National Assembly for Wales

Bovine Tuberculosis
July 2011

This research paper provides a briefing on the present situation with regards to bovine TB in Wales, including data up to the beginning of 2011.

It gives an overview of the procedures and processes that are currently implemented to control and prevent the spread of TB, as well as the procedures in place for the steps to be taken if TB is discovered in a herd.

A synopsis of the current legislation and policies regarding bovine TB in Wales is also included in this research paper.

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National Assembly for Wales

Bovine Tuberculosis
July 2011

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Research Service

Summary

Bovine TB (*bovine tuberculosis*) is an infectious and chronic disease of cattle for which, according to the Welsh Government, there is no effective treatment available. It poses a risk to the Welsh beef and dairy industries, also affecting agricultural production and food supplies.

Over the past 25 years, the number of cases of bovine TB in Wales has been increasing; in 1985 there were no new incidences of TB whilst 15 years later in 2000, there were 264. Last year, there were 433 new herds confirmed with the disease and 7,690 animals were slaughtered as a result of the disease. The cost of compensating cattle keepers as a result of infection by *M. bovis*, is increasing, and since 2000, in excess of £100 million has been spent.

In April 2008, the previous Welsh Government announced the TB Eradication Programme which aimed to reduce the occurrences of TB in herds and ultimately eradicate the disease in Wales. The programme included the TB Health Check Wales, the promotion of improved animal husbandry and biosecurity practices, changes to the compensation regime, badger culling within an Intensive Action Pilot Area (IAA) and the potential of using cattle and badger vaccines. Pre-movement testing continues alongside the new testing measures with an additional 3 years funding of £27.7 million provided. In June 2011, the Welsh Government announced that it would be establishing an independent expert panel to peer review the scientific evidence base in relation to Bovine TB. No further decisions on action including a cull of badgers will be made until the panel's results have been published.

Bovine TB can affect other species as well as cattle. In 2009, five sheep from different flocks were diagnosed with TB from nine submissions for testing; also, 23 domestic pigs from 9 different units out of the 166 submitted for testing were confirmed to have TB, as were 18 wild and 1 farmed, out of 52 deer. The general trend is for an increase in bovine TB cases in non-bovine animals with time.

Three pieces of legislation have recently been passed, *The Tuberculosis (Wales) Order 2010*, *The Tuberculosis (Wales) Order 2011* and *The Badger (Control Area) (Wales) Order 2011*. In January 2011, new terminology was also introduced to align the terminology used in Wales with the EU legislation Directive 64/432/EEC which sets out the requirements for TB control. The new terms introduced are *Officially TB Free* (OTF), *Officially TB Free Suspended* (OTFS) and *Officially TB Free Withdrawn* (OTFW) and they replace the terms *confirmed* and *unconfirmed.*

This paper provides background information on tuberculosis and an overview of the present situation of bovine TB in Wales. A detailed description is given of the procedures and processes that are currently being implemented to control and prevent the spread of TB, as well as the procedures in place for the steps to be taken if TB is discovered in a herd.

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Bovine Tuberculosis

1. Bovine Tuberculosis

Bovine TB (*bovine tuberculosis*) is an infectious and chronic disease caused by *Mycobacterium bovis* (*M. bovis*) and usually affects the lungs and lymph nodes of cattle.[1] It is easily spread through the respiratory system, and is often asymptomatic[2].[3] Infected cattle are able to transmit the disease before they show signs of being unwell, which may be for many months after they are infected, and therefore control of TB is dependent on the early detection and elimination of infected cattle.[4] According to the Welsh Government, there is **no effective treatment available** for cattle with TB, and it is illegal to attempt to provide treatment.[5] They state that it is a risk to the Welsh beef and dairy industries, and can affect agricultural production and food supplies.[6] TB can also be spread to other animals; whilst cattle and badgers are the principal hosts of the disease in the UK,[7] camelids, deer and goats are also susceptible.[8] Humans can be infected by Bovine TB, but the incidences are very low due to inspection of meat at slaughterhouses and pasteurisation of milk (which kills the *M. bovis* bacteria).[9]

1.1. Bovine TB in Wales

Over the past 25 years, the number of cases of bovine TB in Wales has been increasing; **in 1985** there were **no new breakdowns** (new incidences) of TB whilst 15 years later **in 2000**, there were **264**.[10] The following year there was a dramatic increase in cases as the Foot and Mouth Disease epidemic caused TB testing to stop.[11] **Bovine TB in Wales was made a notifiable disease** in all mammals except man in 2006.

Table 1 shows the number of animals slaughtered in Wales between 1998 and 2011 after being infected with M. bovis. **A reactor is an animal which has failed the Tuberculosis skin test**; this could be due to M. bovis or another mycobacteria but it is impossible to know in a living animal which bacteria has

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[1] Welsh Government, *Disease Surveillance and Control, Bovine Tuberculosis*, *Background* (Website) [accessed 26 May 2011]
[2] Shows no symptoms or signs of illness.
[3] Welsh Government, *Disease Surveillance and Control, Bovine Tuberculosis*, *Background* (Website) [accessed 26 May 2011]
[4] ibid.
[5] ibid.
[6] ibid.
[7] ibid.
[8] ibid.
[9] ibid.
[10] Welsh Government, *Bovine Tuberculosis: Background, The scale of the problem* (Website) [accessed 26 May 2011]
[11] ibid.

caused the fail result.[12] **Reactor animals are valued and destroyed**; compensation is paid to the owner.[13] If a reactor is found within a herd, it is termed a herd breakdown.[14] Table 2 gives the number of animals slaughtered for each of the preserved counties of Wales. The data for the total number of animals slaughtered in each year for Wales as a whole is shown in Figure 1.

Table 1: Animals infected by M. bovis between 1999 and 2011 in Wales

Number of animals

Year	As Reactors	As Inconclusive Reactors (IRs)	As Direct Contacts (DCs)	Total Slaughtered
1998	774	72	200	1,046
1999	920	41	398	1,359
2000	986	41	372	1,399
2001	1,578	66	430	2,074
2002	4,305	99	656	5060
2003	4,809	137	788	5,734
2004	4,682	126	707	5,515
2005	5,520	138	1,119	6,777
2006	5,241	103	721	6,065
2007	7,171	111	631	7,913
2008	10,542	230	1,271	12,043
2009	9,951	166	316	10,433
2010	7,321	132	237	7,690
2011*	1,245	18	15	1,278

Table 1: The number of animals infected by *M. bovis* and the total number of animals slaughtered in Wales, between 1999 and 2011*. *The number recorded for 2011 is for 1 January to 28 February 2011 inclusive
Source: DEFRA's Animal Health Database.[15]

[12] Department of Agriculture and Rural Development, *Basic information about Tuberculosis reactor animals* (Website) [accessed 26 May 2011]
[13] ibid.
[14] ibid.
[15] DEFRA (archive), *TB* (Website) [accessed 26 May 2011]

Table 2: Animals infected by *M. bovis* between 1998 and 2011 in the preserved counties of Wales

