Management of Infectious Disease Outbreaks in Animal Populations

Overview

This module is designed to teach both the theoretical and practical information required for the management of a major infectious disease outbreak of farm animals.

Topics will include epidemiology of infectious diseases, risk and cost-benefit analysis, surveillance, diagnosis and vaccination strategies before and during an outbreak, contingency planning and case studies to illustrate how disease outbreaks could be better managed.

Welcome to the course

Management of Infectious Disease Outbreaks in Animal Populations is an optional course in the Livestock Health and Production and the Veterinary Epidemiology and Public Health programmes of the Royal Veterinary College. The module may also be studied as a 240-hour Individual Module. This course is designed to provide you with both comprehensive theoretical knowledge and practical tools for the management of major infectious diseases in livestock.

Infectious diseases of livestock are no longer only the domain of farming communities and the veterinary profession. Many of the infectious diseases that affect livestock are of the epidemic type and tend to have rapid and explosive spread. The impact of these diseases is felt not only in their effect on the animal (sickness and sometimes death), but also as the consequent loss of productivity and reduced farm income, the economic losses from curtailed international trade in live animals and their products, and often the effect they have on people who may become infected with zoonotic diseases.

We are now living in an increasingly interconnected world with high levels of national and international population movements and changing climatic conditions; episodes of emerging and re-emerging diseases are a consequence of these global changes that the world has to contend with. The appearance of diseases, such as West Nile virus in the USA and bluetongue in the UK, illustrates the ease with which disease agents can move to new geographic locations and establish themselves. Rift Valley fever reappeared in Kenya in 2006/2007, leaving close to 100 people dead and others infected. The re-emergence of the disease was attributed to unexpected heavy rainfall that caused flooding and created breeding grounds for mosquitoes which spread the virus of the fever from infected livestock to humans.

The effective control and management of infectious livestock diseases depends to a large extent on an understanding of the epidemiology of the disease. Also important is an understanding of the interplay between agent, host and environment in developing interventions to control outbreaks of these infectious diseases and strategies to eradicate their causal pathogens. Surveillance for early recognition of disease problems, effective responses to prevent the spread of the disease and reliable predictive capabilities are all essential in the management of infectious disease outbreaks.

What will you learn from this course?

By the end of this course you should be able to:

- describe the epidemiological concept of disease transmission and related factors, and explain the epidemiological aspects of the relationship between host, agent and the environment
- explain the role of economic analysis in animal health management
- describe monitoring and surveillance approaches
- outline measures needed to prevent the introduction of a disease into a country
- make recommendations on the most appropriate control methods for different diseases
- identify the highest-threat emergency animal diseases for your country, know where those threats are likely to come from and recognize how they will manifest themselves.

Course structure

The course consists of 11 units of study, all of which you should complete. They make up the following three modules.

Module 1: Epidemiology of Infectious Diseases

This module (Units 1-3) explores the nature and mechanisms of infectious viral diseases, epidemiological aspects of disease control and the principles of risk and economic analysis in disease control. The module focuses on selected viruses and diseases chosen on the basis of their global incidence and economic importance, and guides you in considering different elements of risk assessment and the role of economic analysis in animal health projects.

Module 2: Principles of Management of Infectious Diseases

The second module (Units 4-7) examines methods of surveillance, monitoring and detection of infectious disease, explains the principles of prevention, including immunization, and considers the management of outbreaks. In this module you will learn about contingency planning and the importance of international co-operation in the control and management of high-threat disease outbreaks.

Unit 4 involves computer-based activities using an epidemiological program, Epitools - Epidemiological Calculators, which you will be instructed to download for free from the Internet.

You will require a computer with a Windows-based operating system environment (Win95 and higher) – or with a functional Windows emulation within a Unix/Linux or Apple Macintosh environment.

Module 3: Case Studies in the Management of Infectious Diseases

In the final module (Units 8-11) you are presented with case studies which address diseases with different characteristics. The approaches presented in the case studies emphasize both diagnosis and eradication, and the examples are designed to enable you to put into practice the information and fundamental principles acquired in the earlier modules.

Tutor-marked assignments

In addition to your work on the 11 units, you are required to complete and submit at least one tutor-marked assignment (TMA) for assessment. If you submit more than one - and you may submit up to two - your best TMA will be used in the calculation of your final mark. Full information on how to approach and submit TMAs is provided in the Programme Handbook and in the assignments themselves. You should bear in mind that your TMA will count for 20% of your final mark for the course.

Study time

The entire course, including revision and examination, is designed to take approximately 240 hours to complete. This is made up of between 15 and 25 hours' study time for each unit, 10-20 hours for the TMA(s) - so that the units and assignments will require a total of about 220 hours - and the remaining time for personal study and revision. You may find that some units will take you more or less time than estimated, depending on your familiarity with the subject.

Assessment

Your work for this course will be assessed by means of a three-hour unseen written examination paper which will take the form of essay questions. In addition, you must submit at least one and up to two TMAs.

The grade awarded will be based on the mark obtained in the written examination (80%) and on the mark for the compulsory TMA (20%).