mystery.

Trade with EU countries is often cited in this context. The relevant EU provisions only affect export of live cattle, not meat and dairy products. Since the BSE ban was lifted, live cattle exports have never exceeded £3.3 million in annual value <sup>8</sup>. This controversial trade (which includes large numbers of calves sold at low prices for rearing in continental veal crates) is hardly worth over £100 million of taxpayers' money spent every year on Bovine TB control.

We need to reduce the cost of Bovine TB to farmers and taxpayers. Ask any farmer what the cost of Bovine TB is and he will say testing, culling and movement restrictions, imposed by the present policy. A policy aimed at reducing the cost would introduce better and cheaper ways of managing and preventing disease, such as those we consider in our conclusion.

**We hold that not one of the diverse and ever changing reasons put forward by Defra stands examination.**

However, UK policy is ultimately driven by the EU requiring member states to eradicate Bovine TB and laying down the precise means to be used, along with prohibition of vaccination <sup>9</sup>.

No specific reasons for EU Bovine TB policy can be found, except those for the overall Community Animal Health Policy which covers a multitude of diseases, including Bovine TB. The reasons stated for the Community Animal Health Policy <sup>10</sup> are similar to those used by Defra in respect of Bovine TB, and just as irrelevant to Bovine TB.

**Not one of the reasons for EU policy stands examination either.**

For any government to intervene in private or business affairs, and in particular to take and kill livestock, there must be a sound justification rooted in the common good. No such justification has been advanced.

**The current Bovine TB policy is without foundation.**

## **5. How current policy is delivered.**

Under the current UK 'test and cull' policy, cattle are tested at intervals determined by risk of infection. Those that fail the test are slaughtered and severe restrictions on cattle movement are placed on the farm.

In the test primarily used in the UK, a small amount of

tuberculin (a sterile extract obtained from a culture of *M. bovis*) is injected into the animal. A swelling will occur if the animal has previously been challenged by, and the immune system has reacted to, tuberculosis bacteria.

However, reactions of the animal's immune system to other types of mycobacteria can also cause the swelling. To reduce the number of false diagnoses this would lead to, a preparation of *M. avian*, the avian form of tuberculosis, is injected nearby. *M. avian* is widely present in the environment. It is not harmful to cattle, although their immune system reacts to it.

The swellings are compared after 72 hours. Statistical studies, rather than an understanding of the underlying biological mechanism, have indicated that if the *M. bovis* swelling is significantly larger than the *M. avian* swelling, a reaction to *M. bovis* has occurred. The animal is then deemed to be a 'reactor' and killed.

This test is known as the 'skin test' (or more properly as the *single intradermal comparative cervical tuberculin test*).

A blood test, the *gamma interferon* test, is also used on some occasions as an ancillary test. It evaluates the same immune response but is conducted in the laboratory. There are documented cases of wildly differing results from using the two tests on the same herd.

If an animal fails either the skin or blood tests it is slaughtered.

Serious concerns (some of which we will explain below) exist among scientists and farmers about the accuracy of the tests, while Defra goes as far as to admit the tests are 'imperfect'<sup>11</sup>.

## 6. Why 'test and cull' is not working.

After sixty painful and expensive years of testing and slaughtering cattle, and an intervening period of relatively few incidents of Bovine TB, we are again several decades from any chance of 'official TB free' status. As the Bovine TB Advisory Group concluded in its final report to Defra <sup>12</sup>;

*"Bovine TB has been a difficult and demanding problem for many years. There are reasons for believing that it can be controlled and finally eradicated but this will require a long-term commitment by all stakeholders **and take at least 20 years.**"*

Can we afford the cost and will farmers tolerate another 20 years of movement restrictions, disruptive and inaccurate testing and compulsory cattle culling?

