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Northern Ireland Audit Office

Eradicating Bovine TB in Northern Ireland

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL
27 November 2018

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K J Donnelly
Comptroller and Auditor General

Northern Ireland Audit Office
27 November 2018

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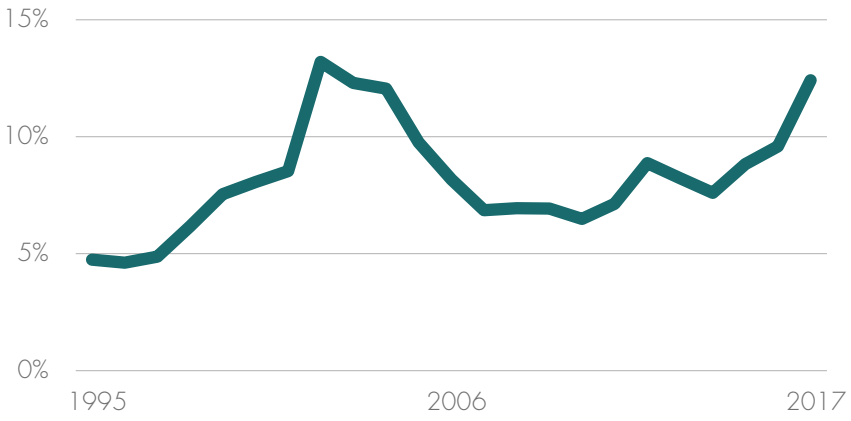
Key Facts

The eradication of Bovine TB has been a Departmental policy since 1964. The Department has incurred significant expenditure trying to meet this objective.

£44m	£555m
In 2017-18	Since 1996
[£10 million of this was funded through salvage receipts and European Union co-funding]	**[£85 million of this was funded through salvage receipts and European Union co-funding]**

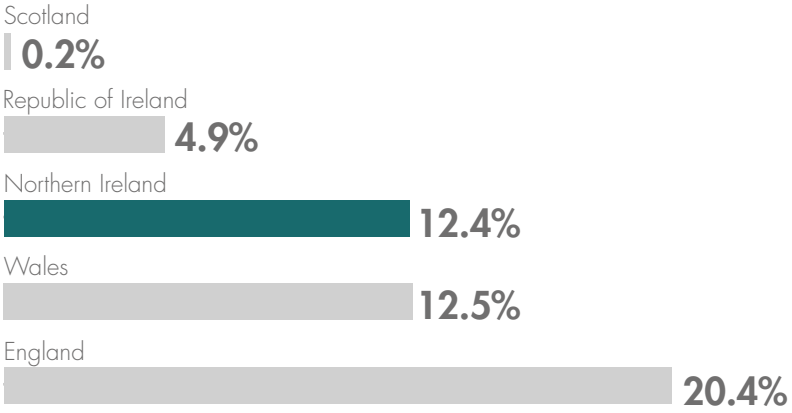
While we acknowledge that without the Department's intervention the prevalence of the disease would have been significantly higher, the rate of Bovine TB still remains high amongst herds in Northern Ireland.

Bovine TB Herd prevalence rates in Northern Ireland 1995-2017



The Northern Ireland prevalence of Bovine TB is similar to Wales and less than England, but greater than the Republic of Ireland:

Bovine TB herd prevalence by country (2017)



Glossary of Terms/Abbreviations

Term	Definition
APHIS	DAERA's Animal and Public Health Information System (APHIS) is a computer database for information on food animals and their keepers.
AERA Committee	Agriculture, Environment and Rural Affairs Committee.
bTB	Bovine Tuberculosis.
CAFRE	College of Agriculture, Food and Rural Enterprise.
Chronic herds	Herds that have prolonged and/or recurrent bTB breakdown incidents.
DAERA	Department of Agriculture, Environment and Rural Affairs.
DAFM	Department of Agriculture, Food and the Marine (Republic of Ireland).
DEFRA	Department for Environment, Food and Rural Affairs.
DVO	Divisional Veterinary Officer or Divisional Veterinary Office.
Edge Area	DEFRA's strategy for the eradication of bTB in England is applied through three management regions or zones. The Edge Area is a buffer zone between the High Risk Area (HRA) and Low Risk Area (LRA) in England. The incidence of bTB in the Edge Area is much lower than in the HRA, but higher than in the LRA.
FVO	Food and Veterinary Office (within European Union).
GIS	Geographical Information System
Herd Incidence	Number of new herd breakdowns divided by the number of herds with a herd level test over a specified period of time, expressed as a percentage (one herd with multiple tests is only counted once).
Herd Prevalence	Number of herds with a bTB reactor divided by the total number of herds with a herd level TB test, expressed as a percentage (one herd with multiple tests is only counted once). This may be expressed as over a certain time period (period prevalence).
HFAA	Health and Food Audits and Analysis.
High Risk Area	DEFRA's strategy for the eradication of bTB in England is applied through three management regions or zones. The High Risk Area covers the South West, West Midlands and East Sussex and is where a relatively high proportion of herds are infected by bTB.
Interferon Gamma Blood test (IFNG)	The test is carried out in the laboratory using freshly collected blood samples. It is a supplementary blood test that can be used alongside the skin test. It is the only UK and EU approved blood test for bTB.

Glossary of Terms/Abbreviations

Incidence	Number of reactors or new breakdown herds divided by the number of animal or herd tests over a specific period of time expressed as a percentage (one animal or herd with multiple tests is only counted once).
LRS	Lesion at Routine Slaughter – animals sent to the abattoir as part of normal business ('skin test' negative cattle) which are found to have bTB-like lesions at post mortem inspection.
Lesion	A lesion is abnormal damage or change in living tissue. bTB-like lesions may appear in any organ, although the respiratory system is most commonly affected. The absence of lesions does not confirm absence of the disease.
Low Risk Area	DEFRA's strategy for the eradication of bTB in England is applied through three management regions or zones. The Low Risk Area covers large parts of Northern and Eastern England. It has a low incidence of bTB and no recognised significant reservoir of the disease in wildlife.
New herd breakdown	A herd with at least one skin test reactor animal where the herd had no other reactor animals during the previous 12 months. NB, herds with Bovine TB confirmed from lesions found at routine slaughter, and no subsequent reactors during the breakdown, are not included.
NIAO	Northern Ireland Audit Office.
NIC	'Negative in Contact' - animals that are not positive to a diagnostic test, but are removed on the basis of being at increased disease risk due to the extent of their exposure to disease.
OTF	Officially Tuberculosis Free.
OTS	OTF Suspended.
OTW	OTF Withdrawn.
PAC	Public Accounts Committee.
PME	Post-Mortem Examination by meat inspectors in an abattoir.
Prevalence	Number of reactors or herds with a TB reactor divided by the total number of animals or herds tested.
PVPs	Private Veterinary Practitioners.
Reactor	An animal that gives a positive response to the skin test.
Routine slaughter	Animals sent to the abattoir by the farmer as part of normal business ('skin test' negative cattle).
RTA	Road Traffic Accident.

Glossary of Terms/Abbreviations

Salvage receipts	Income for carcasses of animals sent for slaughter under the eradication programme.
Sensitivity	The proportion of infected cattle that is correctly detected by the test.
SICCT	Single intradermal comparative cervical tuberculin test (also known as the 'skin test').
TBEP	bTB Eradication Partnership.
TBSPG	bTB Strategic Partnership Group.
Tuberculin	Tuberculin is a protein extract of either *Mycobacterium bovis* (in the case of Bovine tuberculin) or *Mycobacterium avium* subspecies *avium* (in the case of Avian tuberculin) that is used in the 'skin test' to detect the disease.
TVO and VOT	DAERA Temporary Veterinary Officer and Veterinary Officer Testing (TVOT). DAERA employed Veterinary Officers whose duties are mainly TB testing.
TVR	Test and Vaccinate or Remove (wildlife intervention research).
VO	DAERA Veterinary Officer.

Executive Summary

Executive Summary

Introduction

1. Bovine Tuberculosis (bTB) is a chronic, infectious cattle disease. It is difficult to clinically diagnose and tough to eradicate. The disease can spread between animals of the same, or different, species. Typically infection is spread between cattle herds through cattle movements or through direct or indirect contact with infected cattle in other herds or with infected wildlife. Spread within herds is through direct or indirect contact with infected cattle and/or infected wildlife.

2. bTB is no longer a human health problem here because of the current bTB testing programme, pasteurisation of milk and meat inspection. However it remains a risk, particularly for those working closely with cattle or drinking unpasteurised milk. As a result of the existing eradication programme, which ensures the removal of infected cattle, it is rare for the more advanced, clinical signs of the disease to be visible. Ensuring farmed animals are free from disease is clearly important for both human health and for animal welfare reasons. In addition, the disease status of herds impacts on the success of the agri-food industry and therefore the economy. Sales of livestock and livestock products outside Northern Ireland were estimated to be worth more than £1.5 billion in 2015.

Other EU states have tackled bTB successfully

3. Currently 18 (out of 28) European Union (EU) Member States have bTB-free (OTF) status, having demonstrated that the percentage of confirmed bTB cattle herds has not exceeded 0.1 per cent each year for six consecutive years. Within the United Kingdom (UK), only Scotland has achieved OTF status.

4. The Department of Agriculture, Environment and Rural Affairs' (the Department's) efforts to eradicate bTB have been largely unsuccessful. The eradication of bTB became Departmental policy in 1964. Over 50 years later, incidence of the disease remains relatively high. In 2017, 0.91 per cent of animals tested had a positive reaction. The annual herd prevalence (the proportion of the herds tested that had reactors) in Northern Ireland rose from 4.9 per cent in 1997 to 12.4 per cent in 2017.

bTB imposes significant costs on farmers and taxpayers

5. The Department's eradication programme cost the government around £44 million in 2017-18. This covered the cost of testing and compensation (paid at 100 per cent of market value for cattle compulsorily removed). Farmers also bear considerable costs of programme compliance, including the cost of facilitating testing and costs associated with loss of their OTF status should they become a TB breakdown herd.

6. Total gross expenditure on the bTB Eradication Programme since 1996 amounts to over £0.5 billion (excluding salvage receipts and European Union co-funding of £85 million). Between April 2006 and March 2018, the Department spent £356 million on its bTB eradication programme. Almost half of the Department's costs relate to compensation. Since 2006, some £158 million compensation has been paid to farmers for the compulsory removal of almost 127,500 cattle under the bTB eradication programme.

7. Under current arrangements, Northern Ireland farmers receive 100 per cent compensation when their animals are compulsorily removed for disease control purposes. In effect, since 1998, the public purse has underwritten farmers' risk of herds contracting bTB. In our view, this has provided little incentive for the industry to share ownership of the problem. If Northern Ireland secured OTF-status, annual compensation payments (over £23 million in 2017-18) and testing costs (over £9 million in 2017-18) would be reduced substantially. We note that the Department tried on two previous occasions to amend the compensation regime but its proposals were not supported by the Northern Ireland Assembly's Agriculture, Environment and Rural Affairs Committee. Members considered that they could not make a decision on changes to the compensation regime until a proper eradication plan is put in place to reduce and eradicate bTB.

Successful eradication depends upon tackling all sources of infection concurrently

8. Assessments of disease sources from June 2016 to January 2018 showed that around a quarter of herds which had tested positive for bTB (26 per cent) had more than one possible source or that the source was unknown (classified as 'Not Established'). Spread of the disease between cattle was attributed as the source in 22 per cent of breakdowns. Badgers were attributed as the cause in 22 per cent of the investigations. Purchased animals were the source of 19 per cent of the breakdowns and 7 per cent were due to carryover due to inadequate clearance of disease from the herd or from the environment.

9. In 2015, the European Commission was critical of several practices within Northern Ireland that impact on bTB infection control, for example, controls on animal movements, biosecurity measures and the level of Departmental engagement with stakeholders. Its report concluded that while the eradication programme was applied largely in accordance with planned arrangements, the incidence rate had not reduced to the extent that would be expected with an effective eradication programme.

10. In 2014, the Department appointed an independent expert advisory group, the TB Strategic Partnership Group (the Group) to develop a long-term strategy to eradicate bTB from the cattle population in Northern Ireland. The Group concluded that there is "*no single solution*" or "*quick*

Executive Summary

fix" and recognised that, internationally, eradication of bTB has only been achieved where all factors that contribute to the persistence and spread of the disease in infected livestock and wildlife populations are tackled concurrently. Importantly, the Group stated that the success of the Strategy is dependent on the"degree of co-operation between stakeholders".

11. The Group's '*Bovine Tuberculosis Eradication Strategy for Northern Ireland*' (the Strategy) was presented to the Department in December 2016. The Strategy addresses several major issues in eradicating bTB, including:

- The disincentive effect of uncapped 100 per cent compensation for animals removed under the eradication programme;
- The perception that this was the sole responsibility of government only, and the need for partnership working and a sharing of responsibility between government and industry for eradication to succeed;
- The need for improved biosecurity within farms;
- The need to deal simultaneously with the reservoir of disease in wildlife.

12. The Strategy formed the basis of the Department's consultation on proposals to eradicate bTB. The consultation closed on 5 February 2018. The Department told us an internal bTB Programme Management Board will consider the consultation responses. This Board will oversee advice to the Minister (once in post) and prepare an Outline Business Case to underpin the finance to implement accepted recommendations.

Value for money conclusion

13. Over 50 years after the introduction of a bTB eradication policy, incidence of the disease remains relatively high (9.61per cent in 2017). The programme has cost the taxpayer £470 million pounds since 1996. The Department's intervention has maintained an industry which exports £1.5 billion a year: without it, the prevalence of bTB would undoubtedly have been significantly higher and the sales of livestock and livestock products outside Northern Ireland would have been jeopardised. In that sense, the programme has delivered value. Nevertheless, the continuous cycle of testing, removing and compensating for infected animals has failed to achieve the desired outcome and without eradicating the disease, it is hard to argue that it represents best value for the public purse.

Recommendations

R1 The consultation on the revised Strategy will provide clarity on the steps necessary to move towards eradication of bTB in Northern Ireland. The Department should move toward full implementation of proposals as consulted on in the Department's recent consultation document to tackle robustly all of the factors that influence the persistence and spread of bTB.

R2 In particular, the Department should reinforce the message that eradication is not solely an issue for the government and re-emphasise the need for shared ownership between the industry and the government.

R3 To drive home the need for shared ownership of the problem and to reduce the burden on the public purse, the Department should take steps to reduce compensation (by imposing a realistic cap on the total payable for each animal and by reducing the current rate from 100 per cent of market value). This will require government and industry support.

R4 In addition, the Department should:

- Take action to ensure farmers adopt and maintain effective bio-security measures and high standards of herd health management;
- Take all relevant steps to improve the testing regime;
- Enforce compliance with EU regulations on restocking; and
- Take action to address the wildlife factor.

R5 The Department should regularly evaluate the effectiveness of its new strategy. The results should be used to inform modifications and revisions to its approach.

Part One:
Introduction and Background

Part One:
Introduction and Background

bTB is a potentially fatal disease which is difficult to diagnose and eradicate

1.1 Bovine Tuberculosis (bTB) is a persistent, infectious cattle disease. It is caused by the bacterium *Mycobacterium bovis* and causes weight loss, slight fever and coughing. As a result of the existing eradication programme, which ensures the removal of infected cattle, it is rare for the more advanced, clinical signs of the disease to be visible. However if left to run its course, the disease eventually leads to the death of the animal. Clinical diagnosis[1] and detection by testing is difficult and, because it is infectious, the disease is tough to eradicate. Treatment of bTB infected cattle is prohibited by the European Union[2]. As well as affecting cattle, bTB can affect other mammals (for example humans, badgers, deer, goats, pigs, dogs and cats).

