IAA statistics and epidemiological information

TB incidents in the IAA and the rest of South Wales

Statistical Directorate

Welsh Assembly Government

A summary of key statistics about TB incidents in South Wales. Using the Animal Health database as at a download on 17 January 2011. Showing information for all incidents that have been open since the start of 2004.

Contents

Data source

Data were downloaded from the main Animal Health database on 17 January 2011. The data include information about all TB breakdowns that have been open since 2004. Breakdowns that were closed before 1 January 2004 are excluded.

The database is constantly being updated with new and amended information. The results that we present here show the situation as it was on the database at 17 January 2011. When we re-run calculations using a later download there will be some differences between the two downloads for the same incident. This will happen if, for example, the incident has been closed, or the results of the confirmation test have been received so that the incident changes from being unclassified to confirmed or unconfirmed.

It is not possible to go back and re-run an extraction with the database as it was on a particular date.

Geographical coverage

The data cover all incidents managed by the South Wales Animal Health Office. This covers herds in the southern part of Powys and the rest of southern Wales up to and including Ceredigion. It excludes northern Wales - Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Flintshire, Wrexham and northern Powys.

We split the results for South Wales are split into three regions.

- The Intensive Action Area (IAA).
- A 2 kilometre buffer zone around the IAA.

- The rest of South Wales.

Allocating herds to regions

As a part of the measures in the IAA Animal Health have performed an exercise to determine which herds are actually grazing within the region. As herds stop or start grazing in the region this list is maintained.

Allocation to the buffer zone is less robust. It is based on taking the point map reference for the herd and finding if this falls within the region. While a reasonable approximation it does give the possibility that some herds grazing in the buffer zone will be missed and some that are not grazing there will be selected. This is a risk, but, for summary purposes, there is no reason to believe that it introduces any significant bias into the statistics.

Any herd known to be in South Wales but not in the IAA or the buffer zone is allocated to the "other" category.

Historical comparisons

While we have a definitive list of herds in the IAA from 1 May 2010 (and into the future) we do not have this going back before the work started. When looking at data over time we look at the set of herds as it is now and see what happened to them previously. While not showing exactly what was happening in the IAA in previous years it does have the advantage of looking at a consistent set of herds over time. The same approach is taken for herds in the buffer zone.

Further information

The information presented in this report is a summary of key statistics. More detail is available by analysing the full download dataset.

Figure 1
Herds with incidents by region and status

	IAA	2km buffer	Others	Total
Total herds	**309**	**117**	**7,298**	**7,724**
Herds with				
Any incident (a)	222	66	3,156	3,444
Any confirmed (b)	180	54	1,991	2,225
Open incident (c)	78	8	565	651
Open confirmed (d)	53	6	364	423
Share of herds with				
Any incident (a)	72%	56%	43%	45%
Any confirmed (b)	58%	46%	27%	29%
Open incident (c)	25%	7%	8%	8%
Open confirmed (d)	17%	5%	5%	5%

Download from TB incidents database at 17 January 2011
Including all incidents open at any time from 1 January 2004
Excludes incidents closed before 1 January 2004
(a) - any incident from 2004
(b) - any confirmed incident from 2004
(c) - incident open at the time of the data download
(d) - confirmed incident open at the time of the data download

Figure 2

Share of herds with a TB incident by type of herd, region and status

	IAA	2km buffer	Others	Total
Total herds	**309**	**117**	**7,298**	**7,724**
Share of herds by type				
Dairy	40%	32%	22%	23%
Beef	50%	62%	69%	68%
Others	10%	6%	9%	9%
Total	**100%**	**100%**	**100%**	**100%**
Share of herds in a type that have had any incident				
Dairy	93%	84%	72%	74%
Beef	60%	40%	37%	38%
Others	43%	71%	22%	24%
Total	**72%**	**56%**	**43%**	**45%**
Share of herds in a type that have had any confirmed incident				
Dairy	80%	71%	43%	46%
Beef	47%	31%	24%	25%
Others	27%	71%	14%	15%
Total	**58%**	**46%**	**27%**	**29%**
Share of herds in a type with an open incident				
Dairy	45%	11%	16%	18%
Beef	12%	6%	6%	6%
Others	13%	0%	4%	4%
Total	**25%**	**7%**	**8%**	**8%**
Share of herds in a type with an open confirmed incident				
Dairy	30%	11%	10%	11%
Beef	8%	3%	4%	4%
Others	7%	0%	2%	2%
Total	**17%**	**5%**	**5%**	**5%**