Number of animals

Year	Dyfed	Gwynedd	Clwyd	Powys	South Glamorgan	Mid Glamorgan	West Glamorgan	Gwent
1998	549	30	2	100	7	4	75	279
1999	829	3	6	74	0	3	85	359
2000	765	0	2	129	0	4	49	450
2001	1,474	0	6	248	2	1	45	298
2002	3,087	16	60	810	14	19	60	994
2003	3,559	37	55	953	2	14	76	1,038
2004	3,906	16	96	821	0	12	122	542
2005	4,540	12	36	1,002	2	2	183	1,000
2006	4,041	12	117	1,079	9	24	133	650
2007	5,028	22	138	1,342	3	26	68	1,286
2008	8,361	30	334	1,705	2	15	199	1,397
2009	6,981	104	384	1,833	14	35	152	930
2010	4,634	60	273	1,705	198	27	159	634
2011*	745	15	36	312	14	7	13	136

Table 2: The total number of animals slaughtered as a result of infection with M. bovis between 1998 and 2011* for the preserved counties of Wales. Source: DEFRA's Animal Health Database

Figure 1: Total number of cattle in Wales slaughtered due to infection with *M. bovis*

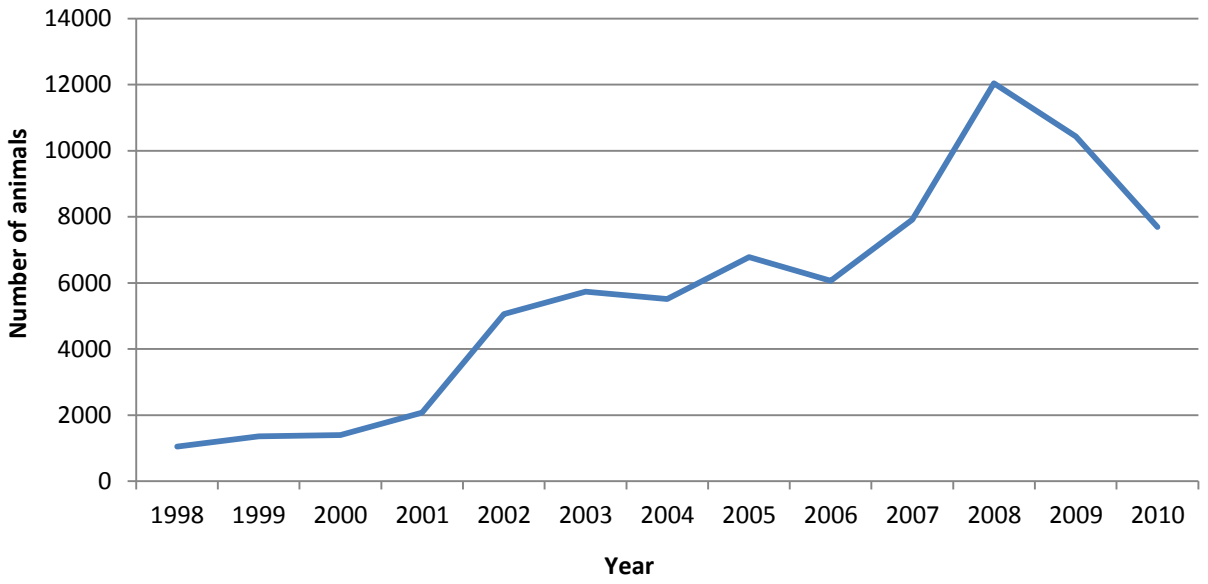

Figure 1: The total number of cattle in Wales slaughtered between 1998 and 2010 due to infection with *M. bovis*. The data from 2011 are not included as it is not a complete year Source: DEFRA's Animal Health Database

Table 3 gives the number of herds tested for TB in Wales, and Tables 4 and 5 give the individual values for the preserved counties of Wales.

Table 3: Herds infected by M. bovis between 1998 and 2011 in Wales

Number of herds

Year	Total Tests on Herds	Herds under Movement Restriction	Total New Herd Incidents	Confirmed New Herd Incidents
1998	4,679	312	230	87
1999	5,223	398	282	127
2000	5,433	409	264	151
2001	2,079	357	207	132
2002	8,480	812	618	348
2003	7,422	1,066	625	327
2004	8,359	1,073	656	324
2005	8,641	1,182	733	396
2006	10,637	1,273	766	433
2007	10,548	1,515	930	437
2008	12,201	1,895	1,193	541
2009	16,092	2,114	1,175	513
2010	15,745	1,370	1,036	433
2011*	3,606	913	183	67

Table 3: The number of herds tested for TB, the herds under movement restrictions, the total number of new incidences in herds and and those which have been subsequently confirmed. *Data from 2011 are up to the 28 February. Source: DEFRA's Animal Health Database

Table 4: Herds infected by M. bovis between 1998 and 2011 in the preserved Welsh counties

Number of herds

	Dyfed				Gwynedd				Clwyd				Powys			
Year	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1998	2,013	160	134	49	524	6	5	1	529	10	3		673	30	19	6
1999	2,380	211	161	60	557	5	3	1	376	11	5	1	903	47	32	13
2000	2,609	191	132	68	388	3			380	7	2		1,009	66	44	27
2001	1,120	176	125	80	155	3	1		137	7	2	1	358	70	39	27
2002	2,970	421	329	175	1,218	10	7	1	985	17	11	5	1,937	187	143	94
2003	3,758	582	339	168	234	7	3	1	289	11	2	0	1,758	242	153	85
2004	3,971	593	351	159	486	18	15	4	443	18	14	4	2,133	255	172	105
2005	4,228	664	416	207	516	15	8	1	475	26	15	7	2,044	285	184	117
2006	4,795	677	363	194	913	13	8	2	856	46	33	15	2,594	332	233	144
2007	5,172	786	480	192	416	7	5	3	792	59	35	12	2,589	397	242	144
2008	5,788	1,036	659	280	711	13	8	2	1,054	77	60	23	2,980	481	320	169
2009	6,982	1,134	592	230	1,874	38	31	7	1,753	123	87	25	3,309	519	316	180
2010	6,521	678	479	167	2,032	62	27	1	1,883	63	77	18	3,245	334	292	185
2011*	1,304	466	74	19	646	19	13	1	518	41	18	1	737	230	53	31

Table 4: The number of herds tested for TB, the herds under movement restrictions, the total number of new incidences in herds and and those which have been subsequently confirmed. *Data from 2011 are up to the 28 February. Source: DEFRA's Animal Health Database

Table 5: Herds infected by M. bovis between 1998 and 2011 in the preserved Welsh counties

Number of herds

	South Glamorgan				Mid Glamorgan				West Glamorgan				Gwent			
Year	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1998	1	50	3	3	94	2	2	1	110	7	6	4	686	94	58	25
1999	1	50	1		117	3	2	1	204	28	21	15	636	92	58	36
2000	1	33			92	3	2	1	206	21	12	7	716	118	72	48
2001		11	1	1	23	1			61	11	5	4	214	88	34	20
2002	1	78	2	2	170	4	3	1	206	16	14	5	916	155	109	66
2003	0	60	4	3	134	7	4	0	230	21	12	8	959	192	109	65
2004	2	44			147	4	3	2	224	25	18	13	911	160	83	37
2005	1	41	2	2	111	3	3	1	248	24	14	8	978	163	91	55
2006	2	79	4	3	196	8	6	2	259	23	12	10	945	170	108	65
2007	4	66	5	2	189	13	10	4	271	31	23	8	1,053	217	133	74
2008	2	61	3	2	198	12	9	2	270	30	12	5	1,139	243	123	60
2009	3	180	9	7	365	16	12	3	358	34	21	10	1,271	241	109	57
2010	1	207	22	16	379	34	14	1	381	50	32	17	1,097	127	99	38
2011*	47	12	2	1	73	9	5	2	79	26	2	2	202	110	16	10