1.2 The risk of infection to humans is generally extremely low because of the measures that are currently in place, such as the pasteurisation of milk, testing of the live animal population and post-mortem meat inspection of every animal slaughtered for human consumption under the current eradication programme.

1.3 Vaccination is a key part of the control of tuberculosis in humans worldwide. There is currently no vaccine approved for use in cattle[3]. The disease can spread between animals of the same or different species. Typically infection is spread within, and between, herds, following cattle movements or following direct or indirect contact, with neighbouring infected animals or infected wildlife.

1.4 In 2017[4] there were 25,000 farms in Northern Ireland with three-quarters of these (19,060) being classified as 'very small' farm businesses[5]. Cattle farming is the main agricultural activity, with almost 1.7 million cattle on just over 20,000 farms (half of these cattle farms had fewer than 50 cattle each).

Eradication of bTB is important to the Northern Ireland Agri-food industry

1.5 Ensuring farmed animals are free from disease is clearly important for animal health and welfare reasons. Additionally, the disease status of herds impacts on the success of the agri-food industry and therefore the economy. Sales of livestock and livestock products outside Northern Ireland were estimated to be worth more than £1.5 billion in 2015; sales to countries outside the United Kingdom (UK) were estimated to be worth more than £0.7 billion in 2015. With the UK set to leave the European Union (EU), there is concern that high rates of bTB could represent a barrier to trade with the EU or other countries.

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1 Clinical diagnosis in live cattle or other farmed species is made on the basis of medical history and physical examination alone, without the benefit of laboratory tests or x-rays.

2 European Union Council Directive 78/52/EEC

3 Even if an approved vaccine existed, it may not be possible to introduce it because trading partners may not wish to purchase products from vaccinated animals. Its use would also be dependent on having a test which could distinguish between infected and vaccinated animals.

4 DAERA *The Agricultural Census in Northern Ireland, Results for June 2017.*

5 Using 'standard labour requirement' classification – 'very small' has less than 1 standard labour unit (1,900 hours per year) requirement.

1.6 EU regulations govern the trade in dairy, beef and live animals[6], and food safety[7]. Under existing regulations:

- A herd must be certified 'Officially Tuberculosis Free' (OTF) before live animals can be traded across the European Community (similar rules apply for trade in live animals within Northern Ireland and between Northern Ireland and the rest of the United Kingdom).
- Milk from an animal which reacts positively to a bTB test must be excluded from the food chain[8]. Milk from the rest of the herd must be appropriately heat-treated.
- Meat for export must be certified by an official veterinarian to confirm it is from animals that have been examined and found to be free from generalised disease, fit for human consumption and compliant with specific additional rules relating to bTB[9].

1.7 Supporting legislation in Northern Ireland specifies bTB as a scheduled, notifiable disease, sets out the required examination and testing scheme and provides the Department of Agriculture, Environment and Rural Affairs with slaughter, valuation and compensation powers. Responsibility for bTB policy and programme implementation and compliance with the EU/local bTB legislation falls to the Department. **Appendix 1** sets out the relevant statutory provisions which relate to bTB.

The eradication programme has been in place since the 1950s

1.8 Efforts to eradicate bTB in the UK were initially aimed at alleviating public health concerns and increasing the productivity and welfare of cattle. The first bTB eradication programmes were

6 For a non-EU country to trade into the EU, it must demonstrate that its bTB controls are at least equivalent to those of the EU. For trade outside the EU, the World Animal Health Organisation (of which the UK is a member) recommends bTB controls at least equivalent to EU requirements.

7 The main food hygiene EC Regulations are No. 852/2004 (hygiene of foodstuffs), No. 853/2004 (specific hygiene rules for food of animal origin) and No. 854/2004 (official controls on products of animal origin intended for human consumption).

8 Producers are notified of the results of skin tests at, or shortly after, the tests are read. Final interpretation of TB tests lies with the Department but reactors and inconclusives disclosed on farm are notified to the herd keeper, or their agent, on farm by the Testing Officer. In addition, APHIS (DAERA's animal database) issues automated emails to APHIS linked milk purchaser when there is a change on OT*(OTF/OTS/OTW) status or status reason. Although responsibility to withhold reactor milk rests with the herd keeper, this acts as a prompt to the purchaser to satisfy themselves that reactor milk is not collected and to ensure that all other milk goes for pasteurisation from herds where OTF status is either withdrawn or suspended. DAERA's Agri-food inspection branch (Milk Inspectorate) are also notified of a change in OT* status/status reason.

9 The same pre and post-mortem inspection system and inspections/verifications are in place for meat destined for the local market and for meat destined for export (as specified in EC regulation 854/2004) (some non-EU countries have specific additional requirements). Meat from cattle infected with bTB can enter the food chain in NI, and everywhere else in the EU, but only after government Meat Inspectors inspect the animals (before slaughter) and examine the carcasses afterwards for visible TB lesions. Where disease is seen in more than one organ or part of the carcass, the whole carcass is condemned. Animals at 'routine' slaughter ('skin test' negative) that are found to have visible lesions of TB are then treated in exactly the same way as if they were reactors (animals that have a positive reaction to the bTB 'skin test'). The Department informed us that the European Food Safety Authority and the Food Standards Agency (UK) have looked at the risks and are content that beef from bTB reactor animals can enter the food chain. The bacteria are not usually found in the meat, even in infected cattle, and there is no documented evidence of humans acquiring TB from eating beef.

Part One:
Introduction and Background

voluntary but, by the late 1950s, compulsory schemes were introduced. By the end of 1960, each herd in the UK was certified as being subject to regular bTB testing.

1.9 The introduction of compulsory annual testing for bTB resulted in a decline in disease prevalence. By 1965, 0.08 per cent of animals in Northern Ireland subjected to the tuberculin intradermal test (the 'skin test') had a positive reaction. In response to low levels of bTB, the herd testing interval was extended from one year to a two or three year cycle. During this period the animal incidence rate fell to 0.04 per cent in 1970. However since 1983, in response to increasing incidence, routine testing reverted to an annual cycle. A timeline of bTB initiatives and reports is provided at **Appendix 2**.

Many EU countries have achieved bTB free status

1.10 Member States which can demonstrate that the percentage of confirmed bTB cattle herds has not exceeded 0.1 per cent each year for six consecutive years are awarded *'officially tuberculosis free'* (OTF) status. In 2016, 18 (out of 28) EU Member States had OTF status (**Figure 1.1**). Within three of the 10 Member States yet to achieve OTF (Italy, Portugal and the United Kingdom), specific regions had achieved OTF status; for example within the UK, Scotland and the Isle of Man had OTF status.

Figure 1.1: bTB Status across EU countries, EU/European Economic Area[10], 2016

Key: OF- Officially bTB free; and
MS - Member State.

Source: The European Union summary report on trends and sources of zoonoses, zoonotic agents and food-borne outbreaks in 2016, European Food Safety Authority Journal, November 2017

10 The European Economic Area includes all EU countries and also Iceland, Liechtenstein and Norway.

It is difficult to identify comparable prevalence across the UK and the Republic of Ireland

1.11 The Department explained to us that because eradication programmes in each country vary and statistics are collected and presented differently, it is difficult to present truly comparable bTB herd prevalence figures for the UK and Republic of Ireland. Information on regional herd and animal disease statistics are published by each administration and standardised returns are also made to the EU Commission.

1.12 **Figure 1.2** shows bTB prevalence (based on 2017 figures) reported to the European Commission, as part of the co-funding process, across the UK and the Republic of Ireland. Herd prevalence in Northern Ireland (at 12.4 per cent) was higher than the Republic of Ireland (4.9 per cent), very similar to Wales (12.5 per cent) and lower than overall in England (20.4 per cent). Scotland does not receive co-funding from the European Union since it has achieved and maintained OTF status.

Figure 1.2: UK (excluding Scotland) and Republic of Ireland Herd Prevalence, 2017

Administrative area		Period Herd Prevalence (%)
Northern Ireland[1]		**12.4**
England[1]:		**20.4**
'Low Risk Area'	2.5%	
'Edge Area'	10.9%	
'High Risk Area'	29.47%	
Wales[1]		**12.5**
Republic of Ireland[2]		**4.9**

Source: [1]UK's co-funding report (2017).
[2]DAERA communication with the Department of Agriculture, Food and Marine

1.13 For disease surveillance and eradication purposes, England has recognised three distinct geographical areas, based on the level of disease risk (*low risk* and *high risk* areas, and an *edge* (or '*buffer*') area between the low and high risk areas). Each area has specific strategic bTB objectives and control policies. In 2017, the prevalence in both the low risk (2.5 per cent) and edge areas (10.9 per cent) were lower than those reported in Northern Ireland. The rate in the high risk areas (at 29.4 per cent) significantly exceeded the Northern Ireland rate. Over half (55 per cent) of England's land mass falls in its low risk area where routine herd testing takes place every four years. By comparison, in England's edge and high risk areas (16 and 29 per cent of the land mass, respectively), routine testing may be annual or six monthly depending on region. Wales has also identified defined areas based on infection levels. In the Republic of Ireland and Northern Ireland, infection is more widely distributed.

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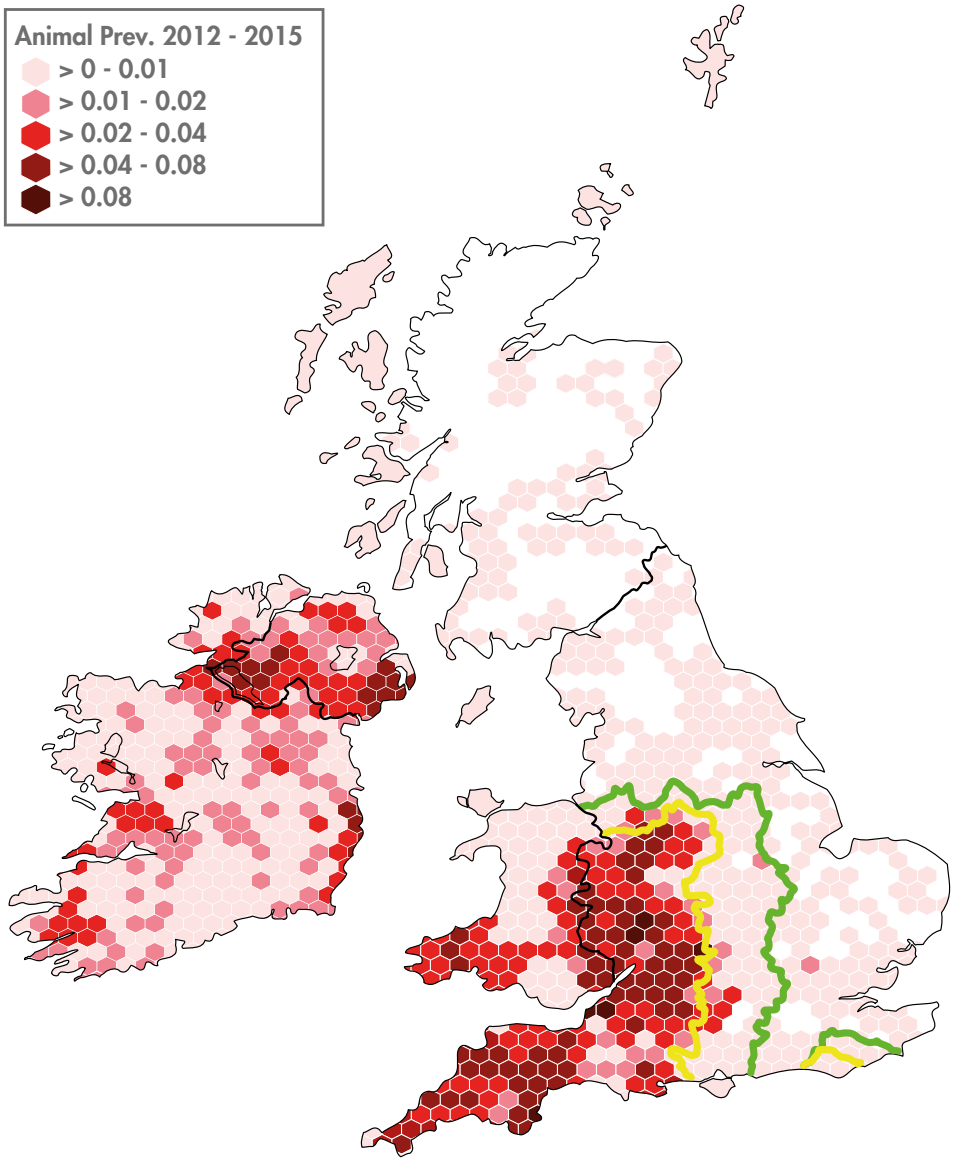
1.14 **Figure 1.3** maps the reported animal disease prevalence across the UK and the Republic of Ireland[11]. The map highlights that the highest levels of disease prevalence over the period from 2012 to 2015 occurred in the South West of England, in parts of Wales, in the east and west of Northern Ireland and in some localised areas in the Republic of Ireland.

Figure 1.3: Cumulative animal disease prevalence, 2012-2015



*Notes: In England, the yellow line delineates the boundary between the **high risk** and **edge** areas; and the green lines delineate the boundaries between the **edge** and **low risk** areas.*

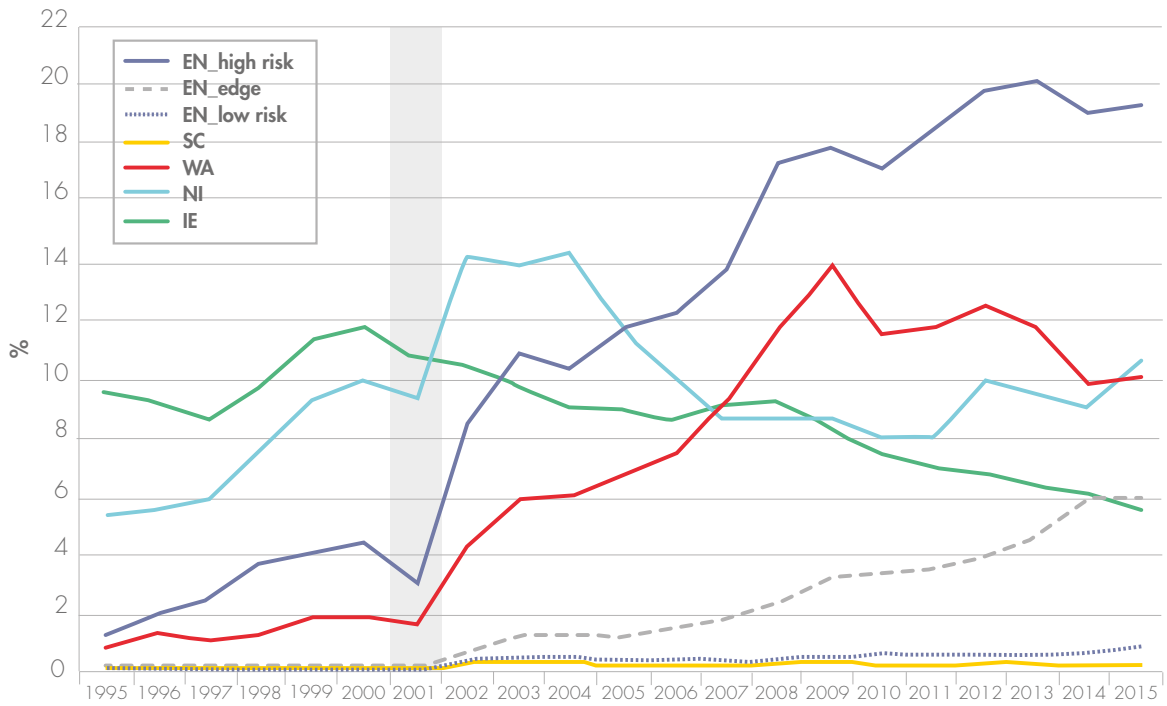
Source: Further Description of bovine tuberculosis trends in the UK and the Republic of Ireland, 2003-15. [submitted to the Vet Record journal, for publication]

11 This analysis is based on aggregated spatial data, based on a uniform surface of 1,542 hexagons (each with an effective diameter of 20 Km) and summarises the animal data for all farms within each hexagon.

