

Annex

Background and methodologies to the National Statistics on the Incidence of Tuberculosis (TB) in cattle in Great Britain

History and background

1. Monthly bovine TB statistics have been published by Defra since 1996. This was the first year that administration of TB testing was computerised, with records held on the Animal Health and veterinary laboratories agency (AHVLA) old VETNET computer system. In September 2011, AHVLA rolled out the TB module of its new computer system ("Sam"). Methodological improvements in how the statistics are calculated were also made at this time, and following quality assurance of data from the new system, TB figures derived from Sam were first published in April 2012. Details of the new methodologies and subsequent level of revisions to the published figures can be found at:-
<http://webarchive.nationalarchives.gov.uk/20130315143000/http://www.defra.gov.uk/statistics/files/defra-stats-foodfarm-landuselivestock-tb-statsnotice-120403.pdf>
2. The data used in the production of these statistics comes from the administration by AHVLA of the government's bovine TB (*M. bovis*) surveillance regime in cattle herds. For further information on TB in cattle, TB testing in England and much more, please go to the Defra TB Website - <https://www.gov.uk/government/policies/reducing-bovine-tuberculosis>

For information on the bovine TB eradication programme in Wales see:
<http://new.wales.gov.uk/topics/environmentcountryside/ahw/disease/bovinetuberculosis/?lang=en>
3. Under the TB eradication programme all cattle herds are subject to tb testing. Information on TB tests can be found at:-
<http://www.defra.gov.uk/ahvla-en/files/AG-TBYHE-02.pdf> - testing in England
<http://www.defra.gov.uk/ahvla-en/files/AG-TBYHW-02.pdf> - testing in Wales
<http://www.defra.gov.uk/ahvla-en/files/AG-TBYHS-02.pdf> - testing in Scotland
4. The AHVLA computer system used for the administration of TB testing is known as Sam. For information about Sam see:-
<http://ahvla.defra.gov.uk/official-vets/access-to-sam/what-is-sam.htm>

Methodology

5. Data is extracted from Sam around 3 months after the end of the period covered in the stats notice. This is to allow time for the majority of post-mortem and laboratory test results (which usually take at least six weeks to complete) to feed into the data to be published. Publishing earlier than this would result in greater levels of revision to incident rates. Data is extracted for the current year and previous two years each month – so that any revisions made to records on the system such as test results or breakdown classification, etc. will feed into the following months publication. Further information on revisions policy can be seen below.

6. The bovine TB statistics are presented for GB as a whole, for England, Scotland and Wales and then by English region (North, East and West) and by county. Data is split into the different geographical areas using the CPHH (County, Parish, holding, herd) number of the holding where the TB test or breakdown took place. Country, regional and county statistics are only presented from 2008 onwards because...
7. Certain statistics are affected by seasonal patterns and variations in the frequency of testing. TB testing is seasonal as more herds are tested in the winter when more cattle are housed. The animals tested are not a random sample of the whole GB herd. Furthermore, herds are tested more frequently in areas of higher TB incidence than in those of historically low incidence. In general, as more tests are carried out, more TB incidents (infected herds) are likely to be found. These last three points in particular are likely to introduce an element of bias to the overall GB incidence rate shown in these statistics.

Herd TB incidence

8. This is presented in the tables as “Number of OTFW incidents as a percentage of tests on officially TB free herds”. This measure is calculated as the number of herds that had their officially TB free status withdrawn (OTFW) due to a new TB breakdown during the report period, divided by the number of tests in Officially TB free (OTF) herds in the same period. In months where a range is given, the lower figure of the range is the number of OTFW incidents, and the upper figure is the sum of OTFW + unclassified new herd incidents. The percentage range equates to these two measures.
9. The herd TB incidence measure is presented in the charts - Figures 1 and 2. Provisional data points use an average of the minimum and maximum figures to provide a data point for plotting. The trend in the incidence of TB in cattle in Great Britain is analysed using a 23-term Henderson moving average of the seasonally adjusted data of the incidence rate (the number of OTFW incidents divided by the number of tests on OTF herds). This helps reduce the impact of monthly and seasonal fluctuations and is presented as the blue trend line in figure 1 and 2.
10. From March to December 2001 the trend was not published because the reliability of the underlying data was significantly affected as a result of the disruption to TB testing during the Foot and Mouth Disease outbreak. Publication of the underlying trend resumed from January 2002 onwards, although 2002 data and trend should be treated with caution as post-FMD testing was initially targeted at higher risk herds and herds with overdue tests.

