



GENERAL SUPPORT

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EPIDEMIOLOGICAL SUPPORT

Key CVERA contact: Simon More

FARM INVESTIGATIONS

Farm investigations are a critical component of CVERA's work. These investigations offer the opportunity for CVERA staff to support veterinary students in the use of practical epidemiological skills to solve (often complex) on-farm problems. Key epidemiological skills concern the use of simple methodologies to examine patterns of disease presentation in time, in space and among different animal groupings. Farm investigations, which are a key component of the final year curriculum, are conducted in collaboration with local private veterinary practitioners and/or veterinary inspectors. The following investigations were conducted during 2006 and 2007:

- Pneumonia (Co. Meath; January 2006)
- Periparturient problems (Co. Tipperary; February, November 2006, April 2007)
- Multiple health problems in adult cattle (Co. Cork; February 2006, February, May 2007)
- Mastitis (Co. Meath; March 2006)
- Johne's disease (Co. Tipperary; March 2006)
- Tuberculosis (Co. Cork; September 2006)
- Pneumonia (Co. Louth; October 2006)
- Tuberculosis (Co. Wicklow; November 2006)
- Sub-optimal fertility (Co. Tipperary; November 2006)
- Sub-optimal fertility (Co. Offaly; November 2006)
- Mastitis (Co. Waterford; January 2007, March 2007)
- Calf health, infertility, Johne's disease (Co. Kilkenny; February, September, November 2007)
- Pneumonia (Co. Kildare; February 2007)
- Tuberculosis (Co. Waterford; February 2007)
- Sub-optimal fertility (Co. Waterford; March 2007)
- Mastitis (Co. Meath; March 2007)
- Tuberculosis (Co. Wicklow; October 2007)
- Sub-optimal fertility (Co. Wicklow; October 2007)
- Pneumonia (Co. Dublin; November 2007)
- Mastitis (Co. Dublin; November 2007)
- Sub-optimal fertility (Co. Kerry; December 2007)

“Simple epidemiological methods can be used in the field to examine patterns of disease in time, in space and among different animal groupings. This information then provides clues about the cause of the problem.”

GENERAL EPIDEMIOLOGICAL TRAINING

A course in introductory epidemiology was held in Mulraney, Co. Mayo (08-09 November 2007) and Cahir, Co. Tipperary (29-30 November 2007). The following provides a background to this course:

'Epidemiology is often viewed as a discipline of facts and figures, with only limited application to front-line veterinarians on the ground. The purpose of this one-and-a-half day course is to demystify epidemiology, and provide attendees with a sound understanding of epidemiology in action. The course is problem-based, and will centre on a range of hands-on learning exercises that are relevant to Veterinary Inspectors in the field. Following this course, there will be an opportunity for interested attendees to join a mentored study group that will meet on an ongoing basis.'

An epidemiological mentoring group has been established, to support veterinary inspectors with an interest in the principles and methods of veterinary epidemiology. The group met in Portlaoise, Co. Laois, in October 2006, May 2007 and November 2007.

Risk analysis has been recognised worldwide as an important tool for decision-making in many fields, including animal and human health. CVERA is working with the DAFF to strengthen capacity in risk analysis among DAFF staff, with workshops in November and December 2006.

STATISTICAL SUPPORT

Key CVERA contact: Tracy Clegg

During 2006-2007, in addition to core projects, CVERA provided statistical support and advice to a range of researchers as follows:

Department of Agriculture, Fisheries and Food

- Serological surveillance of cattle for Bluetongue in Ireland
- Comparison of the potency of different tuberculins used in the field compared to the Irish standard
- A case-control study of paratuberculosis (Johne's disease) in Irish dairy herds
- Cattle movements into and out of Irish beef herds infected with Johne's disease
- Trends in the number of, and rate at which, cows are culled from the Irish cattle population, 2003 to 2006
- Control of *Mycobacterium bovis* infection in two sika deer herds in Ireland

UCD School of Agriculture, Food Science & Veterinary Medicine, University College Dublin

- The effect of varying levels of population control on the prevalence of tuberculosis in badgers in Ireland
- Leptospirosis in Irish suckler herds
- A critical evaluation of farm-level milk quality, based on milk recording data
- UCD review of horse welfare in Ireland 2007-2009
- Comparison of the Immulite® and RIA assay methods for measuring peripheral blood P4 levels in Greyhound bitches prior to breeding
- Influence of induction of parturition on the neonatal acute phase response in foals

UCD Veterinary Hospital, School of Agriculture, Food Science & Veterinary Medicine, University College Dublin

- The influence of sternal vs. lateral recumbency on the L5-L6 mid-laminar distance amongst dogs

UCC Department of Zoology, Ecology and Plant Science, University College Cork

- How many Eurasian badgers *Meles meles* L. are there in Ireland?

National Veterinary Research and Quarantine Service, Korea

- A critical evaluation of surveillance and control measures within the national brucellosis eradication programme in the Republic of Korea during 2000 to 2006

Vet-Aqua International and the Marine Institute, Galway

- Epidemiology of Pancreas Disease amongst Atlantic farmed salmon in Ireland

GIS SUPPORT

Key CVERA contacts: Guy McGrath and Daniel Collins

THE WILDLIFE UNIT

a. An independent monitor

CVERA acts as an independent monitor for the National Parks and Wildlife Services (the Department of the Environment, Heritage and Local Government) to ensure operations of the Wildlife Unit (DAFF) are within pre-agreed criteria. This includes verifying individual badger removal licences and maintaining checks on areas treated by the Wildlife Unit on a county by county basis through time. Ongoing reports with thematic maps are produced for the two government Departments.

b. Administration

In addition to monitoring and reporting on Wildlife Unit activities, CVERA maintain the GIS component of the Wildlife Unit administration centre in Johnstown Castle, Co. Wexford. This centre provides all District Veterinary Offices with the relevant maps and ortho-photography to complete badger surveys in areas where tuberculosis breakdowns in cattle have been attributed to wildlife. The badgers setts found through surveying are then digitised and maintained centrally on the GIS.