1.15 **Figure 1.4** shows the results of an analysis of the levels of bTB over the period 2003-2015 across the UK and Republic of Ireland[12], produced using standardised definitions[13]. The trends in the incidence figures are particularly informative in that they show the rate of spread of infection to new herds. Figure 1.4(b) shows a substantial and sustained increase in the herd incidence within high risk and edge areas of England since 2001 (the year of the Foot and Mouth outbreak). By 2007, bTB levels in Northern Ireland had reduced to levels similar to those in the Republic of Ireland and Wales. However, since then the Northern Ireland rate has risen (to 10.3 per cent in 2015) while the Republic of Ireland rate continued to fall (to 3.5 per cent in 2015) and the rate in Wales rose before falling back to 6.3 per cent in 2015. Throughout the period the standardised incidence rate did not exceed 0.7 per cent in England's low risk area and 0.4 per cent in Scotland.

Figure 1.4(a): Standardised annual herd prevalence, 1995-2015

*(**Herd Prevalence** is the number of herds with a bTB reactor divided by the total number of herds with a herd level TB test, expressed as a percentage (one herd with multiple tests is only counted once). This may be expressed as over a certain time period (period prevalence)).*



12 The paper was a collaboration between bTB experts from each of the five countries.

13 Although disease surveillance and control measures are largely standardised through European legislation, regional approaches, designed to address local features and risk factors, have resulted in differences in policy, operation and epidemiological understanding across the UK and the Republic of Ireland. This has created some difficulties in comparing disease incidence.

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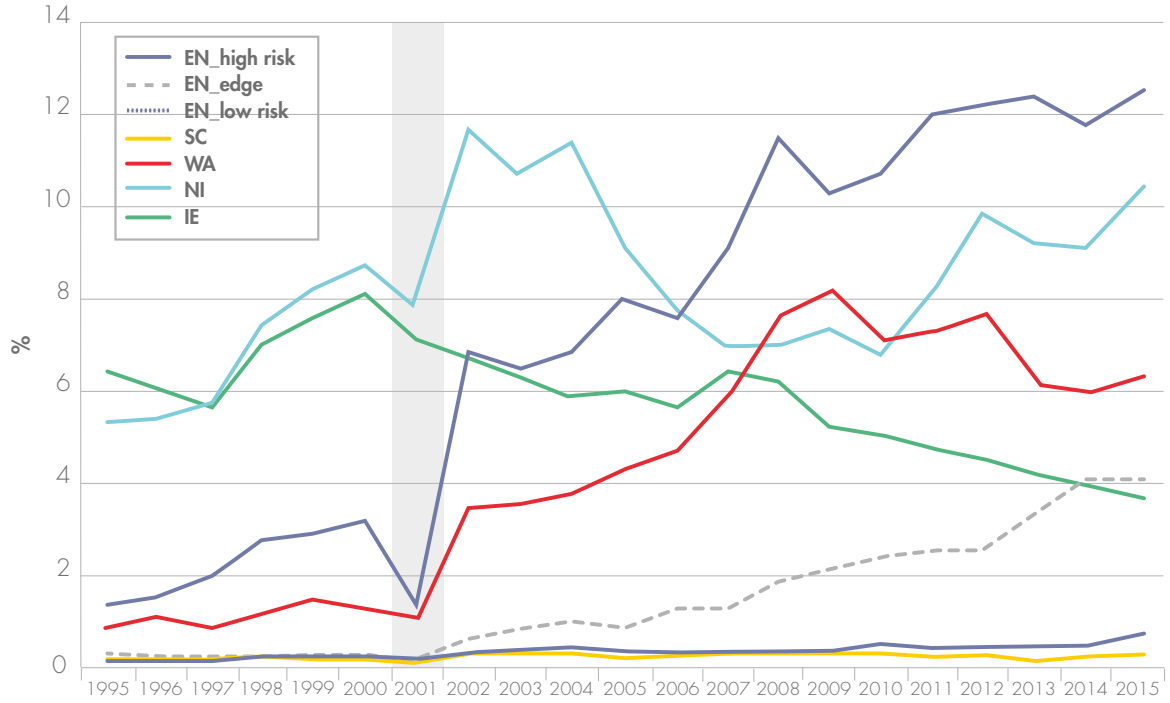
Figure 1.4(b): Standardised annual herd incidence, 1995-2015

*(**Herd Incidence** is the number of reactors or new breakdown herds divided by the number of animal or herd tests over a specific period of time expressed as a percentage (one animal or herd with multiple tests is only counted once)).*



Note: The foot and mouth epidemic was at its height in 2001 and on-farm testing for bTB was suspended in the UK and Ireland.

Source: Descriptive analysis of bovine tuberculosis trends in the UK and the Republic of Ireland, 2003-15. [Submitted to the Vet Record journal, for publication].

The Department's eradication programme has been the subject of a number of reviews

NIAO Reports

1.16 We have reported on bTB on a number of occasions[14]. In our 2009 report 'The Control of Bovine Tuberculosis in Northern Ireland'[15], we concluded that:

14 C&AG's General Report on the 1985-86 Appropriation Accounts (HC77) and '*Department of Agriculture: Animal Health Measures*' NIAO, HC 670, 1992-93, 27 May 1993.

15 *'The Control of Bovine Tuberculosis in Northern Ireland'* NIAO, 18 March 2009, NIA 92/08-09

"bTB has been a long-standing major problem in Northern Ireland and the Department's progress in tackling it has been slow. A range of initiatives, over the period from 1992 when disease levels were rising, enjoyed only limited success until 2003, when incidence of the disease began to fall. Since then progress has been made, with herd incidence of bTB having been reduced by some 50 per cent from peak levels. However, while the general trend of the disease is decreasing, it remains significantly higher than the 1997 level and it is clear that much remains to be done."

1.17 Our report contained several wide-ranging recommendations relating to:

- bTB testing;
- Preventing the spread of the disease;
- EU matters (compliance with EU Directives and maximising EU funding); and
- Compensation, enforcement and tackling fraud.

The Public Accounts Committee Report

1.18 The Northern Ireland Assembly's Public Accounts Committee (PAC) considered our 2009 report and in its follow-up report[16] concluded that:

"….the Department's progress in tackling bTB has been much too slow and the resulting costs prohibitive. The disease has been a major problem in Northern Ireland for more than two decades – this is far too long. While progress has been made in reducing the incidence of bTB in recent years, the level remains significantly higher than in 1996 and many times greater than the 1986 level…..If the Department is to make real progress, it must adopt a much more strategic approach, with a clear focus on eradication of the disease rather than mere containment."

1.19 The PAC identified the need for a fundamental change in mind-set within the Department. In very broad terms, the PAC recommended a renewed focus on eradication (rather than containment), more action to tackle the wildlife issue and close monitoring of the relative costs of testing.

The Northern Ireland Assembly's Agriculture and Rural Development Committee[17] Report

1.20 The Northern Ireland Assembly's Agriculture and Rural Development Committee (AERA Committee) undertook an inquiry into Bovine Tuberculosis in 2012[18]. It expressed serious

16 *'Report on the Control of Bovine Tuberculosis in Northern Ireland'* NIA PAC, 12th report, 2008-2009, 11 June 2009.

17 The NIA's Agriculture and Rural Development Committee has been replaced by the Agriculture, Environment and Rural Affairs Committee.

18 *'Review into Bovine Tuberculosis'* NIA Agriculture and Rural Development Committee, NIA 83/11-15, 13 November 2012.

Part One:
Introduction and Background

concern that unless the recent sharp increase in infection rates was tackled, the disease could take a much firmer hold in Northern Ireland and prove more difficult to eradicate in the longer term. While the inquiry concluded that the current testing and surveillance regime was *'one of the most robust in Europe'*, it was critical of the Department's:

- reliance on a skin test which, due to its sensitivity limitations, could be missing one in four infected animals;
- failure to fully interrogate and use the wealth of information available on bTB; and
- progress in completing, evaluating and potentially rolling out, the Wildlife Intervention Study.

The European Commission's Directorate-General Health and Food Safety

1.21 In 2015, the European Commission's Directorate-General Health and Food Safety (DG HFS[19]) reported[20] on its assessment of the implementation of the 2014 and 2015 Northern Ireland eradication programmes. It concluded that:

"The eradication programme is applied largely in accordance with planned arrangements but the herd incidence rate has stagnated at levels above 6 per cent, which is not what would be expected with an effective eradication programme in place."

1.22 The report identified five broad issues which, collectively, were holding back progress in the eradication of the disease:

- ineffective implementation of some measures to stop disease transmission between cattle and between cattle and badgers, for example, controls on animal movements and biosecurity measures;
- a need to increase the sensitivity of tests;
- ineffective policies to clear up chronically infected herds and to understand and contain levels of infection in the badger population;
- the absence of regular evaluation of the effectiveness of the eradication programme measures to define and adapt disease control strategies; and
- insufficient engagement and commitment of key stakeholders to the eradication programme.

19 Previously the Food and Veterinary Office (FVO).

20 *'Evaluate the Effectiveness of and Progress made by the Programmes Co-Financed by the European Union to Eradicate Bovine Tuberculosis in Northern Ireland'* European Commission Directorate F – Food and Veterinary Office, Ref. Ares (2015) 5874014, 15 December 2015.

1.23 In relation to the Department's plans to introduce a revised eradication strategy, the DG HFS commented that if all relevant stakeholders accepted and co-owned the strategy, it would provide a good opportunity to bring the programme to a level where the final target of accelerated eradication becomes realistic and achievable.

Scope and Methodology

1.24 The purpose of this report is to assess the impact and effectiveness of the Department's bTB eradication strategy. The report highlights trends in bTB levels and the cost of the Department's eradication programme. Our findings are based on information provided from the Department, discussions with the Department's bTB policy and veterinary staff and a review of relevant literature.

1.25 The main issues covered in the review are:

- the escalating costs of the eradication programme (Part 2);
- the continued prevalence of the disease and the Department's proposals for a new strategic approach (Part 3).

Part Two:
The Cost of the Northern Ireland Bovine Tuberculosis Eradication Programme

Part Two:
The Cost of the Northern Ireland Bovine Tuberculosis Eradication Programme

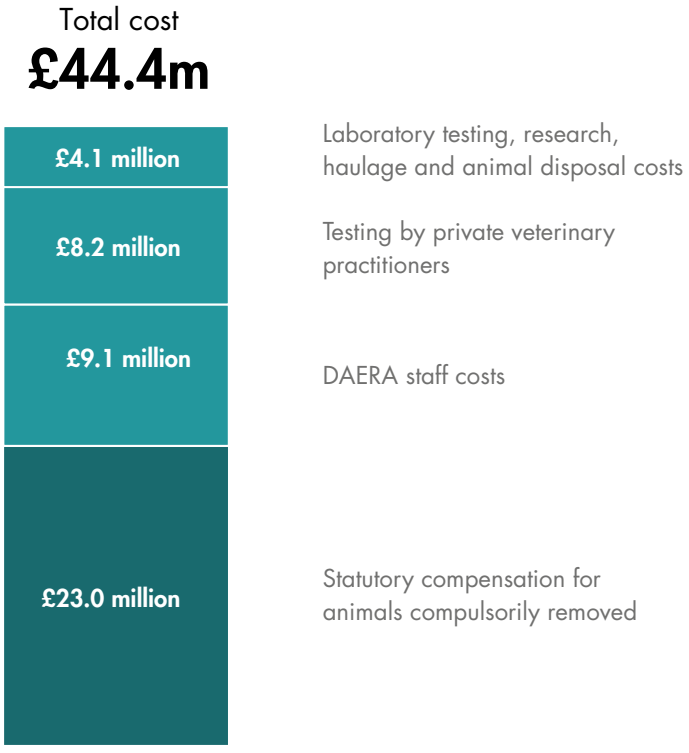
The costs incurred under the current bTB eradication programme are significant

2.1 bTB imposes significant costs on farmers and taxpayers. While the government foots the bill for the testing programme and compensation, farmers incur disease prevention costs, costs of facilitating testing and compliance costs associated with clearing infected herds.

2.2 In 2017-18, the bTB programme cost the taxpayer £44.4 million (see **Figure 2.1**). Farmers also bear considerable costs of programme compliance, which are likely to be around £10 million per annum[21]. This covers costs incurred introducing, and maintaining, improved biosecurity measures, time to facilitate testing and losses incurred from reduced milk production in dairy cows and reduced performance and/or carcass damage in beef cattle.

Figure 2.1 Breakdown of bTB eradication programme costs 2017-18

Just under half of all expenditure on the BTB eradication programme is incurred paying compensation (100 per cent market value) for destroyed animals.



Source: DAERA

21 NI Assembly, oral answer to question, 20 June 2016.

The Department has spent £356 million on the bTB eradication programme over the last 12 years

2.3 Our 2009 report highlighted that, over the 10 year period to March 2006, the Department had spent £199 million on the bTB eradication programme. In the 12 years to March 2018, it spent a further £356 million (**Figure 2.2**), bringing the total expenditure on the eradication programme to over half a billion pounds since 1996 (see **Appendix 3**). The total expenditure figure has been offset over this period by £46 million recovered in salvage costs and £33 million received through EU co-funding.