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes incidents closed before 1 January 2004
Type of herd is taken from herd categories recorded by Animal Health
"others" include any type not specifically "dairy" or "beef"

Figure 3

Cumulative share of herds that have had a TB incident, by region

	IAA	2km buffer	Others	Total
All herds (=100%)	**309**	**117**	**7,298**	**7,724**
Any incident				
2004	29%	21%	11%	11%
2005	39%	26%	17%	18%
2006	46%	35%	22%	23%
2007	56%	40%	27%	29%
2008	62%	50%	34%	35%
2009	67%	55%	40%	41%
2010	72%	56%	43%	45%
Confirmed incident				
2004	20%	15%	7%	7%
2005	29%	18%	11%	12%
2006	35%	28%	14%	15%
2007	43%	33%	18%	19%
2008	48%	42%	22%	23%
2009	53%	46%	25%	27%
2010	58%	46%	27%	29%

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes incidents closed before 1 January 2004
Once a herd has had an incident it will be counted in all subsequent years

Figure 4
Share of herds by number of incidents in the herd, by region

	IAA	2km buffer	Others	Total
All herds (=100%)	**309**	**117**	**7,298**	**7,724**
All incidents				
None	28%	44%	57%	55%
1	24%	32%	26%	26%
2	26%	11%	10%	11%
3	14%	7%	5%	5%
At least 4	8%	6%	2%	3%
Confirmed incidents				
None	42%	54%	73%	71%
1	29%	31%	20%	20%
2	23%	13%	6%	6%
At least 3	6%	3%	2%	2%

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes incidents closed before 1 January 2004

Figure 5
New and closed incidents by year and region

	IAA	2km buffer	Others	Total
New incidents in year				
2004	41	12	509	562
2005	53	10	592	655
2006	41	21	572	634
2007	78	16	706	800
2008	71	22	912	1,005
2009	55	12	875	942
2010	79	10	699	788
Incidents closed in year				
2004	56	16	473	545
2005	35	8	547	590
2006	48	16	517	581
2007	55	10	603	668
2008	63	21	719	803
2009	73	22	1,028	1,123
2010	61	15	715	791
Net change in year				
2004	-15	-4	36	17
2005	18	2	45	65
2006	-7	5	55	53
2007	23	6	103	132
2008	8	1	193	202
2009	-18	-10	-153	-181
2010	18	-5	-16	-3

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes incidents closed before 1 January 2004
Includes confirmed, unconfirmed and unclassified incidents
"New" incidents are based on the date of the disclosing test
"Closed" incidents are based on the date of the issue of the TB10
"net change" is "new" minus "closed" herds

Figure 6

New and closed confirmed incidents by year and region

	IAA	2km buffer	Others	Total
New confirmed incidents in year				
2004	27	7	271	305
2005	34	5	348	387
2006	28	18	351	397
2007	52	10	341	403
2008	43	15	462	520
2009	29	6	404	439
2010	39	4	314	357
Confirmed incidents closed in year				
2004	32	10	261	303
2005	22	4	288	314
2006	31	12	314	357
2007	36	4	281	321
2008	35	17	346	398
2009	39	15	479	533
2010	40	7	378	425
Net change in year				
2004	-5	-3	10	2
2005	12	1	60	73
2006	-3	6	37	40
2007	16	6	60	82
2008	8	-2	116	122
2009	-10	-9	-75	-94
2010	-1	-3	-64	-68

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes incidents closed before 1 January 2004
"New" incidents are based on the date of the disclosing test
"Closed" incidents are based on the date of the issue of the TB10
"net change" is "new" minus "closed" herds

