



ENHANCING UNDERSTANDING OF BOVINE TB IN GREAT BRITAIN

Bovine TB (bTB) Epidemiology Enhancement Project (TBEEP) (05/15)

Established to design and implement improvements to Animal and Plant Health Agency (APHA) investigation of bTB infection on farms, and to the analysis and control of the bTB epidemic at regional and cluster level. The establishment of a bTB Epidemiologic Assessment Centre (EAC) is part of this project. Its intended outcome is to improve understanding to enable better targeted interventions to reduce exposure, enable earlier detection and limit on-farm and geographical spread.

bTB Data Capture Changes

Improved epidemiological on-farm breakdown-reactive data capture:

Assessment of origin of disease has been replaced with assessment of the risk pathway

Risk pathways describe both the source (origin) of infection **AND** how it reached the cattle. Up to three hazard/risk pathway combinations are available for ranking, according to the likelihood of being the cause and route of the breakdown. Certain risk pathways can be ruled out and uncertainty be made explicit (e.g. 'most likely' or 'possible').

New guidance has been published to help vets complete the TB Disease Report Form (DRF)

Includes definitions for options, guidance for each section and explains why the data are important.

Options available when completing the DRF have been revised for some sections

Improved, more explicit options lists for a range of risk factors such as premises type, contact between herds and management factors.



Risk Characterisation of Farms

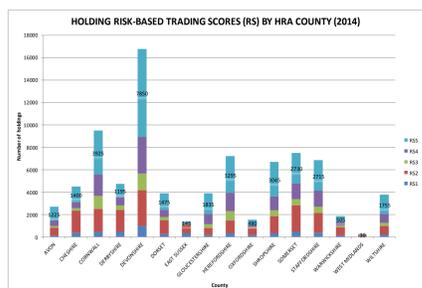
Design of a central process to categorise farms according to infection risk to inform targeted interventions and evaluation/prediction of epidemic curve.

MS Access database of farms in England and Wales

Flexible interrogation and selection based on risk factors and/or disease measures, aided by research, statistics and local knowledge.

Network analysis applied to cattle movements

Used to characterise farms according to exposure or dissemination risk, using movement data.



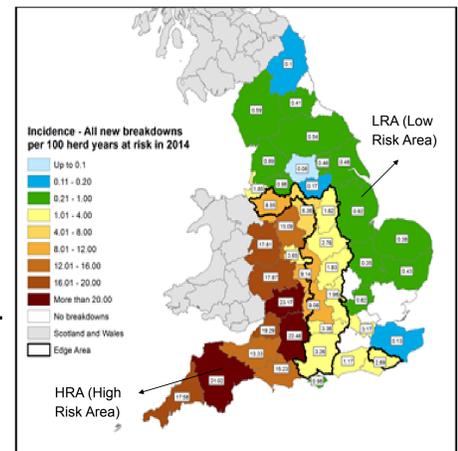
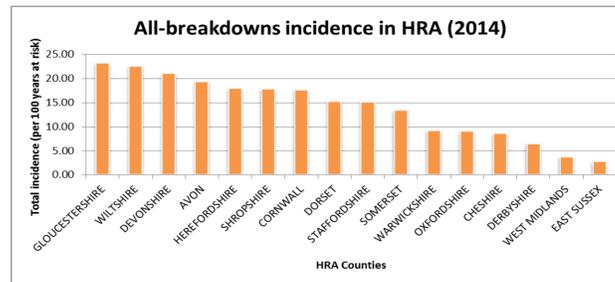
Database output based on Adkin, A., et al., *Development of risk-based trading farm scoring system to assist with the control of bovine tuberculosis in cattle in England and Wales*. Prev Vet Med, 2016. **123**: p. 32-38.

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The bTB EAC is a multidisciplinary expert group which aims to improve the analysis of bTB data, to generate more focused, evidence-based farm and area-level advice on interventions, and to analyse and report on the epidemic on an ongoing basis. That analysis will measure the effect on interventions and give early warning if controls do not generate the expected outcomes.

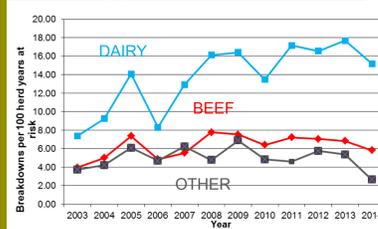
More Integrated Epidemiological Reporting

Epidemic not homogeneous within risk areas. E.g. HRA of England:



The EAC will increase analysis at county level to improve the understanding of the disease and apparent risk factors. E.g.:

Herd type vs incidence:



The incidence graph suggests dairy farms are at increased risk of a bTB breakdown but their adjusted incidence rate ratio (for location and herd size) is very similar to the one in beef herds*:

Type: **Beef =1**; Dairy = 0.91; Other = 0.45 ($p \leq 0.05$)

Location: **HRA =1**; Edge = 0.24; LRA = 0.04 ($p \leq 0.001$)

Herd size: **>300=1**; 201-300=0.65; 101-200=0.54; 51-100=0.25; 11-50=0.14; 1-10=0.04 ($p \leq 0.001$)

* Source: Bovine Tuberculosis: Infection status of cattle in England, January to December 2014.

Improved integration of local and national knowledge:

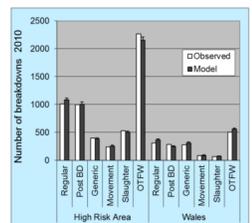
Up to now, there has been limited opportunity for epidemiological interpretation of collated statistics using local knowledge and it has been challenging to adjust appropriately for errors, such as false negative tests. The new project will seek to address this and also provide better prospects for integrating local knowledge of epidemic behaviour and the implementation of control measures with predictive modelling.

Support to Modelling Initiatives

Within EAC, we provide support to the development and strategic use of bovine TB-related modelling initiatives.

BoTMEW

Bovine Tuberculosis model for England and Wales, developed by a team led by Dr Colin Birch, is being used to inform best options for targeting disease control measures.



BoTMEW output example

TBMI

This is a model being developed by a consortium of researchers, led by Professor Rowland Kao. We provide advice (e.g. current disease control measures and diagnostic tests use) and support; for example, facilitating access to data.