International EpiLab (Denmark), and
Office International des Épizooties (OIE)

Present a post-ISVEE Training Course

Advanced surveillance techniques: *The use of multiple non-survey data sources to demonstrate freedom from infection*

Sunday 23rd to Tuesday 25th November, 2003

Introduction

International recognition of freedom from infection is an important element in ensuring fair trade in animals and animal products, while preventing the international spread of significant animal diseases. Generally, quantitative evidence for freedom from infection is provided through the use of structured random surveys, while other evidence (such as the quality of the veterinary services, clinical surveillance and negative laboratory findings) is usually evaluated in an informal qualitative manner.

This training course is designed to give participants the necessary tools to undertake quantitative analysis of complex non-survey data sources, and combine evidence from multiple data sources, to support claims of freedom from infection. The techniques presented have been recently developed by scientists working at the International EpiLab, Denmark, and provide an opportunity to:

- maximize the value gained from all sources of evidence through quantitative analysis, thereby making the process faster and less expensive,
- use a combination of different surveillance activities (including structured surveys and complex, non-survey based surveillance) to accumulate the necessary evidence to demonstrate freedom,
- provide objective quantitative measures of the sensitivity of different components of a surveillance system, allowing critical evaluation and the development of optimal surveillance programs based on cost-benefit analysis,

The course will take place over three days, immediately following the 10th ISVEE in Chile. The first day will provide the necessary theoretical background, followed by a description of the methodologies. The second will be a hands-on activity allowing participants to gain experience through implementing the methods, including the use of stochastic simulation software. The third day will include a discussion of the limitations of the methods, areas of current research and an open discussion to share participants' experience and thoughts.

Presenters

The course will be presented by four respected scientists with extensive experience in research into methods to demonstrate freedom from infection:

- Angus Cameron - AusVet Animal Health Services, Australia
- Matthias Greiner - International EpiLab, Denmark
- Tony Martin - Western Australian Department of Agriculture,
- Mo Salman – Animal Population Health Institute, Colorado State University, USA

Participants

The course is targeted at epidemiologists actively involved in the design and analysis of surveillance systems, and who are involved in issues of demonstration of disease status. Examples presented will be based on national freedom, but those working at different levels (e.g. farm-level or zone) may also benefit. The techniques are equally applicable to developed and developing countries. At the completion of the course, participants should have a sound understanding of quantitative approaches to demonstrating freedom from infection using multiple data sources, including their limitations. While not essential, participants with knowledge of the following areas are likely to gain more benefit from the course:

- basic probability theory
- scenario trees and risk analysis techniques
- spreadsheets and the use of complex spreadsheet formulae (specifically MS Excel)
- the use of stochastic simulation software (specifically @Risk)

Participants should, however, have a good understanding of disease surveillance, and surveillance activities undertaken in their own country.

Decision makers who are not directly involved in the analysis of surveillance data are also welcome to attend, in order to understand the potential application of these methods.

Registration and Cost

Registration will be possible on the standard ISVEE registration form. The cost of the course will be US$ 200 and cover lecture materials, lunch and refreshments. A second announcement will be made when final venue and cost details are available.

Course Outline

Sunday 23rd November - Introduction to surveillance methodologies

Introduction and context

- International trade, WTO and SPS
- OIE, risk analysis and freedom from disease
- Purpose of surveillance and types of surveillance

Fundamentals and terminology

- Theory of freedom
- Probability and distributions
- Tests, sensitivity, specificity
- Bayes theorem
- Threshold prevalence
- Describing differential risk
- Internal time period for analysis

Methodology

- Identifying potential data sources
- Describing surveillance system components
- Development of scenario trees
- Calculation of component and system sensitivity
- Stochastic modelling
- Use of the sensitivity ratio to compare scenarios
- Combination of data
- Calculation of the probability of country freedom

Monday 24th November - Hands-on activities - analysis of surveillance systems and modelling

Analysis of non-random data sources

- Identify non-random data sources from participants' own countries
- Describe the steps in the surveillance process
- Formulate scenario tree suitable for analysis
- Identify hierarchical structure and probability inputs required

Modelling scenario trees

- Build a spreadsheet model, implementing a scenario tree
- Specify input probabilities and suitable probability distributions
- Develop alternative scenarios to evaluate options

Stochastic Modelling

- Specifying input and output values
- Specifying simulation options
- Specifying reporting options
- Running the model

Interpreting the output

- Surveillance system component sensitivity
- Efficiency of the system component (sensitivity ratios)
- Calculation of the probability of country freedom

Combination of data

- Data from multiple time periods
- Data from multiple sources

Tuesday 25th November - Examples, limitations, research and discussion

Examples of analyses

- International EpiLab
- Poultry case study
- Cattle case study
- Swine case study

Current issues

- Independence of tests
- Independence of surveillance system components
- Eliciting and combining expert opinion
- Non-quantitative analysis
- Assessing system coverage
- Determining a prior probability for country freedom

Workshop

- Participant discussions

- Application of the methodology
- Research needs and opportunities