Figure 7
Survival time of closed incidents by region

Survival in years	IAA	2km buffer	Others	Total
Share of all incidents				
Under 1	42%	36%	34%	35%
1 to 2	29%	31%	28%	28%
2 to 3	15%	15%	14%	14%
3 to 4	7%	4%	10%	9%
4 to 5	4%	7%	5%	5%
5 to 6	2%	3%	5%	5%
At least 6	2%	4%	3%	3%
Total (=100%)	**390**	**108**	**4,604**	**5,102**
Average (days)	603	684	736	725
Share of confirmed incidents				
Under 1	40%	29%	34%	35%
1 to 2	28%	35%	27%	28%
2 to 3	16%	20%	14%	15%
3 to 4	8%	1%	9%	9%
4 to 5	3%	9%	6%	6%
5 to 6	2%	1%	5%	5%
At least 6	2%	4%	4%	4%
Total (=100%)	**234**	**69**	**2,347**	**2,650**
Average (days)	612	710	752	739

Download from TB incidents database at 17 January 2011
Herds active as of that date
Considers all incidents that have closed since 1 January 2004
Excludes all incidents that were open at the time of the download
Number of incidents differes from previous tables since 6 incidents have been excluded as anomalies
Survival time is calculated from the issue of the TB10 to the herds next disclosing test date or 10 January 2011 if there is no next disclosing test

Figure 8

Average duration of a closed incident in days by region and year closed

	IAA	2km buffer	Others	Total
All incidents				
2004	309	263	245	252
2005	309	367	233	240
2006	381	410	246	262
2007	310	226	233	239
2008	294	323	260	264
2009	319	365	250	257
2010	457	506	280	298
Confirmed incidents				
2004	374	289	313	319
2005	400	644	291	303
2006	461	460	304	323
2007	389	383	314	323
2008	407	367	359	364
2009	445	444	350	360
2010	595	850	385	413

Download from TB incidents database at 17 January 2011
Herds active as of that date
Considers all incidents that have closed since 1 January 2004
Excludes all incidents that were open at the time of the download
Year of closure is taken from the date of issue for the TB10
Duration of the closed incident calculated from the disclosing test date to the date of issue of the TB10

Figure 9
Share of open incidents in a region by duration of the incident

Duration (years)	IAA	2km buffer	Others	Total
All incidents				
Under 1	65%	63%	68%	68%
1 to 2	9%	13%	13%	13%
2 to 3	14%	13%	6%	7%
3 to 4	6%	0%	4%	4%
At least 4	6%	13%	9%	9%
Total (=100%)	**79**	**8**	**566**	**653**
Confirmed incidents				
Under 1	49%	50%	60%	58%
1 to 2	13%	17%	16%	16%
2 to 3	21%	17%	7%	9%
3 to 4	9%	0%	4%	5%
At least 4	8%	17%	13%	12%
Total (=100%)	**53**	**6**	**365**	**424**

Download from TB incidents database at 17 January 2011
Herds active as of that date
Excludes all incidents with a date for the TB10 recorded on the database
Duration is measured from the date of the disclosing test up to 10 January 2011

Figure 10
TB incidents in the Intensive Action Area, 2004 to 2010

Year	In year changes			Open at year end
	New	Closed	Net	
Intensive Action Area				
2004	41	56	-15	38
2005	53	35	18	56
2006	41	48	-7	49
2007	78	55	23	72
2008	71	63	8	80
2009	55	73	-18	62
2010	79	61	18	80
All South Wales				
2004	562	545	17	392
2005	655	590	65	457
2006	634	581	53	510
2007	800	668	132	642
2008	1,005	803	202	844
2009	942	1,123	-181	663
2010	788	791	-3	660

Source: download from TB incidents database at 17 January 2011
Some results from the very late 2010 may still be missing
All incidents whether confirmed, unconfirmed or unclassified
New incidents dated by the disclosing test
Closed incidents dated by the issue of the TB10
If no TB10 has been issued the incident is assumed to be still open
At January 2011 there were 309 cattle herds in the IAA