Over the period 1998 - 2009 the number of new herd incidents<sup>13</sup> in Great Britain increased by 276%, and the

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number of cattle consequently culled, by a staggering 477%. Defra states that;

*"The causes of the long-term increase in bTB in GB are not well understood as there are likely to be many factors involved".<sup>14</sup>*

**In other words Defra does not know why there has been a dramatic long term increase, or why Bovine TB policy has failed.**

To avoid confusion, we use the term 'official TB free' status, which correctly describes a state of very low incidence of Bovine TB. This is the best the test and cull policy could ever achieve. Defra uses the term 'eradication' to mean the same. However, 'eradication', used in a scientific or veterinary context such as this, means extermination of an infectious agent so that no further cases of the related disease can occur. Only two diseases have ever been eradicated; smallpox and rinderpest, the latter being a cattle disease. Both were eradicated using vaccination.

**The 'skin test' is compromised by three major shortcomings.**

#### **1. False positives.**

According to Defra <sup>11</sup> the test falsely condemns only 1 in 1,000 cattle tested. (The 'specificity' of the test). This makes the test sound accurate until what it really means is realised.

#### **Using Defra's testing figures <sup>15</sup> (for 2009):**

In England 4,899,144 tests were performed, 1 in 1,000 tests, 4,899 in those 4,899,144, will be false reactors or 'false positives', 24,924 cattle were actually condemned as reactors, 4,899 or **1 in every 5** of those cattle will have been incorrectly condemned.

In Wales 1,812,666 tests were performed, 1 in 1,000 tests, 1,812 in those 1,812,666, will be false reactors or 'false positives', 10,117 cattle were actually condemned as reactors, 1,812 cattle, or **1 in every 6** of those cattle will have been incorrectly condemned.

In Scotland 229,800 tests were performed, 1 in 1,000 tests, 229 in those 229,800, will be false reactors or 'false positives', 323 cattle were actually condemned as reactors, 229 or a staggering **2 out of every 3** of those cattle will have been incorrectly condemned.

The principle of this calculation has been confirmed by Defra in a letter ref. RFI 3725 & RFI 3749 of 19 January 2011 <sup>17</sup>.

Not only are thousands of cattle being falsely



condemned, but as herd size increases, the chance of a false positive in the herd increases. Thus the larger the herd, the greater the chance that such a false positive will be the sole cause of movement restrictions and repeat testing on the entire farm, with all the accompanying disruption, costs and anxiety to the owner.

The *gamma interferon* blood test, used on some occasions as an ancillary test, has a higher sensitivity, thus showing less false negatives (see 2 below) but, having a massively inferior specificity. It condemns an even higher proportion of cattle as false positives.

## 2. False negatives.

According to Defra<sup>11</sup> the skin test **misses 1 in 5 cattle that it should identify as reactors**. (This is the 'sensitivity' of the test). For every four 'reactors' slaughtered in the belief that they are or will become infectious or infected, **one more remains undetected and potentially infectious in the herd or worse still, moved to infect another herd** or area. If one or more reactors have been found in the herd, a further test is done 60 days later and it may then detect the missed reactors, or maybe not.

In many countries this shortcoming is recognized and the skin test is used as a herd test. All animals in the herd are tested individually as in Britain, **but if a single reactor is found, the entire herd is slaughtered** and restocking is delayed.

## 3. A functional test should detect cattle that have, or will have, Bovine TB.

The skin test does not do this, it identifies animals that have come into contact with *M. bovis* and mounted an immune reaction - exactly what a healthy animal should do.

The latent infection that remains may in some of these animals re-emerge as Bovine TB, but not in all. All are slaughtered.

Only about one third of reactors show evidence of infection at postmortem and can be listed as 'confirmed reactors'. Much of the compensation paid to farmers is for healthy cattle that were unlikely to develop Bovine TB, or would have been slaughtered in the normal course of farm production long before any symptoms developed.

The testing regime:

- **Condemns thousands of cattle in error.**
- **Fails to detect a significant proportion of those cattle that are infected.**
- **Looks for the wrong thing.**

*'Test and cull'  
is not working*

## *The current policy has failed*

Besides the shortcomings in the 'imperfect' testing regime, Bovine TB policy is having severe effects on farming. Healthy cattle are being slaughtered and farmers are consequently suffering unnecessarily. If Bovine TB itself was affecting farm productivity, evidence would have emerged by now. It is not easy for cattle to catch Bovine TB and clinical symptoms are rarely seen on farms.

