

# Preface

## Models in the management of animal diseases

The purpose of this issue of the *Scientific and Technical Review* of the World Organisation for Animal Health (OIE) is to encourage and facilitate worldwide improvement in the understanding of the ways in which national Veterinary Services may make use of models in the management of animal diseases.

The international standards contained in the OIE *Terrestrial Animal Health Code* and *Aquatic Animal Health Code* (2, 3) refer to concepts such as risk analysis, the performance of Veterinary Services, accountability, transparency of decision-making, animal disease response plans, emergency preparedness, epidemiological surveillance and monitoring programmes; it is important, therefore, that Veterinary Services worldwide have the tools they need to prepare and deal effectively with such issues. Electronic and other technological tools, as well as progress in scientific understanding of animal diseases and their management, are important in enabling Veterinary Services to make steady improvements in their performance and preparedness so that they can provide the optimum service to society.

Preparing for an animal disease emergency often presents considerable challenges for Veterinary Services. Exotic infections are likely to have been absent from the country for many years, and the situation concerning the size of susceptible populations, location of the herds, direct and indirect contacts among herds, available resources, laboratory tests and control methods are likely to have changed considerably over the years. Obviously, new and specific tools are needed to supplement the common scientific knowledge and the practical experience learned from countries that have already had disease emergencies. One such tool is epidemiological modelling.

Modelling has become a widely used tool in evaluating, prioritising and deciding among alternative disease management activities. The value of epidemiological models lies in their ability to study 'what if' scenarios and to provide decision-makers with *a priori* information about the potential consequences of disease incursions and the expected impact of control strategies. To be useful, models need to be fit for purpose and appropriately verified and validated. Validation of epidemiological models is important for gaining confidence in model outputs.

Modelling will be most useful when used pre-outbreak, particularly in the areas of retrospective analysis of previous outbreaks, contingency planning, resource planning, risk assessments and training. The complexity and variability inherent in biological systems should limit the use of today's models as predictive tools during actual outbreaks.

Models are just one tool for providing scientific advice, and their results should be evaluated in conjunction with experience from experimental studies, field studies and common scientific wisdom. International collaborations, such as those made possible through the OIE, can help address validation issues and improve the utility of models for emergency disease management.

Many OIE Member Countries already have experience with this tool, and the scientific literature contains many examples of the use of epidemiological models in a variety of animal disease situations. Yet Veterinary Services in less experienced countries will gain from a review of the benefits and the risks associated with this newer tool, and acquire a greater understanding of how management decisions can be supported through the use of such models.

Interesting results emerged from the 2007 OIE questionnaire on model usage in Member Countries, which is reported in the introductory paper of this issue by Willeberg *et al.* (1). Clearly, regional differences in experience with modelling existed, but the less experienced countries showed a great deal of interest in becoming more familiar with modelling. Both additional resources and technical assistance, however, are needed to achieve progress.

For the OIE to meet the challenges within its areas of responsibility, a science-based understanding is needed of the often complex epidemiology of infectious animal diseases and the ways in which surveillance and control methods should be adapted to best fit the different characteristics and risk factors of the disease (i.e. is the chosen method the optimum method for controlling a particular disease?). The choice of methodology and response plan for detecting, limiting and controlling the spread of the disease depends on numerous factors, and the Veterinary Services of affected Member Countries must consider:

- characteristics of the respective disease or infection
- geographical and climatic factors
- characteristics of susceptible animal populations at risk of exposure
- economic and social factors
- the infrastructure of the susceptible or the affected industries
- the organisation of the Veterinary Services and the surveillance network
- the levels of government in charge of different aspects of the problem.

Model representations of such complex issues have proved useful as an aid in the decision-making processes involved in preparing and managing animal disease control activities under different conditions.

I would like to express my sincere thanks to all the authors who contributed to this issue of the *Review*. I would also like to thank the Centers for Epidemiology and Animal Health (CEAH) of the Animal and Plant Health Inspection Service of the United States Department of Agriculture and the OIE Collaborating Center for Animal Disease Surveillance Systems, Risk Analysis and Epidemiological Modelling in Fort Collins, Colorado, for conducting the CEAH-OIE workshop on modelling in August 2008. This occasion contributed significantly to the development of this *Review*, as it proved an ideal forum for cooperative discussions on the topic and many of the participants subsequently wrote papers for this issue. The OIE is supportive of the use of modelling in the prevention and management of animal diseases and I am sure that this publication will be a useful resource for anyone wishing to implement modelling in the activities of Veterinary Services worldwide.

I would especially like to warmly thank Professor Preben Willeberg for coordinating this issue of the *Review* and assembling such an informative collection of papers.

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## References

1. Willeberg P., Grubbe T., Weber S., Forde-Folle K. & Dubé C. (2011). – The World Organisation for Animal Health and epidemiological modelling: background and objectives. In *Models in the management of animal diseases* (P. Willeberg, ed.). *Rev. sci. tech. Off. int. Epiz.*, **30** (2), 391-405.
2. World Organisation for Animal Health (OIE) (2010). – *Aquatic Animal Health Code*, 13th Ed. OIE, Paris. Available at: [www.oie.int/en/international-standard-setting/aquatic-code/](http://www.oie.int/en/international-standard-setting/aquatic-code/).
3. World Organisation for Animal Health (OIE) (2010). – *Terrestrial Animal Health Code*, 19th Ed. OIE, Paris. Available at: [www.oie.int/en/international-standard-setting/terrestrial-code/](http://www.oie.int/en/international-standard-setting/terrestrial-code/).



# Préface

## Modèles de gestion des maladies animales

Ce numéro de la *Revue scientifique et technique* de l'Organisation mondiale de la santé animale (OIE) vise à rendre compte des différentes possibilités offertes aux Services vétérinaires par l'utilisation des modèles dans le domaine de la gestion des maladies animales, afin de promouvoir et de faciliter leur utilisation à l'échelle mondiale.

Les normes internationales contenues dans le *Code sanitaire pour les animaux terrestres* et le *Code sanitaire pour les animaux aquatiques* de l'OIE (1, 2) font référence à de nombreux concepts tels que l'analyse du risque, les performances des Services vétérinaires, la responsabilité, la transparence des décisions, les plans d'intervention en cas de foyers de maladie, la préparation aux urgences et les programmes de surveillance épidémiologique et de suivi ; il est donc essentiel que les Services vétérinaires du monde entier disposent des outils nécessaires pour aborder efficacement ces questions. Les outils informatiques, tout comme les technologies nouvelles et les découvertes scientifiques sur les maladies animales et leur gestion contribuent de manière importante à améliorer progressivement les performances et la réactivité des Services vétérinaires afin qu'ils puissent rendre les meilleurs services possibles à la société.

La préparation aux situations d'urgence pouvant affecter la santé animale s'accompagne souvent de difficultés considérables pour les Services vétérinaires. Certains pays ont été épargnés par les maladies exotiques pendant de longues années ; durant ce laps de temps, la taille des populations animales sensibles peut avoir considérablement évolué, ainsi