Figure 2.2 Annual expenditure 2006-2018

There has been a substantial increase in annual expenditure on the bTB eradication programme since 2010-11

Source: DAERA

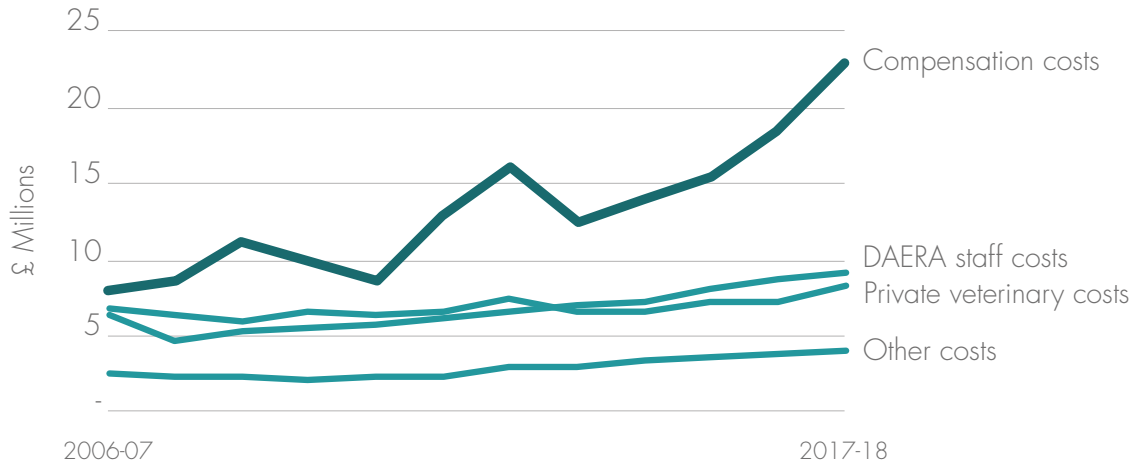
2.4 Each year, around 45 per cent of the expenditure relates to compensation. Over the past 13 years (2006-2018) the Department has paid £158 million in compensation to farmers for the removal of 127,427 cattle. Annual payments to Private Veterinary Practitioners (PVPs) account for around 25 per cent of the overall costs (this percentage has reduced in recent years, see paragraph 2.16), while departmental staff costs account for just over 20 per cent. The remaining 10 per cent of costs cover integral items such as the purchase of 'Tuberculin' (the antigen used in the skin test), the cost of transporting diseased animals, laboratory testing and research (**Appendix 4** provides details of bTB research).

2.5 Programme expenditure has increased in recent years, specifically from 2011-12 (**Figure 2.3**). The increase relates primarily to compensation costs which vary with the number of cattle slaughtered and the market values (farmers receive 100 per cent of the market value for each animal removed).

Part Two:
The Cost of the Northern Ireland Bovine Tuberculosis Eradication Programme

Figure 2.3 Expenditure analysis

The increase in overall expenditure has been primarily driven by increasing compensation costs



Source: DAERA

The Department receives European Co-Funding from the European Commission's Veterinary Fund and retains any salvage income generated

2.6 Following a recommendation by the PAC in 2009, the Department has, since 2010, secured annual co-funding from the European Commission's Veterinary Fund for its eradication programme. The amount received from the fund, approximately £5.4 million is outstanding for the 2017 programme, is based on specified percentages and limits for particular elements of the programme (such as the 'skin tests', laboratory blood tests and confirmatory work) and 'reactor' compensation (cattle positive to the bTB 'skin test') (paragraph 2.3).

2.7 The Department retains the salvage income for the carcasses of animals sent for slaughter under its eradication programme (paragraph 2.3). Salvage income (£4.6 million in 2017-18) varies depending on the market price per kilogram and class of the animal (cow, steer etc.) and the contractor's tender price[22]. Where an entire carcass is considered unfit to enter the food-chain, no salvage income is generated and the Department meets the disposal costs. In 2016-17, the Department paid costs of £200,000 for the disposal of 2,005 animals condemned and excluded from the food chain.

22 The Department informed us that following a competitive tender exercise it entered a 4 year reactor slaughter contract from 1 January 2013 which established a basis for calculating salvage income for the carcasses of condemned animals. The contract was renegotiated and extended for a further year from 1 January 2017. A further Direct Award Contract was awarded to extend the contract up to 31 December 2018 to allow sufficient time for re-tendering. The Department is currently drafting a revised contract.

Since 1998, compensation has been paid to farmers at 100 per cent of market valuation

2.8 The Department pays compensation to farmers when their animals are destroyed after contracting certain diseases[23]. The level of compensation paid varies depending on the disease. In the case of bTB, compensation is paid at 100 per cent of market valuation[24]. Compensation arrangements and rates across the UK and the ROI are set out in **Appendix 5**. Compensation is determined by Departmental Livestock Valuation Officers based on market valuations. Where the farmer disagrees with the valuation, a second valuation may be carried out by an independent valuer[25]. Alternatively, the herd keeper may opt to take his case directly to the Valuation Appeals Panel.

2.9 Compensation is the largest single component (52 per cent in 2017-18) of the eradication programme's total expenditure. The amount of compensation paid is reduced by any insurance received by the farmer. The Department told us that in all cases where it had paid compensation to date, recipients had confirmed that they had not received any insurance payments.

2.10 Full market value compensation was introduced in 1998. Prior to this, compensation was paid at 75 per cent of market valuation. In 2009, the Department told the PAC[26] that, although there had been concerns that increasing compensation levels would encourage farmers to 'invent'[27] or import reactors, the lack of government intervention in the reservoir of infection in badgers made it reasonable for the public purse to cover the full cost of compensation.

2.11 PAC questioned this reasoning given that, at that time, the Department estimated that the wildlife factor was responsible for only nine per cent of bTB infection cases in Northern Ireland. PAC, noting the substantial and sustained rise in disease incidence following the increase in compensation rate, expressed concern that the incentive for farmers to prevent bTB had been removed. We note that the Department tried on two previous occasions to amend the compensation regime but its proposals were not supported by the Northern Ireland Assembly's Agriculture, Environment and Rural Affairs Committee (AERA Committee).

2.12 PAC endorsed the Department's intention to link non-compliance with biosecurity codes to the level of compensation awarded, and noted the Department's comments that if, in future, it decides that a badger intervention strategy is justified in order to reduce levels of bTB, it may

23 Compensated diseases include bTB, Bovine Spongiform Encephalopathy (BSE), Brucellosis and Enzootic Bovine Leukosis.

24 England, Scotland, Wales and NI pay compensation to farmers at 100 per cent of average or current market values. England and Wales have various caps and reductions in place which limit the amount of compensation which can be paid. The ROI has set a cap on the maximum payable and requires farmers to pay for one herd test per year and to pay beef and milk levies.

25 The independent livestock valuer is chosen by the farmer from the Department's list of approved livestock valuers. The ultimate recourse, for both the farmer and the Department, is a Valuation Appeals Panel appointed by the Department.

26 '*Report on the Control of Bovine Tuberculosis in Northern Ireland*' NIA PAC, 12th report, 2008-09, 11 June 2009.

27 The test for bTB is based on the veterinary surgeon's assessment of the Bovine reaction (swelling) relative to the Avian reaction and interference with the injection site to bring on a swelling could 'invent' a positive result in a disease free animal. Paragraph 3.10 explains that, since 2012, we have been notified of 20 suspected fraud cases. These mainly relate to cases where interference with the test is suspected.

Part Two:
The Cost of the Northern Ireland Bovine Tuberculosis Eradication Programme

reduce compensation levels on the basis that it was no longer reasonable to meet the full cost of compensation from public funds.

bTB testing is undertaken by Veterinary Surgeons - either private sector or Departmental staff

2.13 bTB testing is undertaken by Private Veterinary Practitioners (PVP) from private veterinary practices under contract with the Department, by the Department's own staff Testing Veterinary Officers (TVOs and VOTs (qualified vets)) and, to a lesser extent, Departmental field Veterinary Officers (VOs (qualified vets)). The VOs primarily perform follow-up tests (for example, on animals with inconclusive test results or traced from bTB breakdown herds) and undertake an investigative and enforcement role.

2.14 The Department has also trained and deployed technical staff to undertake various non-veterinary elements of the bTB programme that were previously undertaken by its VOs e.g. mapping bTB breakdown farms and gathering disease and biosecurity data. Since February 2018, the Department has been considering the scope to move some additional VO work that does not require a veterinary degree, or veterinary decision making, to its technical staff.

2.15 In April 2016 the Department entered into a new contract with PVPs for the delivery of bTB testing services. The Department informed us that the contract achieved a saving of 9.6 per cent on the cost per animal test, compared to the previous contract, and has improved PVP performance. The reduced fee also includes additional work, such as completion of a biosecurity questionnaire with the farmer, DNA tagging[28] of reactor animals, attendance at one training event per year, and additional management responsibilities. In 2016-17, the average cost of a PVP-performed test was £3.08 while the cost of a TVOT-performed test was £2.80; the Department informed us that the PVP cost also includes the completion of a biosecurity questionnaire at a bTB breakdown, and management and control functions relating to service delivery.

2.16 In 2017-18, over 3 million bTB tests (skin and blood[29]) were performed. Approximately 91 per cent of all bTB herd tests were performed by PVPs. This included almost all (98 per cent) of the annual herd tests and risk herd tests, and 70 per cent of the restricted herd tests. TVOTs concentrated on higher risk herds. In 2017-18, 80 per cent of TVOTs' testing related to restricted herd tests and 20 per cent related to risk herds.

28 DNA tagging – cattle testing positive for bTB are tagged and a sample of DNA retained for cross-checking against DNA of animals sent for slaughter. Random and targeted (where irregularities are suspected) cross-checking is carried out.

29 The 'interferon gamma blood test' (or IFNG) is complex and expensive but can detect infection earlier than the skin test and increases the sensitivity of surveillance testing. It is useful when used alongside the skin test in high risk herds/groups. It is currently only undertaken with the farmer's permission.

Part Three:
Northern Ireland Bovine Tuberculosis Surveillance Programme

Part Three:
Northern Ireland Bovine Tuberculosis Surveillance Programme

Compulsory bTB eradication programmes have been running across the United Kingdom since the late 1950s

3.1 The Department's bTB eradication programme has been established since 1960 and involves:

- ***Disease surveillance: Involving testing of live animals and post mortem examination (PME) in abattoirs*** - As a minimum, all herds must be tested annually by DAERA-approved veterinary surgeons using the tuberculin intradermal test (SICCT or 'skin test')[30], as approved by the EU. The outcome of testing, together with the post mortem examination (PME) result for any animal slaughtered for human consumption, determines a herd's official tuberculosis (OT) status. Herds have one of three designations:
  - Officially Tuberculosis Free (OTF);
  - Officially Tuberculosis Free status Suspended (OTS);
  - Officially Tuberculosis Free status Withdrawn (OTW).

  More detail on herd designations is provided at **Appendix 6**.

- **Removal of bTB reactor animals:** Any animal which tests positive, 'a reactor', to the 'skin test' is compulsorily removed. Identified reactors should be isolated from the herd immediately by the farmer. The Department's target for removal from the farm for slaughter is 15 working days[31]. DAERA compensates farmers at 100 per cent of the market value for animals sent for slaughter following testing.

- **Veterinary Risk Assessment and Application of Disease Controls:** When the disease is suspected in a herd, controls are applied to identify its source and prevent its spread. When a breakdown herd is declared, cattle in the herd are only allowed to be moved direct to slaughter in Northern Ireland. All cattle movements are recorded on DAERA's Animal and Public Health Information System (APHIS) computer database[32]. Herds and individual animals considered to be at increased risk of infection[33] are subject to additional testing and controls.

30 Tuberculin intradermal testing has been used for the diagnosis of bTB for more than 100 years. The single intradermal comparative cervical tuberculin test (SICCT or 'skin test') is approved for use by the EU and compares the size of the reactions to the injection of extract of two different mycobacterium (currently M bovis and M avium). 72 hours (+/- 4 hours) after the injections, the skin fold thickness at each injection site is re-measured and interpreted. Interpretation is complex but in general, the size and nature, of the bovine reaction in relation to the avian reaction are the determining factors.

31 Where the entire herd is removed, there are strict cleansing and disinfection and re-stocking conditions, and specific bTB testing requirements before the new herd gets its Official Tuberculosis Free status restored.

32 Since 1998 all calves must be identified with an ear tag in each ear within 20 days from birth. All cattle identification numbers are authorised by DAERA and recorded on APHIS. Prior to 1998 they were identified with a single tag (**Appendix 6**).

33 Animals may be considered at additional risk to the disease because they have been in close proximity to the breakdown herd e.g. grazing in neighbouring fields; the reactor animal had previously been in the herd etc.

Routine testing intervals vary across Great Britain and the Republic of Ireland

3.2 Under EU legislation, the frequency of routine surveillance is determined by the prevalence of infected herds (see **Figure 3.1**). The minimum routine herd testing cycle, four-yearly testing, applies to OTF regions/countries. To achieve the OTF status the percentage of herds confirmed as infected with TB must not exceed 0.1 per cent of all herds per year, for six consecutive years.

Figure 3.1: Frequency of bTB surveillance of herds required by EU

Herd prevalence (%)	Routine test frequency
>1.0	Annual testing of all cattle older than 42 days
>0.2 - 1.0	Biennial testing
>0.1 - 0.2	Triennial testing of animals older than 2 years
0.1 or less	Quadrennial testing or, providing certain conditions are met, skin testing of herds may be dispensed with

Source: EC Directive 64/432

3.3 Scotland obtained OTF status in September 2009, and has maintained this status ever since, enabling its routine herd testing to move to a risk-based approach. This status also provided the Scottish Government with the flexibility to design a dedicated bTB surveillance programme for the Scottish national herd. On 1 January 2012 the Scottish Government introduced a risk-based bTB testing policy whereby 'low risk' herds became exempt from the four-yearly routine herd testing – 57 per cent of the herds were exempt by 2017.

3.4 By contrast, annual herd testing has been carried out in Northern Ireland and the Republic of Ireland for many years, and in Wales since October 2010. More recently, Wales introduced a regionalised approach to eliminating bTB[34], with the recognition of low, intermediate and high bTB areas from 1 October 2017 based on disease incidence.

3.5 Wales has introduced enhanced measures in each bTB area tailored to protect the low bTB area from disease, and reduce the level of disease in the intermediate and high bTB areas. Whole herd annual testing is to continue across the whole of Wales except in the Intensive Action Area (IAA; an area of west Wales with one of the highest incidence levels) where testing is 6 monthly. In addition, a range of additional measures was introduced in the IAA area to reduce the level of infection within all species. It has stricter cattle controls; improved biosecurity measures; testing of all goats and camelids (includes llamas and alpacas); and badger vaccination.

3.6 Routine test frequency in England varies from annual testing in the west 'high risk area' (representing nearly half of all English herds) to quadrennial testing in the north and east 'low risk area', while those in the intermediate buffer zone 'edge area' are subject to annual testing/ six-monthly testing (December 2017) (see paragraph 1.13).

34 '*Wales TB Eradication Programme*' Welsh Government, 2017. This revised programme undertook to split Wales into a number of "TB areas" in recognition of the differing disease situations.

Part Three:
Northern Ireland Bovine Tuberculosis Surveillance Programme

The EU-approved 'skin test' is not consistently reliable as an indicator of infection

3.7 No single test can identify all infected animals. Clinical signs of the disease are slow to develop and bTB lesions (abnormalities) can be buried deep in animal tissue and are difficult to identify, even during a post-mortem examination. As a result, bTB diagnosis is challenging.

3.8 The '***skin test***' is the only test approved by the EU for routine bTB surveillance. An additional test, the 'interferon gamma blood test' (IFNG or blood test)[35] can be performed to improve disease diagnosis. It cannot be used as a substitute. In Northern Ireland, the blood test is currently only undertaken with the farmer's permission.

3.9 Blood testing can detect infection earlier than the skin test and increases the sensitivity of surveillance testing. Although this complex and expensive test cannot be used as a primary surveillance test, studies have shown that animals that are positive to the test are at a higher risk of becoming skin test reactors in the future. It is, therefore, useful if it is used alongside the skin test in high risk herds/groups. Other EU countries such as the Republic of Ireland, England, Wales and Spain have recently been increasing their use of blood testing to improve detection rates. The number of blood tests on Northern Ireland cattle has increased in recent years.