Testing requires unfamiliar and stressful handling of cattle, compromising both animal welfare and human safety. Compensation does not always cover the value of the animals and certainly not the consequences of movement restrictions and loss of critical breeding stock.

Defra, in its 'Bovine Tuberculosis Evidence Plan 2011/12'<sup>6</sup> states, "... we also recognise that the current TB surveillance and control regime in cattle (based on test and slaughter of reactors) is not preventing the spread of TB to clean areas, and that the incidence of disease in endemic areas appears to be increasing." In other words Defra, to its credit, recognises failure of the policy. Sadly Defra has not proposed cessation or a viable alternative.

The devastating effect of Bovine TB is not the effect of the disease; **it is the effect of the Bovine TB eradication policy.** This policy has failed, producing limited, if any, results and causing severe human and animal welfare problems, at enormous cost to the taxpayer.

**The policy is not only ineffective, it is far worse than the disease.**

### **7. Rethink: there must be a better way**

Whatever aspect is considered - farming profit, cost effectiveness for the taxpayer, animal welfare, human health, conservation or food security - the current policy is a resounding failure.

No business (or rational person) would continue a policy which had **no good reason for existence** and a **60 year history of failure.**

The criteria for a successful policy would be:

- Protection of human health.
- Protection of animal welfare.
- Security of supply of good food from a prosperous and financially self-sufficient farming industry.
- Low or no cost to taxpayers.
- Farms regain primary responsibility for animal welfare, product safety and quality.

## What options exist?

1. Continuing with the current policy, even with marginal changes, cannot be considered a serious option.

2. Drastically increased severity applied to the current policy, along the lines of measures adopted in Australia and the USA, might increase effectiveness:

- Changing from culling of individual animals to complete herd depopulation, dealing with wildlife reservoirs and delaying restocking of cattle.
- Increased risk based and out of area movement controls.
- More frequent testing of cattle, and use of alternative tests.

Clearly the political and financial cost of such measures would be prohibitive and attainment of 'official TB free' status would still take decades to achieve.

3. Acceptance that Bovine TB is not a significant human health risk in the UK and that farmers know best what will work in their circumstances.

- Farms would be free to choose to vaccinate cattle and/or various degrees of compulsory vaccination could be introduced.
- Milk would continue to be pasteurised.
- Inspection at abattoirs would continue.
- Farms would be free to continue routine testing and acquire herd TB free status or to choose vaccinated status, in response to market demand or farm preference.
- Any animal showing actual symptoms of Bovine TB would be tested and either slaughtered, or in appropriate cases, could be isolated and treated.
- Farmers would have the freedom to choose (within guidelines) the most suitable means for Bovine TB control in their circumstances. This is how most animal health problems are successfully managed.

The principle objection to vaccination is that, according to Defra (Options for vaccinating cattle against bovine tuberculosis, June 2007 <sup>16</sup>); *“Not all vaccinated animals would be protected from TB and therefore vaccination alone will not be sufficient to demonstrate disease free status without testing and allow trade in those animals”*. This is a disingenuous argument, as use of the skin test to demonstrate TB free status and select potentially infectious cattle is subject to the same shortcoming.

*There must be  
a better way*

Vaccines can be used for two complementary purposes - to protect individuals or to protect populations. No vaccine provides complete immunity to individuals, just a measure of protection. If enough animals are vaccinated with a typical vaccine it is near impossible for an epidemic to occur - this is the principle of herd immunity which is central to the many successful uses of vaccines to control epidemics.

## **8. Conclusion**

We are suffering under a policy that has demonstrably failed, at massive cost to farmers, to the taxpayer, and to animal welfare. At best it will take several more decades of cattle testing and slaughter to achieve 'official TB free' status.

No sound reason exists for the 'test and cull' policy.

A better way must be found.

When, as is the case with Bovine TB, no overriding public or animal welfare interest exists, farmers are best left to take responsibility for their own animals and business decisions.