Revisions Policy

11. The bovine TB statistics are published three months in arrears. This is to allow time for post-mortem and laboratory results (which take a minimum of six weeks to complete) of TB reactor cattle to feed into the database. To make sure that published data accurately reflects records held in the Sam computer system, data is extracted for the current and previous two calendar years each month. Data for the 4 years prior to this period is updated annually. Historical data prior to this time is not updated, unless there are methodological changes which affect the published figures.

Level of revisions

12. Published figures from June 2012 to May 2013 have been analysed to see what the average level of revisions is for several key items of the stats notice. The table below summarises this.

		Average level of revisions between June 12 and April 13 at given number of months after publication				
Item	Average of the 12 months - June 12 to May 13	1 month	3 months	6 months	Maximum level of revisions for a single month	Revisions at 6 months as a % of average monthly total
Herds not Officially TB free due to a disease incident.	5,496	22	42	65	74	1.2%
Tests on Officially TB free herds	5,957	6	11	12	21	0.2%
New Herd incidents (NHI)	420	4	8	8	16	1.9%
NHI of which TB free status withdrawn	280	11	19	24	30	8.6%
Total Slaughtered animals (Reactors + Direct Contacts)	3,103	0	0	0	2	0.0%

Some records are revised beyond 6 months and future updated versions of these tables will include analysis of revisions at 1 year after date of initial publication.

13. As can be seen in the table the highest level of revisions (as a percentage of the total for that item) is to New Herd incidents of which TB free withdrawn (OTFW). This is to be expected as time lags in the process of further testing and the processing of laboratory test results means that in some herds with Officially TB free status suspended (OTFS), reactor animals with visible lesions or a positive culture result may not be detected until several months into the TB incident (breakdown), resulting in a change of the herd's official TB status from OTFS to OTFW. .
14. The largest levels of revisions are to "Herds not officially TB free due to disease incident" (non-OTF). This figure increases as a result of increases in the number of new herd incidents (NHI). The NHI figure tends to be revised up over time due to time lags in the processing and recording of tests results. Although the increases to the monthly NHI figures are fairly small they have a cumulative effect on the number of non-OTF Herds. Upward revisions to NHI data will cause an increase in the non-OTF herds figure for that month and also the following months (while those new incidents remain open). For example revisions to the NHI figure of +3 in each of the 3 months January – March could give revisions to the non-OTF figure of +3 in January increasing to +9 in March, however this may not be obvious from the figures as while more NHI are identified, older incidents where herds have been declared TB free will close resulting in offsetting downward revisions to the data.

Description of stats notice measures

Herds and Incidents (breakdowns)

15. Number of cattle herds registered on Sam

The number of herds registered on the AHVLA's SAM system – monthly figures are not available before September 2010. Prior to September 2010 testing administration was done via the VETNET computer system. That system did not store the information required to produce a historical data series for this item.

16. Herds not Officially TB free due to a bovine TB incident (non-OTF Herds)

The number of herds that had lost their OTF status (i.e. were placed under movement restrictions) at some time during the period shown due to a TB incident (see below). This figure may include herds experiencing a TB incident that began before (but continued into) the report period. Likewise, any herds experiencing two separate incidents in the same reporting period will appear twice under this data column.

17. Herds under movement restriction at the end of the period due to a TB incident or overdue test.

The number of herds that at end of period shown had their OTF status suspended or withdrawn for any TB-related reason, including TB incidents, overdue TB tests or a slaughterhouse case awaiting culture results.— see notes on overdue tests below.

18. New Herd Incidents

The disclosure of at least one test reactor or a confirmed slaughterhouse case (see below) in a herd that was previously OTF during the period shown.

19. New herd Incidents – *of which*: officially TB free herd status withdrawn (OTFW)

New herd incidents where OTF status was withdrawn from the herd due to the detection of typical lesions of TB during post-mortem examination of one or more test reactors, or where samples from one or more reactor, inconclusive reactor or a slaughterhouse case produce positive culture results for *Mycobacterium bovis* (the causative bacterium of bovine TB). Please note that a small number of herds in Wales and Scotland may have their OTF status withdrawn on grounds other than post-mortem evidence of TB, but such herds will still be recorded as OTFS in these statistics.

The number of OTFW incidents is published as a range to take account of outstanding tests and laboratory results in some herds (unclassified incidents – see below).

20. Number of OTFW incidents as a percentage of tests on officially TB Free herds.

New Herd incidents (OTFW) as a percentage of tests on officially TB free herds (see methodology notes above). This is our headline estimate of the herd incidence of bovine TB for GB.