3.10 In 2016-17, blood tests were conducted on 17,785 animals in Northern Ireland (the laboratory capacity was 18,000 tests). Capacity was increased to 23,000 for 2017-18 as a result of changes made to laboratory testing procedures. Changes have also been made to the sampling protocol to target the use of the limited blood test resource at the highest risk animals, improving the cost benefit of the test. The Department has commissioned research to explore the effect of different applications of the test to facilitate a significant increase in testing capacity and more effective use of the test; and it is being used in a reactor quality assurance pilot, which may lead to the introduction of a policy to use the blood test in the detection/prevention of the fraudulent creation of reactor animals. Since 2012, the Department has notified us of 20 bTB-related suspected fraud cases. On 1 October 2018, a County Tyrone farmer became the first person to be convicted of bTB fraud in Northern Ireland [36]. These mainly related to cases where the Department suspected interference with the test. The Department informed us that its TB counter fraud strategy aims to identify suspect herds and develop and implement counter measures to get compliance and/or evidence for enforcement.

3.11 Currently animals testing positive to the blood test (and not to the skin test) are only removed for slaughter with the farmer's permission. We welcome the proposals in the bTB Strategic Partnership Group's strategy document (paragraphs 10 –12; and 3.25 – 3.31) that:

35 The blood test involves laboratory examination of a blood sample and may help in the earlier detection of disease or in problem herds where it has been difficult to regain their disease free status.

36 The charges included making a false representation at a TB test in respect of 14 cattle, trying to affect the results of a TB test, failing to present animals for TB testing, causing unnecessary suffering to 14 cattle and failing to notify the department of the births of bovine animals. The farmer received a 12 month sentence suspended for two years and was fined £200.

- in all cases where the Department considers it necessary, herd-keepers must have the blood test completed; and
- all animals testing positive to the blood test must be removed.

In 2017, over 3 million 'skin tests' were performed on almost over 1.7 million cattle in herd tests in Northern Ireland

3.12 **Figure 3.2** provides information on the number and outcome of skin tests performed during 2017. That year, a total of 36,627 herd (or just over 3 million animal) skin tests were completed (some herds were tested more than once in the year). More than half of these tests (22,981 (63 per cent)) were risk or restricted herd tests. The remainder (13,646 (37 per cent)) were routine herd tests. These skin tests identified over 15,000 reactors.

Figure 3.2: Analysis of Herd 'Skin Tests' completed in 2017

Herd Test Classification	Number of Herds[1] Tested	Number of Herd Tests Completed	Number of Animals with a skin test at herd tests in the category	Number of 'Reactors' identified
Restricted	3,949	8,246	666,772	9,189
Risk	10,180	14,735	904,086	4,883
Routine	13,447	13,646	625,244	1,383
TOTAL	See Note 1	36,627	**(See Note 1)**	15,455
Total number of animals tested at herd tests – 1,742,312				

Source: DAERA

Note 1: It is not appropriate to total the number of herds or animals tested since herds can have more than one herd classification during the year.

17,517 cattle were removed on the basis of a bTB test completed in 2017

3.13 The total number of cattle removed for slaughter for disease control reasons following a test completed in 2017 was 17,517:

- 15,949 as a result of a positive reaction to the skin test (this includes animals identified through herd tests (see **Figure 3.2** (15,455) and individual animal tests (494));

Part Three:
Northern Ireland Bovine Tuberculosis Surveillance Programme

- 891 'negative in contact' animals (animals which did not test positive but which were considered to be at increased risk due to their exposure to test positive animals); and
- 677 'blood test' positive animals.

3.14 The Department's target is to remove reactor cattle from the farm within 15 working days of the positive test. During 2017, this target was met for 90.6 per cent of reactors.

The Department's Meat Inspectors, under Official Veterinarian supervision, perform post-mortem examinations on all cattle slaughtered for human consumption, to ensure that the meat is safe to enter the food chain

3.15 All cattle slaughtered for trade purposes in Northern Ireland (around 400,000 each year) are subject to post-mortem examination (PME) by meat inspectors. At PME, the meat inspector looks for visible signs of bTB disease (that is, small nodular lesions, most commonly found in the lungs and lymph nodes).

3.16 In cases where suspect bTB lesions are identified during PME in animals slaughtered as normal business by the farmer (that is '*Lesions at Routine Slaughter*'[37] (LRS)), depending on the severity, either the infected part or the entire carcass is excluded from the food chain. In addition, the herd from which the LRS animals came will be put under disease control restrictions. In 2017, the finding of 1,703 LRS cattle[38] at PME led to 656 herds being put under disease control restrictions. Follow-up laboratory testing of LRS animal tissue confirmed bTB in 1,074 animals (63 per cent of the 1,703 LRS cattle). Further testing detected additional reactors in 287 of the 656 herds resulting in those herds being designated as bTB breakdowns in the TB statistics[39].

3.17 The rates for confirmed cases of bTB found at routine slaughter are presented in **Figure 3.3**. This shows a general upward trend in recent years, in keeping with the upward trend observed in the prevalence and incidence rates (**Figure 3.4**). Given the findings are from the cattle population designated as bTB free, and are from a separate independent sampling system than the live surveillance methods, it further supports the conclusion that the underlying disease levels are rising. In addition, work has been conducted since 2015 to improve the sensitivity of detection through meat inspection and this will have contributed to the rise in numbers.

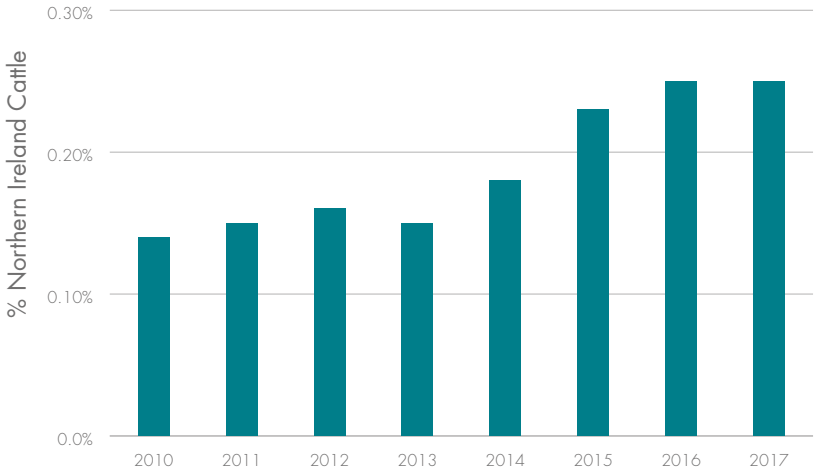
37 Only TB test negative cattle slaughtered as part of herd keeper's normal business are designated 'routine slaughter', some 380,000-450,000 cattle per year.

38 Figures exclude animals brought into Northern Ireland for direct slaughter.

39 A 'new herd breakdown' is a herd with at least one reactor animal where the herd had no other reactor animals during the previous 12 months

Figure 3.3 bTB rates amongst routinely slaughtered cattle

The rates of bTB found amongst routinely slaughtered animals has been increasing:



Note: The figures include only Northern Ireland cattle and exclude animals brought into Northern Ireland for direct slaughter.

Despite the significant investment in the eradication programme, bTB prevalence and incidence have increased since we last reported

3.18 bTB prevalence reflects the proportion of animals/herds with the disease while incidence reports the proportion of **new cases** in the test population. Incidence provides a useful indicator of the future 'trajectory' of the prevalence. **Figure 3.4** shows bTB prevalence and incidence over the period from 1995 to 2017.

3.19 In 2009 we reported that the prevalence of bTB in herds had increased from just under five per cent in 1997 to 13 per cent in 2002[40], before falling back to just under seven per cent by 2007. The herd prevalence remained relatively static until 2011 at around seven per cent (1,655 herds). By 2017 the herd prevalence had increased to 12.4 per cent (2,849 herds). In terms of animals, the figures show that in 2011, the annual prevalence figure was 0.34 per cent (8,136 cattle). By 2017 the animal prevalence had risen to 0.51 per cent (15,949 animals).

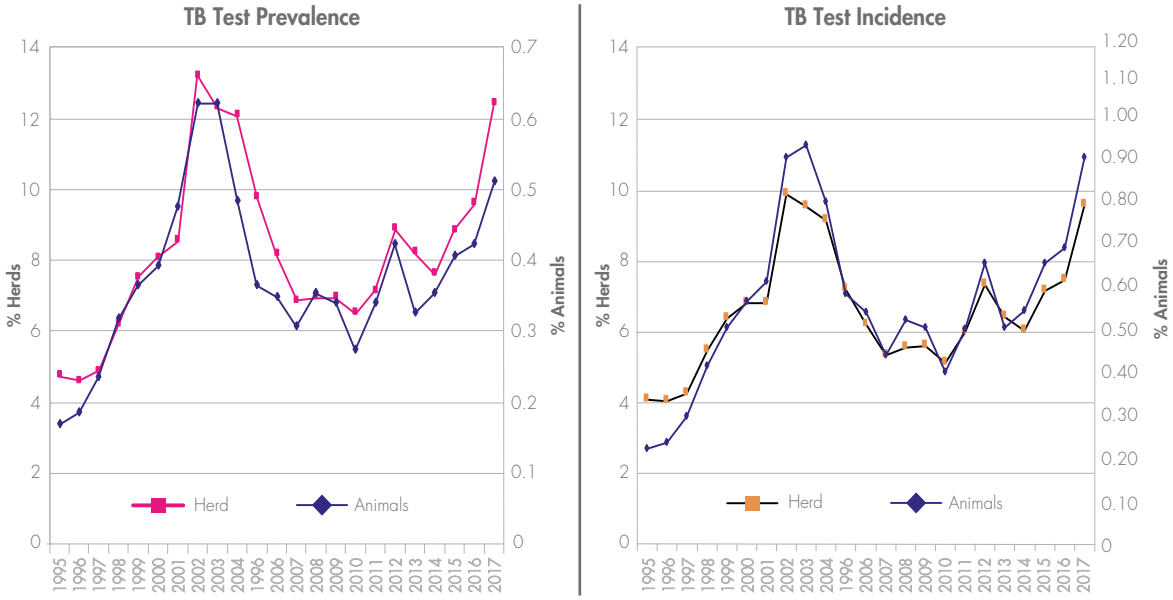
3.20 Trends in the incidence are similar to those of the prevalence, peaking in 2002-03[41] and then decreasing until 2007, before starting again on an upward trajectory from 2010-11. The annual herd incidence rose from 6.0 per cent (or 1,386 herds) in 2011 to 9.61 per cent (or 2,208 herds) by 2017. In terms of animals, the annual incidence rose from 0.51 per cent (8,136 cattle) in 2011 to 0.91 per cent (15,949 cattle) in 2017.

40 The peak of 13% came after the Foot and Mouth Disease outbreak in 2001, when on-farm testing was suspended for around 4 months and a backlog of testing had to be undertaken.

41 The Foot and Mouth Disease epidemic was at its height in 2001 and uniform testing for bTB was suspended in the UK and Ireland – this may have contributed to the peak in 2002-03.

Part Three:
Northern Ireland Bovine Tuberculosis Surveillance Programme

Figure 3.4: bTB Prevalence and Incidence in Herds and Animals over the period from 1995 to 2017 (definitions of herd prevalence and herd incidence are provided in the Glossary)



Source: DAERA

Note: Herd prevalence and incidence for each of the Divisional Veterinary Offices for 2011 and 2017 are provided in ***Appendix 7****.*

Further analysis of prevalence shows that distribution of bTB varies across Northern Ireland

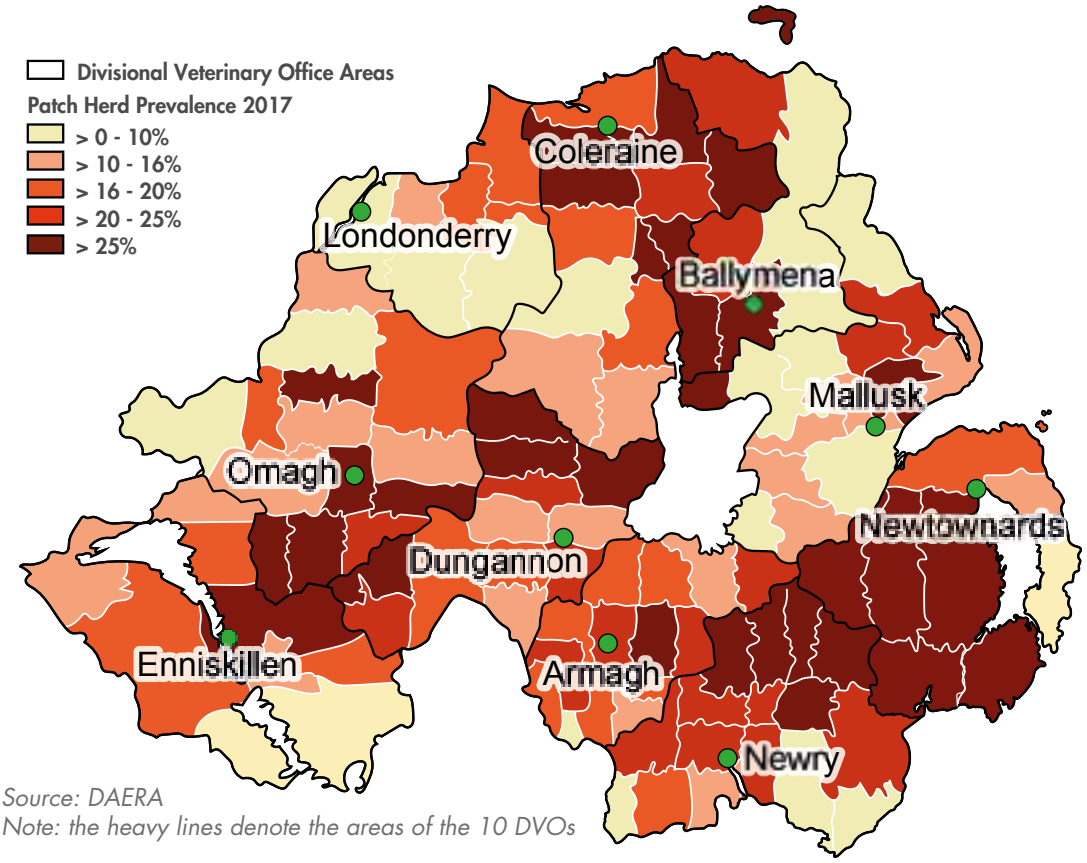
3.21 bTB is not uniformly distributed across Northern Ireland. Figures for the annual herd prevalence in the areas covered by the Department's 10 Divisional Veterinary Offices (DVO) (**Appendix 7**) show that:

- in 2011, the overall Northern Ireland herd prevalence was 7.18 per cent. The lowest prevalence recorded that year was 3.73 per cent (in Mallusk) while the highest prevalence was 10.75 per cent (in Newtownards);
- Londonderry was the only area showing a decrease in disease over the period from 2011 to 2017 (6.13 per cent in 2011 falling to 5.20 per cent in 2017); and
- by 2017, the overall Northern Ireland herd prevalence was 12.41 per cent (ranging from 5.20 per cent (Londonderry) to 17.88 per cent (in Newtownards).

Similar trends were observed in the DVO annual herd incidence.

3.22 Subdividing the DVO areas into smaller 'patches'[42] and calculating the patch bTB prevalence (using the number of herds with bTB and the number of herds tested in each patch), shows the range of variation within DVOs, as well as between DVOs (**Figure 3.5**).