Table 5: The number of herds tested for TB, the herds under movement restrictions, the total number of new incidences in herds and and those which have been subsequently confirmed. *Data from 2011 are up to the 28 February. Source: DEFRA's Animal Health Database

2. Controlling TB in Cattle

2.1. The TB Eradication Programme in Wales

The previous Welsh Government announced a *TB Eradication Programme for Wales* (hereafter referred to as the 'Programme') in April 2008, to be overseen by the TB Eradication Programme Board, a Technical Advisory Group and the Welfare Strategy Steering Committee. The Programme includes the **TB Health Check Wales**, promotion of **improved animal husbandry** and **biosecurity practices** and changes to the **compensation regime**. Also included were badger culling within an **Intensive Action Pilot Area** (IAA) and the potential of using cattle and badger vaccines. Pre-movement testing continues alongside the new testing measures. An additional **£27.7 million for 3 years** has been provided. In June 2011, the Welsh Government announced that badger culling in the IAA would be put on hold until the results of a commissioned review into the scientific evidence regarding the eradication of TB have been published. Other measures for cattle disease control will continue to be carried out during the review.[16]

As part of the Programme, the *TB Health Check Wales* (hereafter referred to as the Health Check) was the first major initiative to test every cattle herd in Wales for TB, with the aim of establishing a current understanding of the scale of the disease.[17] The checks were carried out between October 2008 and December 2009.[18] The Health Check's results show that the incidences of TB across Wales vary from region to region and whilst **some areas have very low incidences** (North West Wales, Figure 2), **others have the highest in Europe** (areas of South West Wales, Figure 2).[19]

However even in regions where the incidences of bovine TB are high, a greater proportion of the cattle herds in these regions are not infected by TB. Therefore in order to protect the welfare of these herds, the previous Welsh Government announced that all herds in Wales as of January 2010, will be annually tested.[20] Herds in North Wales were, prior to 2008, on a four-year testing cycle.[21] The last Welsh Government stated that this increase in testing will ensure that there will only be a small number of undisclosed breakdowns.[22]

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[16] Welsh Government, John Griffiths (Minister for the Environment and Sustainable Development), *Independent review of Bovine TB Eradication Programme scientific evidence base*, Written Statement, 21 June 2011.
[17] Welsh Government, *Bovine TB, Background, The scale of the problem* (Website) [accessed 26 May 2011]
[18] Health check gives a clearer picture of bovine TB in Wales. Veterinary Record, 2010, p953
[19] Welsh Government, *Bovine TB, Background, The scale of the problem* (Website) [accessed 26 May 2011]
[20] Welsh Government, *Disease, Bovine Tuberculosis, Research and Evidence* (Website) [accessed 26 May 2011]
[21] Health check gives a clearer picture of bovine TB in Wales. Veterinary Record, 2010, p953
[22] Welsh Government, *Disease, Bovine Tuberculosis, Background, The scale of the problem* (Website) [accessed 26 May 2011]

Figure 2: New herd breakdowns in Wales between 1 October 2008 and 31 December 2009

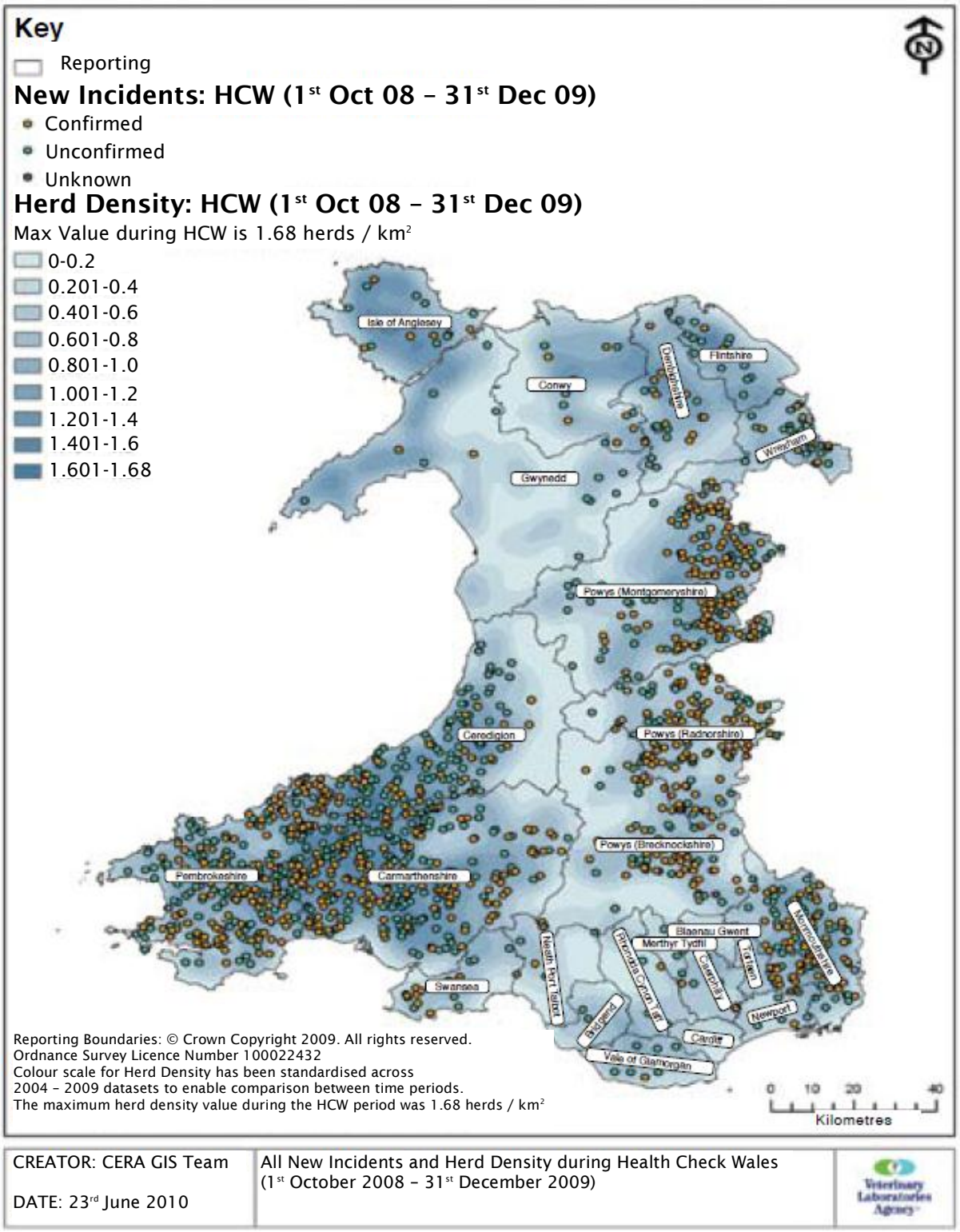

Figure 2: A map of Wales showing the distribution of new herd breakdowns between 1 October 2008 and 31 December 2009, with confirmed cases as yellow points, unconfirmed as green and unknown as brown. Also, the herd density is shown in gradational colours of blue. Source: TB Eradication Programme Annual Report 2009-2010, Welsh Government