GENERAL MAPPING SUPPORT

CVERA provide a broad range of mapping support, including:

- Maps for specific field investigations
- Maps for illustrative purposes in publications and internal reports
- Maps for aiding in the spatial aspects of study design
- Mapping to assist District Veterinary Offices
- Annual production of thematic prevalence maps for tuberculosis, brucellosis and BSE
- Provision of mapping assistance in the event of an emergency disease incursion.

DATABASE SUPPORT

THE TB TESTING DATABASE

Key CVERA contacts: Paul White and Isabella Higgins

Introduction

Since the introduction of the Animal Health Computer System (AHCS) and other online computer systems within DAFF, increasing volumes of data in relation to animal disease and movement within the Irish cattle herd are available for research.

Development

The CVERA national bovine tuberculosis/brucellosis testing database project has been ongoing since 1998. It has continued to play a supportive role in the research programme with the original aim of providing a central database for querying of tuberculosis/brucellosis testing data from the 29 District Veterinary Offices (DVOs).

The database was initiated on Microsoft Access™ which provided user-friendly interface for running queries about the tuberculosis/brucellosis eradication schemes in relation to:

- Tuberculosis test summary data
- Tuberculosis reactor and inconclusive skin results
- Tuberculosis post-mortem results for reactor animals
- Contiguous herds identified by DAF field staff
- Brucellosis test summary data.

Data management within CVERA continues to be a dynamic process with its scale and complexity driven by the ongoing demand for new datasets to be explored within the research programme. Recently, the system has been expanded to deal with laboratory results for TB suspect lesions.

Management

The database is updated at monthly intervals by running an AHCS report that outputs data to standardised text files. The text files are uploaded onto the SQL server database using an Access front-end to automate various server stored procedures. The system currently holds in excess of 4 million tuberculosis herd test records along with associated skin test readings and *post mortem* results.

Interrogation

The ability to run Structured Query Language (SQL) is a key feature of modern relational database management systems that enables questions to be asked about data stored across various tables. By running queries to combine data derived from disparate sources, the system offers the potential to utilise animal movement data to study animal disease data. As large tables are involved, this process is resource intensive and calls for carefully planned query design.

GENERAL DATABASE MAINTENANCE AND INTERROGATION

Key CVERA contact: Isabella Higgins

To assist with a range of research projects, the following national databases are regularly interrogated:

- Animal Health Computer System (AHCS) database;
- Cattle Movement Monitoring System (CMMS) database;
- Factory surveillance database;
- Laboratory Information Management System (LIMS) database;
- Tracing Onward Tracking System (TOTS);
- ER76 database; and
- Badger *post mortem* database (1997-2003).

The following examples illustrate how these data are subsequently used:

- a. The provision of data for ongoing work, PhD theses and various papers, including:
 - A long term study of the impact of proactive badger removal on herd restrictions due to bovine TB in east Offaly 1989-2004;
 - The genetics of predisposition to tuberculosis in Irish dairy and beef cattle;
 - A range of projects relating to tuberculin registration; and
 - APT figures on a DED basis for production of thematic maps.
- b. Data from the east Offaly badger *post mortem* database (1997-2003) was used to reconcile badger licenses from the control area of the east Offaly project during these years.
- c. Data from the calf birth registration database was used to assess the accuracy of individual animal identification. In this study, the DNA profile of the calf was compared with the profile of the registered dam to determine if the dam qualifies as a parent of the calf through DNA testing.
- d. Data relating to tuberculin tests carried out on cattle, and the number of tuberculin reactors disclosed, according to county were compiled to produce the Bovine Tuberculosis Statistics, Annual Summary (2006-2007).
- e. Detailed work was conducted in collaboration with Lee Byeong-yong of the National Veterinary Research and Quarantine Service in Korea to evaluate the effectiveness of surveillance (identifying new cases) and control (clearing known cases) activities within the brucellosis eradication programme in the Republic of Korea during 2000 to 2006. Data from the national animal infectious disease data management system was used to conduct descriptive analyses on a farm basis and then on an episode basis.
- f. National tuberculin testing data were assembled for a project investigating the genetics of predisposition to tuberculosis in Irish cattle. This work is being conducted by Máiréad Bermingham, from Teagasc Moorepark.
- g. Provision of technical support and data for the production of improved statistical measures for TB surveillance and control. Initiated within CVERA, the project is now being led by David Williams and Syed Zeeshan Haider Zaidi from UCD Statistics.
- h. Data of badger removal and TB incidence in cattle, from the Irish midlands since 1989, were assembled for a long-term observational study to evaluate the long-term effectiveness of proactive badger culling, and long-term effects of reactive culling, on TB prevalence in cattle. This work is being led by Gabrielle Kelly (UCD Statistics) and Joe Condon (Dublin Institute of Technology).

“Database interrogation is central to many national projects.”