Figure 3.5: Patch Herd Prevalence, 2017



Source: DAERA
Note: the heavy lines denote the areas of the 10 DVOs

The Department's Veterinary Officers consider available evidence to identify the cause of disease breakdowns

3.23 As part of the management of a bTB breakdown, individual Veterinary Officers use available evidence to assess and record the cause of the breakdown. Before 2016, Veterinary Officers could only record one cause for each outbreak. In cases where multiple sources were suspected, the Veterinary Officers simply noted that source was *'not established'*. A new, more detailed, bTB investigation report form and database was introduced in 2016 which allows more in-depth analysis of the causes of the disease outbreaks.

3.24 Veterinary Officers' assessments of disease sources for the period from June 2016, when the new investigation report was introduced, to January 2018 (**Figure 3.6)** indicated that around a quarter of breakdowns (26 per cent) had more than one possible source or the source was

42 DAERA's Divisional Veterinary Office areas are divided into patches for the purposes of management and workflow. Work can be allocated and recorded by the patch location. This enables measurement of disease levels in smaller geographical areas.

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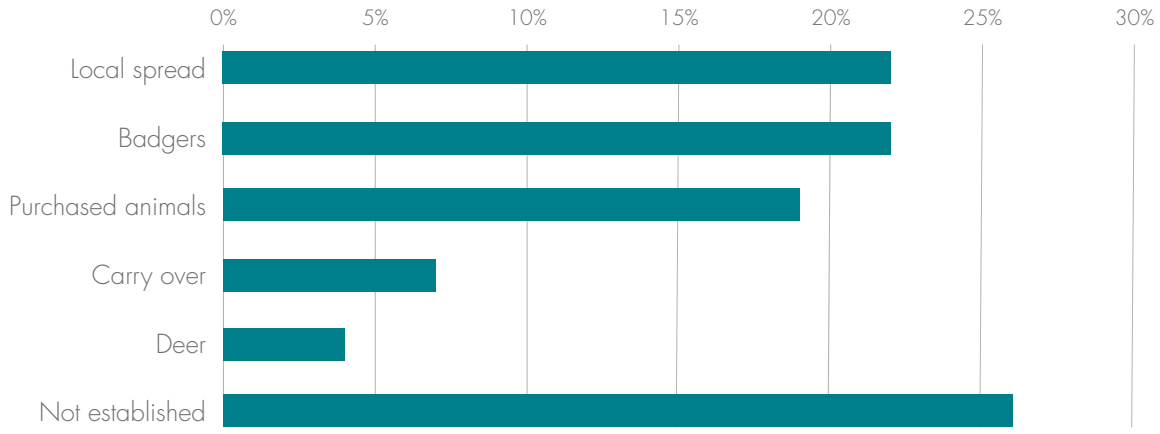
unknown (classified as 'not established'). Cattle to cattle spread, was attributed as the source in 22 per cent of the breakdowns. Badgers were attributed as the cause in 22 per cent of the investigations. Purchased animals were the source of 19 per cent of the breakdowns and 7 per cent were due to carry over due to inadequate clearance of disease from the herd or from the environment. The potential for spread is heightened by the fragmented nature of farms in Northern Ireland and the movement of cattle between various premises.

Figure 3.6 Infection sources for bTB for the 18 months to January 2018

Veterinary Officers' assessments of available evidences indicate that similar proportions (22%) of infections may be caused by local spread between cattle and between badgers and cattle. Previous assessments indicated that spread from badgers was lower, at around 9 to 15 per cent.



Source: DAERA

The Department is consulting on proposals for a new strategic approach to the eradication of the disease

3.25 In 2014 the Department established the independent expert advisory group, the TB Strategic Partnership Group (the Group), to develop a long-term strategy and implementation plan to eradicate bTB from the cattle population in Northern Ireland[43]. The Group conducted an initial consultation in January 2015, gathered relevant evidence and published an Interim Report on 30 June 2015. During the course of its work, the Group met with various representative bodies, experts, scientists, nature conservationists and veterinarians across the United Kingdom and the Republic of Ireland. In addition, the Group spoke to international bTB experts.

3.26 The Group collated and assessed the responses to the Interim Report consultation and employed consultants to evaluate individual recommendations from a cost/benefit and behavioural

43 The Group consisted of scientists and industry representatives as recommended in the *Going for Growth* Report (2013) (a strategic action plan for the Northern Ireland Agri-Food Industry) which recommended the creation of a joint government/industry working group to reduce (and ultimately eradicate) bTB.

perspective. The Group also undertook a scientific analysis to validate its recommendations and consider their impact on disease trends. This work was peer-reviewed by independent academics.

3.27 The Group attributed Northern Ireland's inability to eliminate the disease to:

- Issues with the ability of the current test to detect infected animals;
- The perception that the disease is solely for government to address;
- The perception that government had become resigned to controlling rather than eradicating the disease;
- Little sense of ownership by farmers;
- The perception that some farmers no longer proactively try to control the spread of bTB;
- The fact that stakeholders feel disengaged due to the lack of ability to input into the programme;
- The absence of a wildlife intervention strategy;
- Varying levels of understanding of the disease and the risk of infection;
- Variable standards of herd health management by farmers; and
- Current compensation arrangements, which fail to incentivise good practice.

3.28 The Group heard evidence that:

"there are occasions when cattle are presented for valuation and slaughter which have given positive skin readings but not as a natural response to the injection of tuberculin the implication being that the test has been interfered with. Such actions are obviously fraudulent and morally wrong…while the extent to which this occurs is not known, anecdotally it would appear that the occurrence is frequent enough to warrant further investigation."

In light of its findings, the Group recommended that the Department undertakes work to gather information to inform development of a policy to tackle this problem.

3.29 The Group concluded that there is 'no single solution' or 'quick fix' and recognised that, internationally, eradication of bTB has only been achieved where all factors, including the issues identified above, that contribute to the persistence and spread of the disease in infected animal

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populations are tackled concurrently. The Group anticipates that full implementation of all the recommendations will lead to a steady and sustainable decline in the rates of disease from 2020[44] and eventual eradication of bTB in cattle. In addition, implementation is expected to contribute to improving the health of the badger population.

3.30 The Group produced its '*Bovine Tuberculosis Eradication Strategy for Northern Ireland*' (the Strategy) in December 2016. An extract from the Strategy recommendations is provided at **Appendix 8**. The Strategy covers seven themes, includes 38 recommendations and is intended to:

".....set us on a decreasing trajectory – and over the next 3 or 4 decades see the disease finally eradicated from NI."

3.31 In essence, the revised Strategy recommends greater engagement of key stakeholders, revisions to the current compensation scheme to encourage farmers to modify their behaviour, improved testing, increased compliance with EU regulation and addressing the disease in badgers[45].

3.32 On 30 November 2017, the Department launched a public consultation on a range of proposals to work towards the eradication of bTB in Northern Ireland. The consultation outlined the Department's response to the recommendations made by the Strategic Partnership Group across a number of key programme areas including management and partnership working; testing and processes; approaches to dealing with TB in wildlife; addressing bovine TB risk in the industry and improve the health of the herd; finance and funding; and plans for future research **(Appendix 8(a)** (The Department had already acted on a number of the Group's proposals, for example, by establishing a bTB Eradication Partnership and aligning a number of additional measures in the light of rising disease levels. Details of these are at **Appendix 8(b))**.

3.33 The consultation outlined the Department's key proposals as follows:

- Set up new management/partnership arrangements with a Northern Ireland Eradication Partnership Board, three sub-regional boards and ad hoc local disease teams;
- Change the current testing regime and focus more on biosecurity measures;
- Badger removal and vaccination in targeted areas;
- Encourage ownership across the farming industry for improving herd health; and
- Introduce changes to the compensation system and charging for an annual herd test.

44 The target date of 2020 assumed that the revised strategy would be implemented without delay. Given that this was not the case, the target date is likely to be later.

45 The Department is currently in the final year of fieldwork in the five year Test and Vaccinate or Remove (TVR) Wildlife Intervention Research project. The project involves testing badgers, vaccinating and releasing test negative badgers and culling test positive badgers. Results from the first two years are not sufficient to allow conclusions on the success of the project to be assessed. Costs to end of year 3 amounted to £2.8 million (see **Appendix 4**).

The consultation acknowledged that any final decisions on implementation of the proposals will be subject to the view of Ministers and take into account budget availability. The Department told us that since the consultation closed on 1 February it has convened an internal bTB Programme Management Board to consider the consultation responses. This Board will oversee advice to the Minister (once in post) and prepare an Outline Business Case to underpin the finance to implement accepted recommendations.

Recommendations

R1 The consultation on the revised Strategy will provide clarity on the steps necessary to move towards eradication of bTB in Northern Ireland. The Department should move toward full implementation of proposals contained in the Department's recent consultation document to tackle robustly all of the factors that influence the persistence and spread of bTB.

R2 In particular, the Department should reinforce the message that eradication is not solely an issue for the government and re-emphasise the need for shared ownership between the industry and the government.

R3 To drive home the need for shared ownership of the problem and to reduce the burden on the public purse, the Department should take steps to reduce compensation (by imposing a realistic cap on the total payable for each animal and by reducing the current rate from 100 per cent of market value). This will require support from government and the industry.

R4 In addition, the Department should:

- Take action to ensure farmers adopt and maintain effective biosecurity measures and high standards of herd health management;
- Take all relevant steps to improve the testing regime;
- Enforce compliance with EU regulations on restocking; and
- Address the wildlife factor.

R5 The Department should regularly evaluate the effectiveness of its new strategy. The results should be used to inform modifications and revisions to its approach.

Appendix:

Appendix 1:
Current TB Statutory Provisions (source DAERA) (paragraph 1.7)

The EU and Northern Ireland legislation in relation to the control of bovine tuberculosis (bTB) is as follows:

- **EU Council Directive 64/432/EEC**[46] (as amended);
- **Diseases of Animals (Northern Ireland) Order 1981** (as amended by **Diseases of Animals Act (Northern Ireland) 2010)**;
- **Tuberculosis Control Order (Northern Ireland) 1999** (S.R.1999 No. 263 as amended by S.R. 2004 No. 363, S.R. 2005 No. 53 and S.R. No. 2012 No. 314); and
- **Tuberculosis (Examination and Testing) Scheme Order (Northern Ireland) 1999** (S.R. 1999 No. 264 as amended by S.R. 2015 No. 322).

The above Northern Ireland legislation makes provision for:

- specifying bTB as a scheduled and notifiable disease;
- implementing the EU Directive and requiring notification of, and movement restrictions on, suspect/diseased animals;
- affording the Department powers to slaughter animals, carry out valuations and make compensation; and
- setting out the required examination and official testing scheme.

Responsibility for compliance with all of the above legislation falls to the Department and comprises actions to combat the disease as follows:

- regular official testing of herds for the presence of the disease;
- slaughter of animals reacting to the official test;
- inspection of all cattle slaughtered at meat plants;
- movement restrictions on farms where the disease is present;
- sterilisation of milk from an affected or suspected animal before feeding to other animals; and
- investigation of disease incidents.

46 The EU Directive sets out requirements for the testing and intra-community trade of bovine (and swine) animals and places responsibilities on Member States as to how bTB is monitored and controlled.

Appendix 2:
Timeline of Bovine TB Policy and Main Reports (paragraph 1.9)

	1960	bTB testing mandatory in Northern Ireland with annual routine testing
1960s	1964	Department adopts policy to eradicate bTB
	1965	Northern Ireland moves routine testing from an annual cycle to a longer testing interval in response to low levels of bTB
1970s		***Low levels of bTB from mid-1960s and 1970s***
1980s	1983	Northern Ireland reverts back to an annual cycle of routine testing for bTB.
	1986	C&AG's General Report on the 1985-86 Appropriation Accounts (HC77).
1990s	1993	Northern Ireland Audit Office Report, Department of Agriculture: Animal Health Measures
	1994	PAC report on Animal Health Matters (including Bovine TB)
	1995	Department commences enhanced bTB Programme
2000s	2002	Department bTB Policy Review
	2004	EU Food & Veterinary Office (EU FVO) report on bTB eradication programme
	2005	EU FVO report on bTB eradication programme
	2009	NIAO and PAC reports on Control of Bovine TB
2010s	2012	NIA Agriculture & Rural Development Committee report on Bovine TB
	2015	EU FVO report on implementation of the 2014 and 2015 bTB eradication programme.
	2016	The TB Strategic Partnership Group presents a new Eradication Strategy
	2017	DAERA's public consultation on a new strategic approach to eradication of the disease

Appendix 3:
DAERA expenditure on the eradication programme, 1996-97 to 2017-18

(paragraphs 2.2 – 2.5)

	2006-07 £	2007-08 £	2008-09 £	2009-10 £	2010-11 £	2011-12 £
PVP Costs	6,806,600	6,311,631	5,917,344	6,500,752	6,286,278	6,540,225
Staff Costs	6,451,488	4,700,904	5,286,418	5,581,846	5,792,472	6,181,800
Other	2,555,103	2,414,157	2,371,389	2,133,357	2,251,468	2,407,265
Compensation	7,887,123	8,547,534	11,192,593	9,910,768	8,593,038	12,910,656
GROSS TOTAL	**23,700,314**	**21,974,226**	**24,767,744**	**24,126,723**	**22,923,256**	**28,039,946**

	2012-13 £	2013-14 £	2014-15 £	2015-16 £	2016-17 £	2017-18 £
PVP Costs	7,379,000	6,526,762	6,634,749	7,324,386	7,149,351	8,214,110
Staff Costs	6,480,431	7,071,865	7,260,001	8,105,440	8,698,369	9,124,649
Other	3,011,372	2,990,648	3,453,126	3,527,192	3,746,312	4,005,004
Compensation	16,157,933	12,500,762	14,037,743	15,396,788	18,356,879	23,037,767
GROSS TOTAL	**33,028,736**	**29,090,037**	**31,385,619**	**34,353,806**	**37,950,911**	**44,381,530**

Breakdown of bTB Eradication Programme expenditure, 1996-97 to 2017-18

Expenditure Components	1996/97 – 2005/06 Total (£ million)	2006/07 – 2017/18 Total (£ million)	1996-97 – 2017-18 Total (£ Million)
Compensation to Farmers	86	158	244
Private Veterinary Practices	54	82	136
DAERA Staff Costs	42	81	123
Other	17	35	52
Total Expenditure	**199**	**356**	**555**
Less Salvage Income	23	23	46
Less EC Co-funding[1]	-	39	39
Net Expenditure	**176**	**294**	**470**
Average Total Expenditure per Year	**20**	**30**	**25**

Source: DAERA

EU co-funding commenced in 2010; a total of £33.7 million was received for the 2010-2016 programme and a further £5.4 million is outstanding for the 2017 programme

Appendix 4:
DAERA Commissioned Research and Development Completed or Commenced in 2012-2017

(paragraph 2.4)

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
TB Biosecurity Study	£212,597	Sept 2010 - Oct 2013	There were a number of interesting findings in relation to biosecurity; badgers; farm management practices; and farmers' attitudes. Risk factors for bTB breakdown included: having accessible badger setts within the farm boundary, observation of live badgers on the farm, purchase of store/beef animals, use of contactors for spreading slurry or manure on the farm and feeding meal on top of silage at housing and feeding of magnesium. The nature and number of farm boundaries was not a significant risk factor at multivariable analysis. The active adoption of biosecurity measures by farmers to prevent badger-to-cattle transmission and cattle-to-cattle transmission of bTB was generally poor. There was strong support for badger related interventions, including culling, which 79.2% of farmers would allow on their own land, and vaccination, which 89.6% of farmers would allow on their own land. Overall, farmers showed the highest disagreement with the questions that queried their willingness to pay for control measures in relation to bTB.	Project has informed the Departmental response to the bTB Strategic Partnership Group (TBSPG) Eradication Strategy, particularly relating to farmer attitudes and practices of wildlife intervention and farm biosecurity. It has also informed the practical advice provided to farmers.