During the Health Check the herds were tested by the VLA and of those tested, **3,967** were tests which would not have otherwise been conducted.[23] 0ver 75 per cent of these were in North Wales.[24] Following the Health Check, three technical reports and an executive summary were published on the findings.[25] The executive summary by the previous Welsh Government stated that **1,490 new incidents of TB** were identified, of which **103 were identified specifically as a result of the Health Check** and more than half of these were in North Wales.[26] The testing also found 109 cases of infected cattle in herds that were thought to be free from TB.[27]

As a result of the Health Check, the previous Welsh Government stated that there is a

> …much better appreciation of the geographical clustering of TB infection, including in areas previously thought to be free of the disease.[28]

The Chief Veterinary Officer for Wales commented

> TB Health Check Wales had a greater impact on Animal Health, farmers and vets in North Wales as this was where most of the additional tests took place. By identifying disease in areas of low incidence, it showed that we need to be vigilant and not allow TB to spread even further. It has also highlighted the importance of a regional approach to support the all-Wales policies, a task taken forward with enthusiasm by the North Wales TB Eradication Board.[29]

2.2. Pre-Movement Testing

In Wales it is a requirement that prior to the movement of any cattle, tuberculosis testing must be carried out. There are exemptions to this:[30]

- Cattle moving:
  - for **veterinary treatment**, provided the animals are returned directly to their original premises after treatment
  - **direct to slaughter** or to slaughter markets.
- Any movement approved by the Welsh Ministers on behalf of the Welsh Assembly Government. This replaces reference to 'Divisional Veterinary Manager's discretion' in the 2006 Order. This would only be used in extreme circumstances.
- **Cattle subject to 3-4 yearly routine TB testing**, unless they are moving to agricultural shows. This applies to cattle from England or Scotland moving into Wales.

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[23] *Health check gives a clearer picture of bovine TB in Wales*. Veterinary Record, 2010, p953
[24] ibid.
[25] Glossop, C., 2010. *TB Health Check Wales*. Veterinary Record, p946
[26] *Health check gives a clearer picture of bovine TB in Wales*. Veterinary Record, 2010, p953
[27] ibid.
[28] ibid.
[29] ibid.
[30] Animal Healt*h, The Tuberculosis (Wales) Order 2010 and Pre-Movement Testing advice booklet* 2010

- Cattle that would be subject to 3-4 yearly routine TB testing if not for reasons of public health, e.g. cattle on open farms, producers or retailers of raw milk, AI studs. This applies to cattle from England or Scotland moving into Wales.
- Cattle moving **directly to exempt finishing units** or markets for animals which are not Pre-Movement Tested.
- Cattle moving **directly to approved TB finishing units** for cattle under movement restrictions for TB or approved TB collection centres.
- Cattle moving **from markets**. Farmers moving cattle to markets should comply with PrMT [Pre-Movement Testing] regulations.
- Cattle travelling **to un-housed shows lasting less than 24 hours**. This exemption covers:
    - cattle being moved to **agricultural shows in Wales**
    - cattle being moved **from Wales to agricultural shows** in other parts of Great Britain.
- Cattle movements **within premises sharing rights of common**.
- Cattle moving between holdings within the same Single Occupancy Authority or Pilot Area Sole Occupancy Authority.
- Cattle **less than 42 days old** at the date of movement.[31]

3. Finding TB in Cattle

The operational responsibility for the delivery of the Welsh Government's policy on bovine TB in Wales belongs to Animal Health. If bovine TB is found in a herd, the **case will be referred to Animal Health** and a Veterinary Officer or Inspector will visit the herd.[32] It is at this visit that the process for managing the breakdown and the actions that need to be taken will be outlined.[33] Once the breakdown assessment has been carried out, **a TB2 (listed as restricted status) will be issued** which describes the extent of the restrictions now in place.[34]

3.1. Changes to Terminology and Breakdown Policy

In January 2011 new terminology to describe breakdowns of herds with bovine TB was introduced. [35] The change to terminology has been made to align the terminology used in Wales with the **EU legislation Directive 64/432/EEC** which sets out the requirements for TB control.[36] The terms *confirmed* and *unconfirmed* are no longer used and instead a status will be accorded to a herd following a TB test (or series of tests).[37] The status categories are *Officially TB Free* (OTF),

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[31] Animal Health, *The Tuberculosis (Wales) Order 2010 and Pre-Movement Testing advice booklet* 2010
[32] Animal Health, *Dealing with TB in your herd advice booklet*, 2010
[33] ibid.
[34] ibid.
[35] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Changes in TB Terminology* (Website) [accessed 26 May 2011]
[36] ibid.
[37] ibid.

Officially TB Free Suspended (OTFS) and *Officially TB Free Withdrawn* (OTFW); status categories are usually given upon the results of a TB test, however the OTF status may be withdrawn if the likelihood of infection by TB is established by another epidemiological enquiry.[38]

3.2. Officially TB Free Suspended (OTFS)

An OTFS status is given if a tuberculin test gives a **positive result**, or if a skin test gives an inconclusive result but the herd has had its OTF status withdrawn in the previous three years, or if one or more animals is found to have **suspect lesions** at the slaughterhouse, or if there is a **suspicion of clinical disease** of an animal in the herd, or if the tuberculin skin test becomes overdue. Any combination of these circumstances will also result in an OTFS status being given.[39] For movement restrictions to be lifted on OTFS status herds, **at least one clear TB test is required.**[40]

3.3. Officially TB Free Withdrawn (OTFW)

OTFW status will be given to a herd with a new TB breakdown following the **identification of a reactor** and indicators of TB. Indicators are **lesions** typical of TB found on reactors during post-mortem examination and **cultures of *M. bovis*** in samples from an animal in the herd. Additionally a herd may be given OTFW status if the TB skin test gives reactors and either:

- the herd has had its OTF status withdrawn in the last three years, or
- there is a herd with in close proximity also with its OTF status withdrawn, unless a veterinary risk assessment determines otherwise, or
- Animal Health identifies an additional epidemiological risk.[41]

For movement restrictions to be lifted on OTFW status herds, **at least two consecutive clear TB tests are required.**[42]

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[38] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Changes in TB Terminology* (Website) [accessed 26 May 2011]
[39] ibid.
[40] ibid.
[41] ibid.
[42] ibid.

4. Compensation

All animal health matters in Wales, including the Bovine TB policy, are the responsibility of the Welsh Government. In Wales, the costs of the standard TB controls including testing, as well as TB research which is conducted at the UK level, are met and administered by DEFRA. However, the costs incurred for haulage, valuation, slaughter, disposal and compensation for animals removed due to bovine TB are devolved and are met by the Welsh Government, as are costs for additional testing and control measures outside the remit of standard TB control measures.