Figure 11

Herds under restrictions

	2004	2005	2006	2007	2008	2009	2010
IAA:							
Restricted (a)	46	48	49	56	75	77	74
Unrestricted (b)	263	261	260	253	234	232	235
Total	**309**	**309**	**309**	**309**	**309**	**309**	**309**
2km buffer							
Restricted (a)	11	5	10	19	24	18	10
Unrestricted (b)	106	112	107	98	93	99	107
Total	**117**	**117**	**117**	**117**	**117**	**117**	**117**
Others:							
Restricted (a)	241	336	301	437	564	583	449
Unrestricted (b)	7,057	6,962	6,997	6,861	6,734	6,715	6,849
Total	**7,298**	**7,298**	**7,298**	**7,298**	**7,298**	**7,298**	**7,298**
Total:							
Restricted (a)	298	389	360	512	663	678	533
Unrestricted (b)	7,426	7,335	7,364	7,212	7,061	7,046	7,191
Total	**7,724**	**7,724**	**7,724**	**7,724**	**7,724**	**7,724**	**7,724**

(a) Herds under restriction for 6 months or more within year
(b) Herds free from restrictions for 6 months or more within year
Download from TB incidents database at 17 January 2011
Including all incidents open at any time from 1 January 2004
Excludes incidents closed before 1 January 2004

6 Badger populations

“Badgers are protected under the Protection of Badger Act 1992. They are not an endangered species but have suffered from a long history of persecution” (CCW Website)

The nocturnal and sett-dwelling behaviour of badgers means that estimating their abundance and distribution can be problematic. Much of the information of badgers in Wales was collected as part of the national survey of badger setts in Great Britain carried out from 1985 to 1988. This estimated that there were 35,000 adult badgers in Wales. An update of the survey in the 1990s indicated that the population had probably increased in north and mid-Wales, with little or no change in south Wales. The national survey has not been repeated since.

Recent computer modelling and transect population studies on behalf of the Welsh Assembly Government, produced a similar picture of badgers abundance and distribution in Wales to the national surveys.

Tracking Mammals Partnership who aims to provide up-to-date and reliable information about the status and population trends of UK land mammals estimated an apparent increase in the badger population in Wales between 1996 - 2005 (British Trust for Ornithology Research Report No 462 February 2006) although the percentage change (from 35,000) is not available.

A badger sett survey and population assessment for the IAA area is being completed by an experienced ecological company. They estimate that, in the IAA there are between 1650 and 2300 badgers (Welsh Assembly Government Sett Survey - correspondence).

7 Prevalence of bovine TB in Badgers

The prevalence of bovine TB in badgers is likely to vary greatly locally and across Wales. It is currently difficult to determine the true prevalence of bovine TB badgers in an area without culling large numbers and examining them post mortem. When attempting to identify the prevalence of infection from a study of a subset of a badger population one must recognise that any value of prevalence determined in this way will be an estimate rather than a true prevalence, the accuracy of which will be reliant on a representative sample of the population having been studied. However, a number of previous studies provide a basis on which to estimate expected prevalence.

Between 26 October 2005 and 31 May 2006, 457 found dead badgers from Wales (Annex 24 of SF/EJ/0033/112) were submitted to Veterinary Laboratories Agency (VLA) for examination for mycobacteria. *Mycobacterium bovis* (*M.bovis*) was cultured from samples collected from 55 badgers and organisms resembling *M. bovis* were detected histologically in a further six, culture negative badgers. Thus 61 badgers were considered positive for bovine tuberculosis.

Estimates of prevalence of positive badgers from the sampled population varied significantly with geographical unit, with prevalence in Carmarthenshire (16%; 95% C.I. 8-28%) and Pembrokeshire (15%; 95% C.I. 7-26%) being some of the highest. Badgers positive for *M. bovis* were found within the boundary of the IAA.

The prevalence of *M. bovis* infection in badgers was found to be highest in areas of high cattle prevalence and lowest in areas of low cattle prevalence which is consistent with the hypothesis that the badger is an important component in the epidemiology of bovine tuberculosis in areas of high cattle incidence in Wales.

The study was not designed to indicate the direction or proportion of transmission of *M. bovis* between the two species. The ISG highlighted the weaknesses of Found Dead surveys in estimating the prevalence of TB in badgers, in their final report they stated"*…While estimates were derived for counties it was not possible to estimate prevalence accurately at smaller spatial scales because of the small numbers of animals collected. For example, despite considerable effort to locate and collect carcasses, only a single badger was collected each year from most parishes (around 60% of the total), and the overwhelming majority of parishes (97%) yielded 5 or fewer badgers each year. This illustrates the limited ability of a survey of this kind to provide precise estimates of prevalence in small areas" (Bourne et al 2007 pg 76).*