21. New herd Incidents – *of which*: officially TB free herd status suspended (OTFS)

New herd incidents where OTF status was suspended because of the presence of test reactors in the affected herds, but post-mortem evidence of TB was not detected and all the laboratory culture results were negative for *M. bovis*. Please note that OTFS status does not mean that the herd in question had not been infected with *M. bovis*.

22. New herd Incidents – *of which*: still unclassified TB incidents (pending culture results)
New herd incidents that at the end of the period covered by the notice had not been designated OTFW, but where testing was still underway and could become OTFW if such tests revealed one or more reactors with post-mortem evidence of TB or a positive culture result.

Tests

23. Tests on officially TB free herds (OTF)
This measure is used as the denominator in the calculation of the incidence in TB breakdowns. This is a count of any TB testing event carried out in an OTF herd. The following test types are not included in this measure:-

Pre and Post-movement – see paragraph 26 below.
Gamma interferon blood tests
Short interval tests
Radial tests
Private tests
90 day tests

24. Total Tests on Herds
Herds for which tuberculin skin testing is carried out on at least one animal during the period shown. The following test types are not included in this measure:-

Pre and Post-movement
Gamma interferon blood tests
Private tests

25. Total Cattle Tests
This is a count of the number of tests on cattle. An individual animal could be tested more than once in each time period. All test types are included except for:-

Slaughterhouse cases

26. Statistics on Pre and Post movement TB testing of cattle can be found at:-
<https://www.gov.uk/government/statistical-data-sets/other-tb-statistics>
see heading “Bovine TB: Movement testing monitoring statistics”

Slaughter

27. Reactors slaughtered
An animal which was compulsorily slaughtered by AHVLA because it responded to a relevant test for TB in a way that was consistent with it being infected with *M. bovis*. In any given period, the majority of animals are slaughtered as reactors to the tuberculin skin test (the primary ante-mortem test for TB in GB). A much smaller number of reactors are those giving a positive result to the ancillary interferon-gamma blood test.

28. Direct contacts slaughtered
An animal from an OTFW herd that, although not a test reactor, was considered to have been exposed to *M. bovis* and compulsorily slaughtered.
29. Inconclusive reactors slaughtered
An animal showing a positive reaction to bovine tuberculin that was not strong enough for it to be deemed a reactor. However, instead of being tested again after 60 days (the normal procedure in this case) the animal was voluntarily slaughtered by the owner.
30. Slaughterhouse cases reported to animal health
Non-reactor and non-direct contact animals (normally from OTF herds) that displayed suspect lesions of TB during post-mortem meat inspection at routine slaughter and were notified to AHVLA by a meat inspection team or Official Veterinarian of the Food Standards Agency.
31. Confirmed slaughterhouse cases.
Slaughterhouse cases where laboratory culture of the suspect TB lesions has identified *M. bovis*. Only slaughterhouse cases confirmed by culture may initiate a new (OTFW) TB incident, unless the affected animal originated from a herd already under restrictions due to a breakdown. Unconfirmed slaughterhouse cases per se do not initiate new TB incidents, although they may trigger tuberculin check tests in the herds of origin, which could reveal test reactors and thus give rise to a new incident.

Other GB TB statistics

32. GB surveillance report: Each year the AHVLA publish a surveillance report which presents detailed epidemiology statistics. The report for 2012 and previous years can be found at:-
<http://www.defra.gov.uk/ahvla-en/files/pub-survreport-tb11.pdf>
33. Wales surveillance report : Epidemiology of bovine tuberculosis in Wales
<http://wales.gov.uk/docs/drah/publications/130719annualsurveillancereport2012.pdf>
34. TB statistics for other species in Great Britain can be found at:-
<https://www.gov.uk/government/statistical-data-sets/other-tb-statistics>
See heading: "Incidents of confirmed *M.bovis* infection in domestic and companion animals and wild deer in GB".

Bovine TB statistics and reports in other countries

35. Although published bovine TB statistics exist for other countries, they are rarely as detailed as those published for GB. The following are data sources that we are aware of. Please note that this is not an exhaustive list.
36. For statistics on TB in Northern Ireland :-
<http://www.dardni.gov.uk/index/dard-statistics/animal-disease-statistics.htm>

37. For statistics on TB in the Republic of Ireland :-
<http://www.agriculture.gov.ie/animalhealthwelfare/diseasecontrol/bovinetbbrucellosiseradicationchemes/statistics/tbstats>
38. European Food Standards Agency Reports (Pages 209 to 221):-
<http://www.efsa.europa.eu/en/efsajournal/doc/2597.pdf>
39. USDA Monthly TB reports at:-
http://www.aphis.usda.gov/animal_health/tb_bruc/monthly_rpt.shtml