The cost of compensating cattle keepers as a result of infection by *M. bovis*, is increasing (Table 6), and **since 2000**, in excess of **£100 million** has been spent.[43]

Table 6: Expenditure in Wales due to M. bovis

Compensation paid (£1,000,000s)

Financial Year	Compensation Paid	Expenditure	Total Expenditure	Calendar Year	Compensation Paid
1999-2000	1.304	-0.199*	1.105		
2000-2001	1.792	-0.240*	1.552		
2001-2002	2.366	-0.102*	2.264		
2002-2003	8.882	-0.728*	8.154		
2003-2004	10.299	-0.654*	9.645	2003	11.105
2004-2005	9.808	-0.647*	9.161	2004	9.105
2005-2006	13.627	5.190	18.817	2005	13.307
2006-2007	11.642	6.147	17.789	2006	11.845
2007-2008	15.973	6.936	22.909	2007	14.206
2008-2009	23.986	9.536	33.522		
2009-2010	11.668	13.077	31.565		

Table 6: Expenditure due to Bovine TB. Compensation paid per financial year and calendar year, Expenditure for the valuation of TB affected cattle, their haulage to the slaughterhouse, slaughter and disposal, against their net salvage value, and the total expenditure which is the combination of the compensation and the other expenditures. The negative values indicate the net salvage value is higher than the other expenditure costs combined. The totals for 2005-06 to 2007-08 include costs for the implementation of initiatives (e.g. Badger Found Dead Survey, Badger Population Survey and South Wales Biosecurity Intensive Treatment Area). From 2008-09 onwards, totals include costs for implementation of the TB Eradication Programme for Wales. From 2005-06 onwards, Animal Health staff costs and costs relating to Official Veterinarians (OVs) undertaking both routine and non-routine tests are included in the expenditure; earlier figures are not available. *excludes TB testing costs. Source: Welsh Government

The financial cost of **compensation has risen from £1.3 million in 1999-2000, to £11.7 million in 2009-10**, with a peak in expenditure in 2008-09 of £24.0

[43] Welsh Government, *Disease, Bovine Tuberculosis* (Website) [accessed 26 May 2011]

million. The amount of compensation paid for pedigree animals is significant as they make up around 30 per cent of the animals removed, but around 60 per cent of the compensation spent.[44]

Changes to the compensation regime are proposed to encourage farmers to follow best-practices; in 2007, measures were introduced to **reduce the overcompensation** of TB reactors. In a written statement on the update for the Programme in September 2008, the former Minister for Rural Affairs, Elin Jones, stated that:

> The average TB compensation payment for a pedigree animal has fallen from £4,900 in November 2006 to around £3,400 in June 2008.[45]

And also that:

> …it is still my intention to link compensation payments to good biosecurity and good animal husbandry on farms. I believe this is a key way of encouraging farmers to fulfil their responsibilities and comply with legal and best practice requirements.[46]

The compensation payable is subject to the cattle owner being compliant with the rules for TB testing of their herd. The animal must be properly identified by an eartag and passport, as is required by the *Cattle Identification (Wales) Regulations 2007*.[47] A new method for calculating the amount of compensation payable has been outlined in the *Tuberculosis (Wales) Order 2010*.[48] The value of a slaughtered animal is calculated according to the formula given in the Schedule to the *Tuberculosis (Wales) Order 2010*

A x B =C

where A is the animal's market value, B is a figure provided in the Schedule to the *Tuberculosis (Wales) Order 2010* and varies according to different circumstances and C is the value to be paid in compensation.[49]

5. Rules for Good Practices

As part of the TB Eradication Programme in Wales, **stricter cattle controls**, **increased testing** and a **zero tolerance** approach to non-compliance with the regulations have been adopted. These are enforced by a number of agencies comprising the Welsh Government, Animal Health, Local Authorities and Rural

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[44] Welsh Government, Elin Jones, (Minister for Rural Affairs), TB Eradication Programme Update, Cabinet Written Statement, 23 September 2008
[45] Welsh Government, Elin Jones, (Minister for Rural Affairs), TB Eradication Programme Update, Cabinet Written Statement, 23 September 2008
[46] ibid.
[47] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Tuberculosis Order 2010, Change to Compensation Rules* (Website) [accessed 26 May 2011]
[48] ibid.
[49] ibid.

Inspectorate Wales, to ensure that the approach taken is both co-ordinated and effective.[50] Animal Health has implemented procedures and processes to be undertaken when TB tests are overdue.[51]

5.1. Animal Husbandry

Husbandry is the cultivation, management and production of crops or animals for food, and the husbandry methods used can affect the **rate of spread of TB** within a herd.[52] **Some practices can also increase the risk** of TB infection in a herd.[53] *Herd Health Planning* (including a biosecurity protocol) aims to reduce the risk of disease introduction and spreading, under the broad knowledge that the spread of disease is facilitated by direct or indirect contact either through infected animals or infected feed or bedding.[54] For TB it is not always possible to accurately determine the cause of infection of a herd due to its chronic nature and it is further complicated by the **maintained infection of wildlife with TB** and the transmission between species.[55]

To reduce the risk of infection, practices can be employed to **break the likely routes of transmission** for example avoiding contact between different herds.[56] There are some husbandry practices which promote a higher risk of transmission such as mixing herds during winter housing, the use of rented or common grazing and the immediate mixing of purchased replenished stock without first quarantining the animals for testing.[57] Also, feeding pooled, unpasteurised milk or discarded milk from mastitis cases to calves can quickly spread TB.[58] On top of this, some foodstuffs and food delivery systems are more attractive and accessible to wildlife promoting mixing between cattle and wildlife; evidence from work carried out by the *Food and Environment Research Agency* (FERA) suggests badgers regularly visit and come into close proximity with cattle housed in farm buildings increasing the risk of transmission of bovine TB between wildlife and cattle.[59]

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[50] Welsh Government, *Disease, Bovine Tuberculosis, Bovine TB Eradication, Enforcement* (Website) [accessed 26 May 2011]
[51] ibid.
[52] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Husbandry* (Website) [accessed 26 May 2011]
[53] ibid.
[54] ibid.
[55] ibid.
[56] ibid.
[57] ibid.
[58] ibid.
[59] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Husbandry* (Website) [accessed 26 May 2011]

5.2. Regional Eradication Delivery Boards

In 2008, three *Regional Eradication Delivery Boards* (hereafter referred to as the Boards) were established with aims for TB control and eradication best suited to the regions they represent; the Boards are the North Wales Regional Board, the Carmarthen Regional Board and the Cardiff Regional Board.[60]

5.2.1. The North Wales Regional Board

The most important aim of the North Wales Board where incidences of TB are low is to **keep TB out of clear areas**.[61] The North Wales Board gives advice to farmers on biosecurity to minimise the rise of TB infection and farmers in Tywyn, Llanegryn and Llanfihangel y Pennant can report dead badgers and deer to Animal Health who will arrange a post-mortem.[62] The North Wales Board has also developed **Pre-Movement test stickers** for the backs of animal's passports where the TB test has been clear.[63]

5.2.2. The Carmarthen Regional Board

The Intensive Action Area (IAA) is within the area covered by the Carmarthen Regional Board (see section 8.3 for further information). Much of the work of this board is focussed on helping farmers who live outside of the IAA.[64] **Practical advice and guidance** on biosecurity is provided to all farmers and **best practice events** have been organised in south west Wales to ensure as many farmers as possible are aware of the steps that can be taken in order to reduce the risks of TB infection in their herd.[65] The Carmarthen Regional Board is also investigating the effect of TB on the income of farmers.[66]

5.2.3. The Cardiff Regional Board

The Cardiff Regional Board has concentrated on the Gower, introducing **TB: Keep it out** and best practice events.[67] It is hoped that in the future, more best practice events will be held throughout south east Wales, providing advice to as many farmers and veterinarians as possible.[68] A **voluntary code of practice** has been introduced and only cattle testing clear for TB are moved onto the Gower