The prevalence of TB in badgers at the start of the cull in the 10 areas of the RBCT demonstrated a wide variation, 1.6% - 37.2% in the proactive areas and 4.1% - 31.9% in the reactive areas (Bourne *et al*. 2007 pg 74). The overall average prevalence at the start of all culls (culls were started between 1998 and 2002 inclusive) in the proactive area was 11.44%. This was highlighted by respondents to the consultation (Annex para 15.21)

The overall prevalence of TB in road killed badgers within the RBCT (15%) was also similar to that recorded in proactively culled badgers from the RBCT during the same time period (2002- 2005 when culling occurred in all 10 areas) (16.6%) (Bourne *et al.* 2007 *pg 76*)

The "Found Dead" survey overall estimated prevalence of road killed badgers within Pembrokeshire, which is the main county that the IAA is within, was 15% which is similar to the overall prevalence found within the RBCT road kill.

During the RBCT it was recognised that in interpreting patterns of *M. bovis* prevalence in badgers, the standard diagnostic methods used were not 100% sensitive and so would provide an underestimate the number of infected badgers. The sensitivity of the standard post-mortem examination protocol was compared with that of a detailed protocol. A sample of 205 post mortem examinations conducted under lesser time constraints than was possible for the majority of RBCT badgers revealed substantially more infected animals than did standard post mortem examinations of the same animals (sensitivity of the standard post mortem protocol was estimated to be 54.6% (95% CI 44.9% - 69.8%) (Crawshaw *et al 2008*) This potentially increases the prevalence results for proactively culled badgers in the TB endemic areas of the RBCT if you took the average between 2002 and 2005 to 30%. This is similar to results from the Republic of Ireland

(Murphy *et al* 2010) where the infection prevalence was 36.3% from results of all culture positive pooled samples, also there is reference to the Republic of Ireland having established a prevalence of infection of captured badgers, approaching 45% (More S.J. 2009), using improved post mortem examination technique and laboratory support. As highlighted by respondents to the consultation if you took the overall average prevalence at the start of a cull (11.44%) in the proactive areas of the RBCT it would be increased to 21%.

As discussed above it is difficult to assess prevalence at a local level. Based on the fact that Survey of *Mycobacterium bovis* infection in badgers found dead in Wales results in Pembrokeshire were similar to the RBCT and the data available for other endemic areas we expect the prevalence of TB within badgers to be approximately 27% in the IAA. Bearing in mind the high prevalence of infection within cattle herds in IAA, which is higher than other areas of Pembrokeshire, it would not be surprising if this figure is greater than 27%, but there is no other data set available to provide a reliable estimate within IAA. Estimates of prevalence of bovine TB in badgers of greater than 70% have been recorded in areas of England where bovine TB is endemic at Badger Removal Operations. These removals were conducted prior to the RBCT, notably at a time when the prevalence of TB in cattle herds was lower than it is today.

Some respondents to the consultation raised the issue relating to '….*maps depicting the location of badgers analysed in the Found Dead Survey and in the Defra Road kill survey of 2003 -2008. Collectively these maps provide coverage of over 95% of the IAA. The TB status of badgers is clearly identified and show that, within the IAA boundary, 3 out of 60 badgers tested positive i.e an infection level of 5%. Even applying the Crawshaw correction* [see above] *this figure cannot be raised above 10%. …' (Annex 1 SF/EJ/033/011 para 15.21)*

It was suggested that *'….These figures are much lower than encountered in the RBCT and indicate that lower benefits would accrue from a cull of badgers.'*

By calculating TB prevalence in this manner the respondent is suggesting that the TB prevalence in badgers within the IAA is no higher than 10%. We do not believe that this is an appropriate method to calculate prevalence within the IAA and do not agree with the conclusion. Some key factors that have not been considered are the ability of a survey of this kind to provide precise estimates of prevalence in small areas as highlighted above by the ISG and that the "Found Dead" survey was neither set up to estimate TB prevalence in a sampled population across Wales, nor in the IAA.

The intention would be to examine badgers culled post mortem as part of the strategy for the IAA to provide this information and to help inform other decisions. Based on the anticipated population in the area, 27% prevalence would translate to 450-630 badgers being identified as positive for M bovis.

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