Appendix 4:
DAERA Commissioned Research and Development Completed or Commenced in 2012-2017

(paragraph 2.4)

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
			By addressing these risk factors it is hoped that better control of bTB could be achieved.	
An evaluation of interferon gamma (IFNG) testing for bTB in NI	£379,163 (DAERA contribution £222k)	May 2011 - Mar 2015	This study showed that retained IFNG test positive animals were 2.3 times more likely to become reactors than IFNG negative cohort animals, indicating that they posed an increased risk of having TB. Other IFNG research has analysed the effects of different cut-off values for the test, laboratory test protocols and the effects of animal age, production type, season and region on disclosing TB infection in cattle.	The project has provided a robust basis upon which to review the application of interferon gamma to the control of bTB in Northern Ireland. Outcomes from the project were shared with the TB Strategic Partnership Group and with the Food and Veterinary Office (now DG HFS) and have informed the Departmental response to the TBSPG Eradication Strategy. The practical application of the test has been adapted as a result of this research resulting in increased laboratory capacity and better targeting of animals for slaughter.

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
Interactions between badgers and cattle in the rural environment - Implications for bovine tuberculosis transmission	£472,112	Nov 2011 – Jan 2014	The results indicated that direct contact between badgers and cattle at pasture did not occur and probably represented a rare event in terms of bTB transmission. Whilst the study area was relatively small and number of animals collared moderate, these results are supported by other comparable studies and showed consistent patterns in terms of direct contact being negligible. Whilst direct contact may of course occur between these two species, it is likely to be at a low frequency. It is suggested that in terms of reducing potential disease spread between badgers and cattle, it is important to concentrate further research into the management of indirect contact venues for these species. Important areas to consider are setts, badger latrines and limiting access to farm buildings. Relatively simple measures could be instigated to reduce interactions at these key potential indirect routes of bTB transmission and effectively limit contact to very low levels. The cost-effectiveness and efficacy of such measures also needs to be further assessed.	Project has informed both the work of the TBSPG and the Departmental response, particularly in relation to wildlife intervention and farm biosecurity. It has also informed the practical advice provided to farmers.

Appendix 4:
DAERA Commissioned Research and Development Completed or Commenced in 2012-2017

(paragraph 2.4)

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
Badger Road Traffic Accident (RTA) Survey	Average Annual cost: £142,000	Ongoing since the mid 1990s	The continuing survey provides independent data on the levels of TB in the Northern Ireland badger population.	Project has informed the work of the TBSPG and the Departmental response and the distribution of infection and strain types in cattle and badgers in Northern Ireland.
Badger Sett Survey of TVR Trial Areas	£379,886	Jan 2013 – Mar 2014	The survey informed the TVR wildlife intervention research by providing an indication of badger social group density, by identifying the location of active setts, ahead of the start of TVR fieldwork.	Project supported the TVR Wildlife Intervention Research Project.
A literature review on the potential role of slurry in the spread of bovine tuberculosis.	£25,083	Sept 2012 - Feb 2014	The literature review report is available at: https://www.daera-ni.gov.uk/publications/review-potential-role-cattle-slurry-spread-bovine-tuberculosis	Project has informed both the work of the TBSPG and the Departmental response.
Test Vaccinate Remove (TVR) Wildlife Intervention Research Project (Banbridge, County Down)	£2,791,000 (to end of year 3)	2014 - 2018	Project ongoing.	Project ongoing.

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
An assessment of commercially available serological tests for the detection of cattle infected with bovine tuberculosis.	£142,595	Sept 2015 – Aug 2017	This project ceased at review stage concluding that a small number of antibody tests are available for use within a diagnostic programme. These tests, however, are not as sensitive as the skin test or the gamma interferon test and fail to disclose a significant number of diseased cases which would otherwise be identified.	Final report concluded that this project had scientifically established that the utilisation of serology testing for bTB in NI did not significantly add to the disclosure of diseased or infected cattle when the skin and interferon gamma tests were employed.
An evaluation of the role of multiple reactor and chronic breakdown herds in the epidemiology of bovine tuberculosis in Northern Ireland.	£163,700	Sept 2015 – Mar 2018	Mapping suggested that chronic herds had a wide distribution in Northern Ireland (2003-15). Spatio-temporal algorithms identified a number of chronic herd clusters in Northern Ireland. Risk factor analyses revealed that chronic herds were significantly more likely to occur in large herds, herds with increased purchasing of animals and herds that had associated herds. bTB strain data revealed that herds with increased strain diversity were more likely to experience chronic breakdowns. This may indicate that mixed strain infections are harder to clear or that infected cattle are being bought-in.	These reports are currently being reviewed to identify how they can contribute to a reduction in chronic breakdown herds from both a policy and programme perspective.

Appendix 4:
DAERA Commissioned Research and Development Completed or Commenced in 2012-2017

(paragraph 2.4)

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
			There was limited evidence from the data available that chronic herds had greater risk of harbouring the Bovine Viral Diarrhoea (BVD) virus. Similarly, using abattoir data of animals slaughtered in chronic TB and non-chronic herds, there was no significant difference in the within-herd prevalence of liver fluke (Fasciola hepatica). However, there was a significant association between bTB breakdown episode risk and the herd's Johne's Disease (Mycobacterium avium paratuberculosis) status (measured using serological testing). There was also a small increased proportion of chronic TB herds with positive Johne's Disease results relative to TB free herds. This adds to an increasing evidence base that suggests that Johne's Disease in TB affected herds can have an impact on the diagnosis and clearance of infection.	
Investigating TB transmission dynamics using genome epidemiology	Estimated Budget £507,263	Sept 2015 – Sept 2019	Project ongoing	Project ongoing

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
The role of endemic diseases and other factors in the occurrence of bovine Tuberculosis	£262,494	Aug 2015 – Nov 2017	This project concluded that: • Bovine Viral Diarrhoea infection does not appear to have a major effect on bTB in terms of animal diagnosis or increased herd risk; • Liver Fluke does not appear to impact in tuberculin reactions but may impact on pathological progression; • There is little evidence of herd level increased bTB-risk and bulk milk measured exposure to liver fluke; • Other mycobacteria, including Mycobacterium avium paratuberculosis (which includes Johne's Disease) impacts the comparative test such that they may mask true infection; and • There is a relationship between tuberculin reactions and Johne's Disease 'ELISA status', therefore there is potential for test interference.	This project work removes a lot of uncertainty around the issue of co-infection and has provided policy officials with a clearer understanding of major pathogens in Northern Ireland and their potential relationship with the diagnosis and epidemiology of bTB. They have quantified hitherto unknown risk and the results will allow rational assessment on the potential impact of this co-infection nexus.

Appendix 4:
DAERA Commissioned Research and Development Completed or Commenced in 2012-2017

(paragraph 2.4)

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
Resuscitation Promotion Factors (Rpf) enhanced culture of Mycobacterium bovis from clinical tissue	£159,307	Oct 2016 – Apr 2018	This project investigated the potential of bacterial proteins called Resuscitation Promotion Factors (Rpf) to help resolve difficulties in diagnosing TB infected cattle by enhancing the culture process. A review of the current research on Rpf indicated that this proposed use could be of value, however, following further preparatory work it was concluded that current production methods are not able to meet the quantity and quality requirements of a bTB diagnostic service. From a quality assurance and ISO 17025 perspective, it was concluded that assuring reproducible and comparable batches of Rpf would be difficult but would be essential if the approach were to be a success. Overall this project increased the awareness and scientific knowledge of these interesting proteins. As production methods for Rpf are refined and improved, the assessment of the potential for benefits could rapidly commence based on preparatory work conducted in this project.	Final projects received in May 2018 and are currently being reviewed by the Department. Considerable knowledge on the practicalities of producing and manufacturing Rpf's in-house has been gained during the initial consultation and discussions with potential collaborators. If there is interest in this project in the future then the direction of the project could be properly mapped out and rapid progress could be made, bearing in mind the lengthy time to culture M Bovis.

Project Title:	Cost	Time frame	Project Conclusions	Project Impact on Policy / Operational Procedures)
Optimisation and enhancement of the test format for the interferon gamma assay	Estimated Budget £421,209	Aug 2016 – July 2019	Project ongoing	Project ongoing
To improve reliability of genomic prediction for TB resistance in cattle	Estimated Budget £267,863	Jan 2017 – Sept 2019	Project ongoing	Project ongoing
bTB molecular epidemiology - analysis of cattle movements and optimisation of epidemiological investigations.	Estimated Budget £310,968	Jan 2017 – Sept 2019	Project ongoing	Project ongoing

Source: DAERA

Appendix 5:
Comparative bTB Compensation Payments [as per bTB Strategy, December 2016]

(paragraph 2.8)

Country	bTB
Northern Ireland	100 per cent of market value for reactors and in-contact animals as determined by on-farm valuation. Pedigree stock at full valuations. No cap on compensation payments. The Department is currently consulting on changes to the compensation regime.
England	Use is made of statutory monthly table valuations which reflect the average sale prices over the last month (non-pedigree) or six months (pedigree) of bovine animals in 51 different categories. The categories are based on the animal's age, gender, type (dairy or beef) and status (pedigree or non-pedigree). The only exceptions are where insufficient market data results in categories without a set value, and for buffalo and bison. The percentage of compensation may be reduced for TB reactor cattle that are disclosed in herds with overdue TB tests. In November 2018, the following changes are planned: • Reduced compensation (50 per cent) for unclean animals to be applied when an animal presented for slaughter is rejected because it is too dirty for processing; • Reduced compensation (50 per cent) for bought-in reactors to be applied to any animal bought into a breakdown herd which fails a bTB test whilst that particular breakdown is ongoing. Herds that are Cattle Health Certified Standards (CHeCS) accredited will be exempt and will continue to attract 100 per cent compensation. • Cattle keepers who choose to privately slaughter a bTB reactor will receive compensation if the carcase is condemned by the slaughterhouse. In addition, during 2017, England consulted on the introduction of a £500,000 cap for animals compulsorily removed under the bTB Eradication programme.

Country	bTB
Wales	As in NI, 100 per cent of the market value is paid, but taking into account that: • The salvage value of the animal will be paid if it is more than the market value; and • The highest amount of compensation that will be paid for a reactor is £5,000. The Welsh Government has committed to regularly review its compensation regime.
Republic of Ireland	100 per cent of market value (up to a maximum of €3,000) is paid for all cattle, except for one stock bull per year when a cap of €4,000 applies and a cap of €5,000 for a pedigree-stock bull. Farmers pay for one herd test per year. Farmers contribute via beef and milk levies to compensation costs.
Scotland	Compensation is payable at 100 per cent of market value of animals. Valuations of market value can either be: agreed between the owner and government; made by one valuer agreed by the owner and government; made by two valuers (one appointed by government and other by owner); or, failing agreement, one valuer can be appointed by the Institute of Auctioneers and Appraisers in Scotland. In 2017, Scotland consulted on the introduction of a £5,000 cap for animals compulsorily removed under the bTB Eradication Programme.

Appendix 6:
Animal Information, bTB Status and Testing Arrangements (paragraph 3.1)

There are detailed rules for identifying and registering animals. These vary according to species and cover the need to use ear tags, herd registers, flock registers and movement documents. The Animal and Public Health Information System (APHIS) is DAERA's primary database for information on food animals and their keepers since 1998, it supports almost all the day-to-day business of Veterinary Service Animal Health Group (VSAHG) and many other areas of the Department. [APHIS is being replaced]

Annual testing of all herds is mandatory, and all herds at all times have an official tuberculosis (OT) herd status, a herd status reason, and a next test type.

The herd status may only be:

- Officially Tuberculosis Free (OTF);
- Officially Tuberculosis Free status Suspended (OTS);
- Officially Tuberculosis Free status Withdrawn (OTW).

Tests results to the skin test (SICCT) are assessed based on the relative size of Bovine site swelling 72 +/- 4 hours after the test injections compared with the Avian site swelling.

Reaction Result at Standard Interpretation

PASS (retain)

- Animals showing a negative (< or = 2mm) bovine reaction and a positive (> 2 mm) or negative avian reaction.
- Animals showing a positive bovine reaction equal to or less than a positive avian reaction.

INCONCLUSIVE (retest)

- Animals showing a positive bovine reaction not more than 4mm greater than a positive avian reaction.
- Animals showing a positive bovine reaction and a negative avian reaction where the difference is 4mm or less.

FAIL (remove)

- Animals showing a positive bovine reaction more than 4mm greater than a negative or positive avian reaction.

Reaction Result at Severe Interpretation (since 12/03/2018)

PASS (retain)

- Animals showing a negative bovine reaction.
- Animals showing a positive bovine reaction and positive avian reaction, where the avian reaction is more than 2mm greater than the bovine reaction.

INCONCLUSIVE (retest)

- Animals showing a positive bovine reaction and positive avian reaction, where the bovine reaction is either 1 or 2mm less than, or equal to the avian reaction.

FAIL (remove)

- Animals showing a positive bovine reaction which is greater than the avian reaction.

OTS Breakdown:

An OTS breakdown occurs where an animal has a bTB positive result to the skin test (a reactor) or at post-mortem but infection is not confirmed by laboratory testing (histopathology and or bacteriology) and where fewer than two (since 12/03/2018) reactors are identified during the course of the breakdown and infection is not confirmed by post-mortem examination or laboratory testing (histopathology and/or bacteriology). Cattle within an OTS herd cannot be moved into another herd, sent to market or exported. They can be removed for slaughter.

Appendix 6:
Animal information, bTB status and testing arrangements (paragraph 3.1)

OTW Breakdown:

An OTW breakdown occurs where:

- during the course of a breakdown, more than one reactor (12/03/2018) is identified or where more than five animals are found to have visible bTB-like lesions at routine slaughter but infection is not confirmed;
- any animal has had two positive results from four possible tests (skin, post-mortem, histology or bacteriology);
- any animal has had a positive bTB bacteriology result; or
- the Veterinary Officer decides that the level of disease risk is sufficient to warrant OTW status.

Cattle within an OTW herd cannot be moved into another herd, sent to market or exported. They can be removed for slaughter. In addition, a Veterinary Officer may prohibit moves into an OTW herd (or rarely into an OTS herd).