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[60] Welsh Government, *Disease, Bovine Tuberculosis, Bovine TB Eradication, Regional Boards* (Website) [accessed 26 May 2011]
[61] Welsh Government, *Disease, Bovine Tuberculosis, Bovine TB Eradication, Regional Boards* (Website) [accessed 26 May 2011]
[62] ibid.
[63] ibid.
[64] ibid.
[65] ibid.
[66] ibid.
[67] ibid.
[68] ibid.

commons.[69] **Questionnaires on biosecurity** are being completed throughout the area, assisted by Official Veterinarians, and possible funding avenues are being sought to pay for improvement works to the Gower common's fences, gates and stiles.[70]

6. Repercussions For Not Following Good Practices

If cattle owners are non-compliant, Animal Health may acquire a warrant to test the animals, the costs of which are recoverable by the Welsh Government. [71] In addition, the amount of compensation paid to the cattle owner may be reduced.[72] The value of B which is provided in the Schedule to the *Tuberculosis (Wales) Order 2010* is affected by poor practices; if breaches of obligations, breaches of obligation with regards to Veterinary Improvement Notices or overdue testing occur, the value of B will be reduced and less compensation will be paid to the cattle owner.[73]

7. Tuberculosis in Other Species

Whilst bovine species are the natural hosts of bovine TB, **all terrestrial mammals can be infected by the disease**, although some are more susceptible than others depending on their level of exposure, their natural resistance, their immunological characteristics and the husbandry of the animal.

Camelids are susceptible to bovine TB, with the **first British case identified in 1999** in a herd of camelids near an infected herd of cattle.[74] The number of occurrences of bovine TB in Welsh camelid herds is increasing. The results of British cases of M. bovis in camelids from a DEFRA-funded Veterinary Laboratories Agency (VLA) surveillance project (SB 4510) between 2003 and 2008 are shown in Figure 3 and support this.[75] Data for 2009 are given in the project, but not included here as they are provisional.

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[69] Welsh Government, *Disease, Bovine Tuberculosis, Bovine TB Eradication, Regional Boards* (Website) [accessed 26 May 2011]
[70] ibid.
[71] ibid.
[72] ibid.
[73] Welsh Government, *Disease, Bovine Tuberculosis, Practical Advice, Tuberculosis Order 2010, Change to Compensation Rules* (Website) [accessed 26 May 2011]
[74] D. F. Twomey, T. R. Crawshaw, J. E. Anscombe, J. E. F. Barnett, L. Farrant, L. J. Evans, W. S. McElligott, R. J. Higgins, G. S. Dean, H. M. Vordermeier, R. de la Rua-Domenech. *Assessment of antemortem tests used in the control of an outbreak of tuberculosis in llamas* (Lama glama). The Veterinary Record v167, p475-480, 2010
[75] ibid.

Figure 3: Bovine TB in camelids in Great Britain in VLA surveillance project (SB 4510)

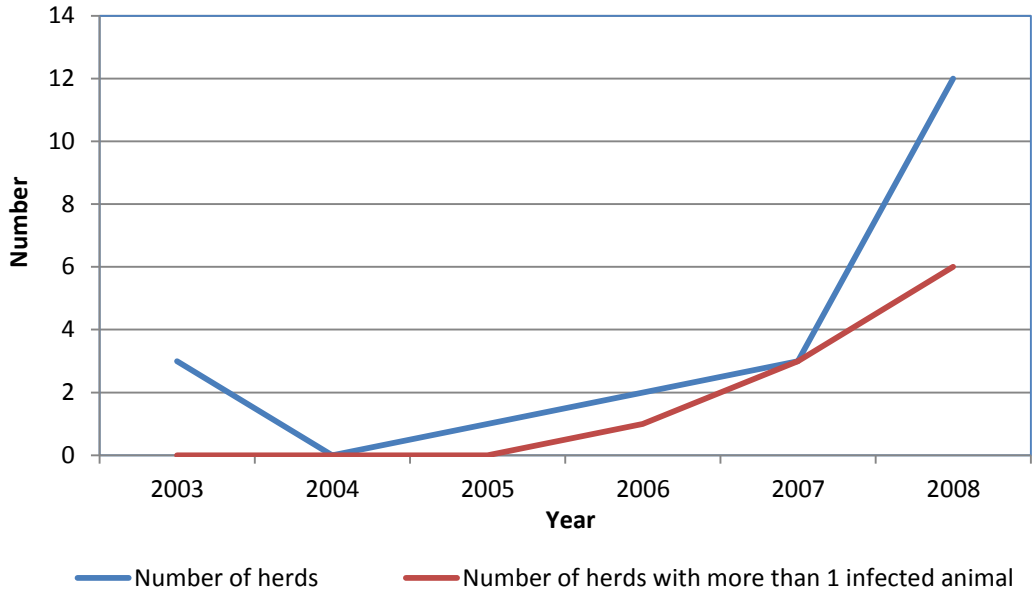

Figure 3: The number of herds of camelids testing positive for *M. bovis* between 2003 and 2008 as part of the VLA surveillance project (SB 4510). Source: Twomey et al. 2010.[76]

The Animal Health Operational Manual outlines the current arrangements for dealing with cases of Bovine TB in camelids. The legislation to deal with outbreaks of bovine TB in non-bovine animals is covered by the *Tuberculosis (Wales) Order 2011* which came into force on 31 March 2011 and stipulates movement restrictions on animals with identified or suspected cases of disease.[77]

In 2008, Bovine TB was found for the first time in an otter (Eurasian, *Lutra lutra*) in Northern Ireland, and although the instances are rare and unlikely to be considered serious for the spread of the disease, it indicates that infection of other wildlife is a by-product of the infection of cattle with bovine TB.[78]

Bovine TB infections of sheep also occur on a very low level as they are naturally resistant and do not retain an infection in their herd without the direct infection by other species with the disease *i.e.* sheep need a source of infection or the disease in the sheep population will cease. Sheep are not regarded as significant in dealing with the occurrence and prevalence of bovine TB.

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[76] D. F. Twomey, T. R. Crawshaw, J. E. Anscombe, J. E. F. Barnett, L. Farrant, L. J. Evans, W. S. McElligott, R. J. Higgins, G. S. Dean, H. M. Vordermeier, R. de la Rua-Domenech. *Assessment of antemortem tests used in the control of an outbreak of tuberculosis in llamas* (Lama glama). The Veterinary Record v167, p475-480, 2010

[77] The Tuberculosis (Wales) Order 2011, SI 2011/ 692 (W. 104)

[78] J. Lee, R. Hanna, R. Hill, C. M. McCormick, R. A. Skuce. *Bovine tuberculosis in an Eurasian otter. The Veterinary Record*, p727-728, 2009

In 2009, five sheep from different flocks were diagnosed with TB from nine submissions for testing.[79] Also in 2009, 23 domestic pigs from 9 different units out of the 166 submitted for testing were confirmed to have TB, as were 18 wild and 1 farmed, out of 52 deer.[80] Figure 4 gives the number of different species of non-bovine animals infected by *M. bovis* in Great Britain during the period 1997 to 2010.[81] The generalised trend is for an increase in the number of cases. The data are given in Table 7 and included in Figure 4.[82]