**Given the lack of real practical human health risk, we propose that option 3 above should be adopted.**

- **Farms would be free to choose to vaccinate cattle and/or various degrees of compulsory vaccination could be introduced.**
- **Milk would continue to be pasteurised.**
- **Inspection at abattoirs would continue.**
- **Farms would be free to continue routine testing and acquire herd TB free status or to choose vaccinated status, in response to market demand or farm preference.**
- **Any animal showing actual symptoms of Bovine TB would be tested and either slaughtered, or in appropriate cases, could be isolated and treated.**
- **Farmers would have the freedom to choose (within guidelines) the most suitable means for Bovine TB control in their circumstances. This is how most animal health problems are successfully managed.**

**In addition to the savings to taxpayers, the saving to farmers in stress, anxiety and loss of production would be beyond calculation.**

## 9. Further information and references

‘*Public health and bovine tuberculosis: what’s all the fuss about?*’ (by Professors Paul R. Torgerson and David J. Torgerson), proposes that bTB control in cattle is irrelevant as a public health policy. They provide evidence to confirm that cattle-to-human transmission is negligible. They believe there is little evidence for a positive cost benefit in terms of animal health of bTB control. Such evidence is required; otherwise, there is little justification for the large sums of public money spent on bTB control in the UK.

This report can be downloaded from [www.rethinkbtb.org](http://www.rethinkbtb.org) and by clicking the links on the references the relevant documents referred to below will be displayed. (Note: Defra links are liable to change as they continually reorganise their web site).

An independent website, [www.bovinetb.co.uk](http://www.bovinetb.co.uk) questions and debates existing policy. It also includes case studies which reveal the flaws of the existing tests and how the policy is having an adverse effect on those involved.

### Refs:

1. [‘Tuberculosis in the UK: Annual report on tuberculosis surveillance in the UK’](#), 2010. London: Health Protection Agency Centre for Infections, October 2010, pages 7 and 17.
2. Professor Paul R Torgerson (co-author of ‘Public health and bovine tuberculosis: what’s all the fuss about?’), email 22/02/11 tells us that virtually all these cases are either in old people who probably have reactivated old lesions that were acquired before there was compulsory milk pasteurisation or immigrants who were infected overseas. Thus transmission to humans in the UK is virtually zero at the present time.
3. Gilbert et al, Nature 26 May 2005, [Cattle movements and bovine tuberculosis in Great Britain](#)  
Defra, [What is Bovine TB](#)  
[Comments by Tony Edwards](#), then Director of Animal Health Wales, Western Mail 23 June 2009.
4. [Survey of Mycobacterium bovis infection in badgers found dead in Wales](#), January 2007, Veterinary Laboratories Agency, executive summary, para 1.7.
5. Defra’s [‘Options for vaccinating cattle against bovine tuberculosis’](#), page 10, para 2.1.
6. Defra’s [‘Bovine TB Evidence Plan 2011/12’](#).
7. Defra’s [new web site on TB control](#)
8. [Freedom of information request on cattle export figures dated 9/2/11 and 10/2/11 from Gardiner, Joanne \(FFG-EKBES, Defra\)](#).
9. [EU Directive 78/52/EEC of 13 December 1977 Chapter III Article 13b](#).  
Also see: [EU Regulation \(EC\) No 853/2004 of 29 April 2004 Section IX Chapter I Para 4. EU Directive 64/432/EEC](#).
10. [EU Community Animal Health Policy](#)
11. [‘Dealing with Bovine TB in your herd’](#), Defra May 2008, Page 13.
12. [‘Bovine Tuberculosis in England: Towards Eradication, Final Report of the Bovine TB Advisory Group’](#), April 2009, Page 4.
13. <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/tb/stats/county.htm> (taking 3 year averages for 1998-2000 and 2007-2009).  
see also [Key herd / animal statistics \(by county\):1998-2010](#)
14. [Options for vaccinating cattle against bovine tuberculosis](#), Defra, para 22.2.16, page 13.
15. [Detailed year-end TB statistics \(by region\): 2009-2010](#)
16. [Options for vaccinating cattle against bovine tuberculosis](#), Defra, para E10, page 5.
17. Defra correspondence, [‘specificity of the tuberculin skin test’](#) ref RFI 3725 & RFI 3749 of 19 January 2011.
18. Professor David Torgerson, Department of Health Sciences, University of York, England.
19. Professor Paul Torgerson, MRCVS. Division of Epidemiology, Vetsuisse Faculty, University of Zurich, Switzerland

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