Appendix 7:
bTB by Divisional Veterinary Offices, 2011 and 2017 (Figure 3.5)

Herd Prevalence (%) for the areas covered by DAERA's Divisional Veterinary Offices, for 2011 and 2017

Divisional Veterinary Offices	Armagh	Ballymena	Coleraine	Dungannon	Enniskillen	Mallusk	Londonderry	Newry	Newtownards	Omagh	NI
2011	7.10	6.06	7.79	5.45	6.20	3.73	6.13	9.26	10.75	7.36	7.18
2017	12.45	13.10	12.63	14.03	10.14	8.62	5.20	13.07	17.88	12.49	12.41

Herd Incidence (%) for the areas covered by DAERA's Divisional Veterinary Offices, for 2011 and 2017

Divisional Veterinary Offices	Armagh	Ballymena	Coleraine	Dungannon	Enniskillen	Mallusk	Londonderry	Newry	Newtownards	Omagh	NI
2011	6.06	5.05	6.51	4.28	5.54	3.35	5.68	6.97	8.91	6.74	6.01
2017	9.33	11.55	9.53	10.45	8.24	7.59	4.41	9.80	12.96	9.83	9.61

Appendix 8(a): (paragraphs 3.25 to 3.33)

Extract from the Consultation on the DAERA's Response to the TB Strategic Partnership Group's (TBSPG) Recommendations to Eradicate bTB in Northern Ireland - Consultation Summary

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
1	59	The Department proposes new partnership structures which will give stakeholders a greater voice in policy development, programme delivery and input to local decisions relating to bTB eradication.	1.1	A new governance structure should be put in place, with the establishment of bodies at a regional, sub-regional and local level, with a focus on disease eradication and an ability to influence policy and disease control.
2	82	The Department proposes that, where it is considered necessary, gamma interferon testing should be mandatory. This would remove the option for herd-keepers to retain any animals which have tested positive to the gamma interferon test.	3.2.2	The use of the gamma interferon (IFNG) test is expanded to remove infected animals as quickly as possible.
3	91	The Department proposes to tailor its approach to dealing with chronic herds by prioritising herds based on potential impact and available resources.	3.2.3	There should be a renewed approach to dealing with chronic herds. This should involve using relevant measures and processes, already identified, in a package targeted at resolving or minimising their impact.
4	95	The Department proposes to introduce measures to prevent restocking of breakdown herds through a phased approach in order to minimise potential hardship for herd-keepers whilst moving towards compliance with EU legislation.	3.2.4	DAERA should move to prevent restocking of all breakdown herds until after the first herd retest and subsequent removal of any reactors.

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
5	100	The Department proposes to put in place mechanisms, in compliance with EU legislation, which will enable limited moves from bTB breakdown herds to approved rearing/finishing herds which are 100% housed and which meet defined, strict biosecurity conditions.	3.2.6	DAERA considers permitting limited moves from bTB breakdown herds to approved rearing/finishing herds which are 100% housed and meet strict biosecurity conditions.
6	104	The Department proposes to bring forward amendments to relevant secondary legislation to enable PVPs to apply DNA tags at disclosure.	3.3.1	Private Veterinary Practitioners (PVPs) should apply DNA tags to any animals that they detect with reactor readings, when they are reading the test results.
7	109	The Department will carry out quality assurance checks on bTB reactors. A pilot started in November 2017. The Department will consider the findings of the pilot and consider further policy changes as appropriate, which could include introducing a policy on bTB reactor quality assurances and further actions where fraud is suspected.	3.3.2	DAERA develops a preliminary field trial and associated research to help establish counter measures to prevent occurrences of cattle being presented as reactors which have not given a natural response to the injection of tuberculin.
8	114	The Department proposes to expand the use of molecular techniques to support efforts to eradicate bTB from cattle in Northern Ireland.	3.4.2	The use of molecular techniques, to identify different strains of the disease, help source the origin and control spread, should be expanded as we seek to eliminate bTB from cattle.

Appendix 8(a): (paragraphs 3.25 to 3.33)

Extract from the Consultation on the DAERA's Response to the TB Strategic Partnership Group's (TBSPG) Recommendations to Eradicate bTB in Northern Ireland - Consultation Summary

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
9	136	The Department recognises that wild deer and camelids are known to be sources of infection. The Department proposes that it should undertake further research as resources allow.	4.1	In relation to bTB transmission, we recommend that the bTB Eradication Partnership (TBEP, a new Northern Ireland level oversight body) should keep the position in relation to wild deer and camelids under review.
10	125	The Department shares the TBSPG's aspiration that vaccination would be the preferred method of controlling TB transmission in badgers.	4.2.1	We recommend that badger vaccination should form part of a longer-term sustainable badger intervention strategy in support of an effective disease control strategy.
11	125	The Department acknowledges that the development of an effective oral bait vaccine could be an important aspect of an eradication strategy.	4.2.2	Once an effective oral bait vaccine for badgers has been developed and is available, the TBEP should consider how it could most effectively be deployed.
12	127	The Department's preferred option is to introduce a combined approach of two or more interventions broadly in line with TBSPG's proposals.	4.3	A badger control policy should be implemented to reduce the overall level of infection in the badger population. This intervention should include the culling of badgers in areas of high levels of bTB in cattle and, in order to mitigate the risks associated with the perturbation effect (whereby culling leads to increases movements of the remaining animals), the vaccination of badgers, combined with culling of test positive badgers in a surrounding area.

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
13	141	The Department broadly supports the recommendations TBSPG made in respect of the badger RTA Survey, subject to resources.	4.4	The RTA Survey should be expanded to have uniform coverage throughout NI and the methodologies should be refined.
14	159	The Department proposes to work with the TBEP, industry, PVPs and the College of Agriculture, Food and Rural Enterprise (CAFRE) to develop an integrated approach to encouraging improved herd health management on farms, at marts and agricultural shows.	5.1	Herd-keepers should be proactively encouraged to improve herd health management and take responsibility for herd health management on individual holdings.
15	163	The Department proposes that it will support the farming industry as appropriate, including farmers and livestock markets, to adopt an informed purchasing approach to bringing stock onto holdings.	5.5	The farming industry should lead in the adoption of an 'informed purchasing' approach for farmers bringing in stock to their farms.
16	161	The Department believes there is benefit in farmers ensuring that they have as much information as possible when bringing animals into their herds. The Department proposes that the farming industry takes a lead, with the support of the Department, to implement this recommendation.	5.6	Livestock markets should be encouraged to display as much information as is practically and legally possible to better inform prospective purchasers to help them assess the risks involved in any purchase.

Appendix 8(a): (paragraphs 3.25 to 3.33)

Extract from the Consultation on the DAERA's Response to the TB Strategic Partnership Group's (TBSPG) Recommendations to Eradicate bTB in Northern Ireland - Consultation Summary

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
17	163	The Department proposes that it will support the industry to promote information openness and transparency at livestock markets and awareness raising by the industry.	5.7	Informed purchasing should be put in place as an integral part of an overall communications strategy.
18	163	The Department proposes to work with the farming industry to develop and introduce segregation notices to protect those herds that are at risk of diseases spread from high risk groups within bTB breakdown herds.	5.9	DAERA should introduce segregation notices to protect those herds that are at risk of disease spread from high risk groups within bTB breakdown herds.
19	171	The Department proposes to keep under review, the potential benefits of herd classification and purchasing based on herd bTB history.	5.10	The TBEP should keep under review the potential benefits of the use of herd classification and purchasing based on herd bTB history as operated, for example, in New Zealand.
20	175	The Department proposes that it should support and focus the industry in a move towards inclusion of bTB resistance as a desirable trait in their selection of breeding material through CAFRE's education and technology transfer programmes.	5.11	Industry leaders should actively encourage farmers to use the 'TB Advantage' genetic index.
21	180	The Department proposes that the industry should take a lead to ensure that vehicles which make regular or return visits to markets should be properly cleaned and disinfected before and after use to prevent disease spread.	5.12	It is recommended that farmers thoroughly clean and disinfect vehicles and equipment after transportation of farm animals.

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
22	202	The Department proposes that there should be a cap on compensation of £1,500 for each non-pedigree animal and £1,800 for each pedigree animal. It also proposes compensation up to a cap of £3,500 for one pedigree stock bull per year, with no carry-over from one financial year to the next.	6.1	A cap in compensation levels should be introduced, with a maximum of £1,500 for non-pedigree bovine animals; a 20% premium for pedigree bovine animals to a maximum of £1,800; and a cap of £3,500 for one pedigree stock bull per year, with no carry-over from one year to the next.
23	206	The Department proposes to introduce a reduction of 10% of the compensation payment in year one, increasing to 25% of the compensation payment in year two. The reduction would be in conjunction with the introduction of caps on compensation paid.	6.2	The TBEP should consider a reduction in the percentage of compensation paid.
24	221	(This is a new proposal from the Department and additional to the TBSPG recommendations). The Department proposes to introduce a requirement that each farmer should pay for one herd test per year.		No recommendation.
25	231	The Department proposes to accept this recommendation. New evidence and innovation proposals are currently considered by the Department on an annual basis.	7.1	DAERA continues to invest in bTB research to facilitate future policy development and new innovations to help tackle the disease.

Appendix 8(a): (paragraphs 3.25 to 3.33)

Extract from the Consultation on the DAERA's Response to the TB Strategic Partnership Group's (TBSPG) Recommendations to Eradicate bTB in Northern Ireland - Consultation Summary

No.	Consultation paragraph number	DAERA proposal	TBSPG Ref. No.	Recommendation
26	234	The Department proposes to accept the recommendation that the TBEP has access to emerging findings, including a role in the dissemination of relevant research to stakeholders.	7.2	TBSPG recommends that the TBEP is recognised as a significant stakeholder in the research agenda and is able to input into the identification of gaps and the research commissioning process.
27	239	The Department proposes that it will make research papers available to the TBEP and any other interested stakeholders. The Department is keen to maintain communications with stakeholders as well as to receive relevant input from them.	7.3	A representative(s) from the TBEP sit on the steering group which will oversee the proposed new programme of bTB research.
28	239	The Department proposes to accept this recommendation. There is benefit in commissioning research upon which any future proportionate policy direction can be proposed.	5.8	DAERA undertakes a review of existing farm fragmentation data to establish whether the practice of farm fragmentation (including conacre) adversely impacts on the control of disease following a bTB breakdown.

Note: No. 24 is a new proposal from DAERA, additional to the TBSPG recommendations.

Appendix 8(b):

Status of TBSPG Recommendations not taken forward in DAERA's Consultation (paragraphs 3.25 to 3.33)

No.	TBSPG Ref. No	TBSPG recommendation	DAERA consideration/action/alignment with additional measures introduced
1	2.1	A new governance structure should be put in place, with the establishment of: • A Northern Ireland level oversight body, the TB Eradication Partnership (TBEP) • A small number of Regional Eradication Partnerships (REPs) and • Responsive local Disease Response Teams (DRTs).	The Department has already established the TBEP so that this independent body can advise the Department and Minister on any implementation of the consultation proposals, following consultation analysis. Appointments were made at the end of April for a period of one year. In addition to this the Department accepted the need for REPs and DRTs. These proposals were also included in the consultation. See consultation document page 15.
2	3.1.1	DAERA should ensure that optimum levels of test sensitivity are achieved through robust training, management and monitoring of all testing vets. We are pleased to see that DAERA has appointed a contract manager for this purpose and recommend that the results of the monitoring are regularly provided to the TBEP.	Systems have been developed and implemented through the TB testing contract since it was introduced in April 2016. Results of the monitoring will be provided to TBEP.
3	3.1.2	That an important aspect of disease surveillance, abattoir surveillance, must be as rigorous as possible and uniformly applied across all Northern Ireland slaughterhouses. We agree with the approach being taken by DAERA and recommend that it continues to monitor the surveillance outcomes.	TBSPG have agreed the approach that has been taken by DAERA on this matter. Surveillance outcomes continue to be monitored and assessed through quarterly reports.

Appendix 8(b): (paragraphs 3.25 to 3.33)

Status of TBSPG Recommendations not taken forward in DAERA's Consultation

No.	TBSPG Ref. No	TBSPG recommendation	DAERA consideration/action/alignment with additional measures introduced
4	3.2.1	DAERA should expand its use of severe interpretation during breakdowns in 'Officially Tuberculosis Free Status Withdrawn (OTW)' herds to require the removal of all animals that are inconclusive on standard interpretation of the skin test. We also recommend that DAERA should undertake further epidemiological analysis to assess the potential for wider use of severe interpretation of the skin test.	In response to the rising disease levels the Departmental Board agreed that the expansion of use of severe interpretation should be implemented as a programme enhancement. Implementation commenced on 12 March 2018. Work has progressed on the further epidemiological work and The Department's Veterinary Epidemiology Unit have provided a draft report that should allow the identification of particular risk groups, based on test readings, and other associated risk factors, within a breakdown herd. This approach may be widened to include other risk tests, should it be decided that that would be beneficial
5	3.2.5	That a herd with two or more Non Visible Lesions reactors should have its Officially Tuberculosis Free (OTF) status withdrawn (OTW) and should require two consecutive clear herd skin tests at least 60 days apart to regain OTF status. Tracing and checking of epidemiologically related herds should also be carried out.	In response to the rising disease levels the Departmental Board agreed that this should be implemented as a programme enhancement. Implementation commenced on 12 March 2018.
6	3.2.7	DAERA should consider that in higher risk breakdowns, a further herd test should be carried out six months after the Check Herd Test.	In response to the rising disease levels the Departmental Board agreed that this should be implemented as a programme enhancement. Implementation commenced on 12 March 2018.

No.	TBSPG Ref. No	TBSPG recommendation	DAERA consideration/action/alignment with additional measures introduced
7	3.2.8	In addition to application of measures to improve test sensitivity, the benefits of depopulation as a control measure should be positively considered in herds with multiple reactors. Partial depopulation should be particularly considered in herds where the reactors represent a significant proportion of a particular group.	A new chapter entitled 'Further Actions to Eliminate Infection' was added to staff instructions in July 2016, in response to a FVO report recommendation. This amendment also covers the TBSPG's recommendation.
8	3.4.1	DAERA's Geographical Information System (GIS) should be developed further as a resource to meet the requirements of DAERA staff, Private Veterinary Practitioners and the governance groups as the Strategy evolves.	A new GIS viewer is being used to map TB breakdowns and support local disease control work. This system is currently being enhanced to provide additional functionality. A new GIS system has been developed that will integrate with the APHIS replacement system (NIFAIS). DAERA will have access to spatial representations of our TB-related data and will be able to provide stakeholders with maps as/when necessary. In future it may be possible to provide stakeholders with direct access to these mapping tools however this will require further development.
9	5.2	In the context of engraining the practice of good herd health management, farmers should use a biosecurity self-assessment check list to be developed by DAERA.	A biosecurity questionnaire was introduced under the TB testing contract in November 2017. See paragraph 154 of the consultation.

Appendix 8(b):

Status of TBSPG Recommendations not taken forward in DAERA's Consultation (paragraphs 3.25 to 3.33)

No.	TBSPG Ref. No	TBSPG recommendation	DAERA consideration/action/alignment with additional measures introduced
10	5.3	Private Veterinary Practitioners and DAERA staff should provide advice to farmers about on-farm practice and herd health management measures specific to that farm and encourage farmers to make improvements to help reduce the risks associated with the spread of infectious diseases. The self-assessment checklist could be used as a starting point.	As covered above the Department has moved to introduce a biosecurity checklist as a first step in this process. Once it is embedded into the interaction between farmers and PVPs we aim that this will then lead to, in time, more in depth discussions and analysis of 'on farm' biosecurity through a Phase 2 amendment to the TB contract. This will require additional funding and is part of the Outline Business Case currently being developed for possible implementation of the consultation proposals, pending Ministerial decisions and securing funding.
11		A system similar to Statutory 'Improvement Notices' [requiring improvements in biosecurity] should be given consideration by the TBEP and DAERA for use where it is apparent that good biosecurity practice is not being adopted voluntarily and a farm business is, as a result, posing a risk to others.	Covered in the consultation, see question H1, page 45.

Source: DAERA

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