Table 7: Non-bovine animals in Great Britain infected by M. bovis between 1997 and 2010

Number of animals

Species	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010*
Farmed Deer	0	1	0	1	0	8	8	0	1	5	1	1	1	1
Park Deer	0	0	3	2	0	2	0	2	1	17	4	2	0	6
Wild Deer	3	6	7	6	1	3	14	42	31	29	20	31	18	15
Domestic Cat	0	2	0	3	0	2	2	6	13	14	15	18	26	23
Domestic Dog	0	0	0	0	0	1	0	1	0	0	1	1	3	2
Domestic Pig	0	0	0	0	0	1	8	1	12	2	5	10	23	29
Alpaca	0	0	0	0	0	0	2	1	0	1	4	13	68	43
Llama	0	0	3	0	0	0	1	0	1	8	16	9	0	0
Sheep	0	0	0	0	0	1	0	3	2	0	0	1	5	13
Goat	0	0	0	0	0	0	0	0	0	0	2	33	0	1
Ferret	0	0	0	0	0	0	0	0	3	0	0	0	0	0
Farmed Wild Boar	0	0	0	0	0	0	0	0	0	2	0	0	0	1

Table 7: Number of non-bovine animals infected by *M. bovis* between 1997 and 2010. *The values given for 2010 are for the period 1 January - 31 December 2010, but are provisional and may change as more data becomes available (data last updated – March 2011). Source: DEFRA – Incidents of M. bovis infection in non-bovine domestic animals & wild deer in GB confirmed by laboratory culture.[83]

[79] Gibbens, N. *Progress through partnership The UK Chief Veterinary Officer's 2009 report on animal health and welfare*, 2009
[80] ibid.
[81] DEFRA, *Animal Diseases-Animal Health, Bovine TB* (Website) [accessed 26 May 2011]
[82] ibid.
[83] ibid.

Figure 4: Number of non-bovine animals in Great Britain infected by *M. bovis* by year and species

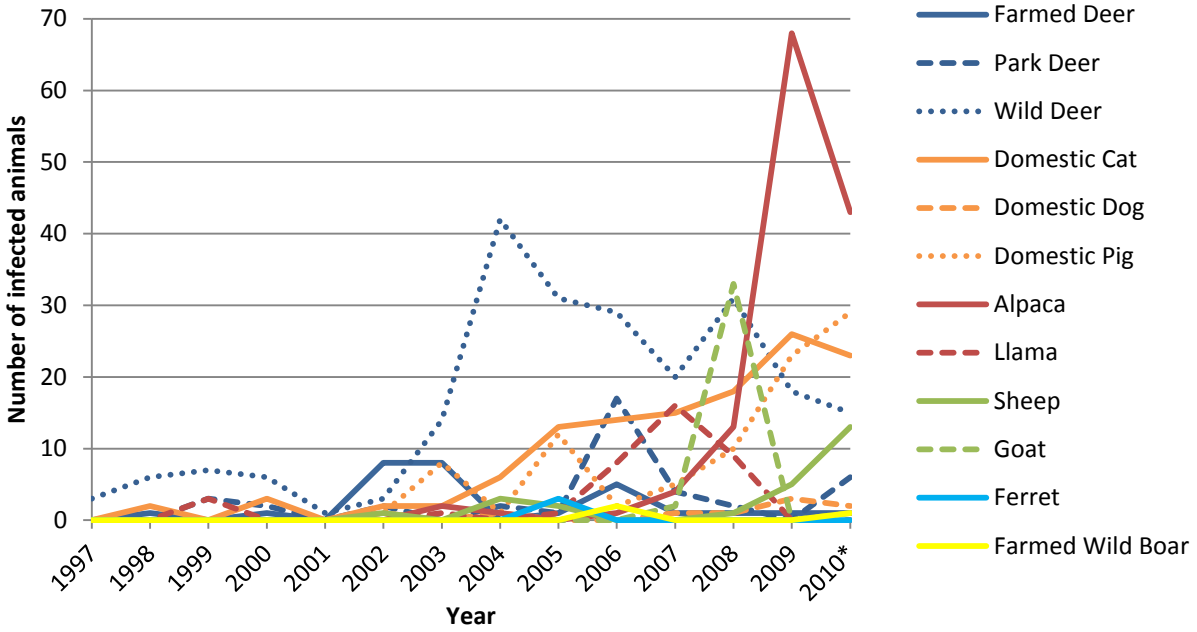

Figure 4: The number of animals of different species infected by *M. bovis* between 1997 and 2010. Data are plotted from Table 7. *The values given for 2010 are for the period 1 January - 31 December 2010, but are provisional and may change as more data becomes available (data last updated – March 2011). Source: DEFRA – Incidents of M. bovis infection in non-bovine domestic animals & wild deer in GB confirmed by laboratory culture.[84]

8. Legislation

Three pieces of legislation have recently been passed, *The Tuberculosis (Wales) Order 2010*, *The Tuberculosis (Wales) Order 2011* and *The Badger (Control Area) (Wales) Order 2011*. The latter two were laid before the Assembly on the 9 March 2011 by the then Minister for Rural Affairs, Elin Jones, as a continuation of the TB Eradication Programme, to come into force on 31 March 2011.

8.1. Tuberculosis (Wales) Order 2010

The *Tuberculosis (Wales) Order 2010* is made under the *Animal Health Act 1981* and confers powers in relation to tuberculosis in Wales onto Welsh Ministers.[85] The Order updates the current rules governing bovine TB in Wales, revoking the *Tuberculosis (Wales) Order 2006* and amending the *Brucellosis and Tuberculosis (England and Wales) Compensation Order 1978*, with two main areas of change, to

[84] DEFRA, *Animal Diseases-Animal Health*, *Bovine TB* (Website) [accessed 26 May 2011]
[85] *The Tuberculosis (Wales) Order 2010*, SI 2010/1379 (W. 122)

Pre-Movement Testing exemptions and to the compensation regime.[86] *The Tuberculosis (Wales) Order 2010* also covers changes to the rules governing handling cattle that are being tested for Bovine TB as well as terminology changes in the existing legislation.[87]

8.2. Tuberculosis (Wales) Order 2011

The *Tuberculosis (Wales) Order 2011* **came into force on 31 March 2011** and amends the *Tuberculosis (Wales) Order 2010*, making arrangements for occurrences of Bovine TB in non-bovine animals, specifically **camelids, goats and deer**.[88] [89] As with the *Tuberculosis (Wales) Order 2010, the Tuberculosis (Wales) Order 2011* is made under the *Animal Health Act 1981*. The Order put the prevention and management of bovine TB in relation to non-bovine animals on a similar footing as for cattle. The Order introduces **control mechanisms for non-bovine animals** to help prevent the spread of disease and provides for statutory compensation for animals removed as reactors that are subsequently slaughtered due to tuberculosis.[90] The Order emphasises the link between the responsibilities of animal keepers and compensation so that keepers are encouraged to protect their animals from Bovine TB. The Order also requires that animal keepers keep records of their animals' movements so that they are able to produce the records when required.[91]

The *Tuberculosis (Wales) Order 2011* revokes the *Tuberculosis (Deer) Order 1989* and the *Tuberculosis (Deer) Notice of Intended Slaughter and Compensation Order 1989 for Wales*.[92] The Order stipulates that the keeping of certain non-bovine animals must be identified (these animals include deer, alpaca, guanaco, llama and vicuna) and that Welsh Ministers must be notified of infection of non-bovine animals with bovine TB.[93]

8.3. Badger (Control Area) (Wales) Order 2011

The first link between badgers and bovine TB was made with the discovery of a badger carcass infected by bovine TB in Gloucestershire in 1971.[94] Figure 5 shows

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[86] *Explanatory Memorandum to the Tuberculosis (Wales) Order 2010*, SUB-LD8049-EM
[87] ibid.
[88] *The Tuberculosis (Wales) Order 2011*, SI 2011/ 692 (W. 104)
[89] Welsh Government, Elin Jones, (Minister for Rural Affairs), *Announcement of Bovine TB Eradication Next Steps*, Cabinet Written Statement, 2011.
[90] ibid.
[91] ibid.
[92] *The Tuberculosis (Wales) Order 2011*, SI 2011/ 692 (W. 104)
[93] ibid.
[94] Welsh Government, *Disease Surveillance and Control, Bovine Tuberculosis, Background* (Website) [accessed 26 May 2011]

the number of badger carcasses testing positive for *M. bovis* in Great Britain between 1975 and 1998. The *Badger (Control Area) (Wales) Order 2011* defines a control area (the IAA) where tuberculosis is known to exist amongst the wild badger population and states that the transmission of TB from the wild badger population to cattle occurs in that area and that the culling of wild badgers is a necessary step in that area to reduce or eliminate the occurrence of TB in any animal.[95] Badgers are protected in the *Protection of Badgers Act 1992* so specific guidelines for the destruction of badgers exist; badgers may only be destroyed by shooting or trapping and either shooting or administering a lethal injection.[96] The *Badger (Control Area) (Wales) Order* revokes the *Tuberculosis Eradication (Wales) Order 2009*.[97]

As part of the Programme, the *Intensive Action Area* (IAA) was set up mainly in **Pembrokeshire** but including small areas of **Carmarthenshire** and **Ceredigion**, in the South West of Wales where the incidence of bovine TB is one of the highest in Europe.[98] This is the control area outlined in the *Badger (Control Area) (Wales) Order 2011*.[99] According to the Welsh Government, the IAA was established to tackle all sources of bovine TB in an approach used in New Zealand where the disease has been successfully eliminated from large areas of the country.[100] In the area now covered by the IAA, in the past 7 years, 72 per cent of cattle farmers have had at least one TB breakdown in their herd.[101]

The *Badger (Control Area) (Wales) Order 2011* sets out the specific procedures that must be followed if a cull of badgers was carried out. In the Explanatory Memorandum to this Order, it is stated that:

> If the legislation is not made the Minister will be unable to directly manage a badger cull in Wales and would need to rely on existing powers in the Protection of Badgers Act 1992 to issue licences to individual farmers to pursue the eradication of bovine tuberculosis in Wales.[102]

However, as stated in section 2.1, the Welsh Government does not intend to use the powers contained in the Order at present and will only make a decision on the use of these powers after the results of an independent scientific review into TB eradication have been published.[103]

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[95] *The Badger (Control Area) (Wales) Order 2011*, SI 2011/693 (W. 105)
[96] ibid.
[97] ibid.
[98] Welsh Government, *Disease, Bovine Tuberculosis, Intensive Action Area* (Website) [accessed 26 May 2011]
[99] ibid.
[100] ibid.
[101] ibid.
[102] *Explanatory Memorandum to The Badger (Control Area) (Wales) Order 2011*, SUB-LD8472-EM
[103] Welsh Government, John Griffiths (Minister for the Environment and Sustainable Development), *Independent review of Bovine TB Eradication Programme scientific evidence base*, Written Statement, 21 June 2011.

Figure 5: Percentage of badger carcasses testing positive for *M. bovis*

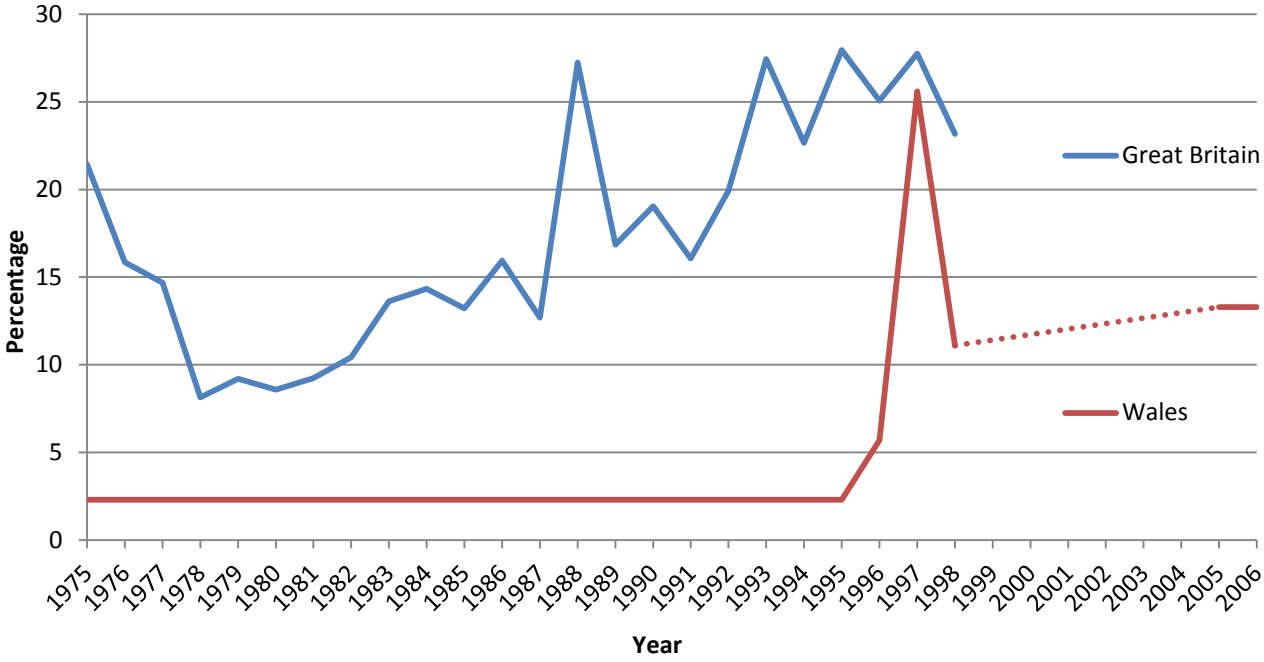

Figure 5: The percentage of badger carcases testing positive for *M. bovis* between 1975 and 1998. The blue line shows data for Great Britain; the red line shows data for Wales. There is no GB data given after 1998. The Welsh data given between 1975 and 1995 are averaged data for that time period; there is no data given between 1998 and 2005 for Wales. Source: MAFF, DEFRA[104] and Welsh Government.

8.4. EU Legislation

EU directive 64/432/EEC on the health requirements of cattle and pigs lays out the requirements for the routine testing of cattle and pigs, and makes requirements for Member States to provide their own plans for the Eradication of Bovine TB.[105]

[104] DEFRA (archive), *TB*, *Statistics* (Website) [accessed 26 May 2011]
[105] Welsh Government, *Disease, Bovine Tuberculosis, Background, Legislation* (Website) [accessed 26 May 2011]