

Introductory Remarks and Objectives

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Past experience:

- Professor of Veterinary Epidemiology, 1967 – 1999 at the Royal Veterinary and Agricultural University, Copenhagen, Denmark
- Visiting Professor at UCD, MSU, OVC, Gent, 1978 - 1994
- Head of Dept. for Projects and Disease Prevention, Federation of Danish Pig Producers & Slaughterhouses, 1997 – 1999
- Chief Veterinary Officer for Denmark, Danish Veterinary and Food Administration, 1999 – 2007



- Member of ISVEE International Management Committee
- Founding Member of the European College for Veterinary Public Health
- Secretary General of the OIE Scientific Commission
- Past member of several EU Scientific Committee's on BSE, Animal Welfare, Veterinary Public Health, etc.
- Past member of the Executive Committee of FAO's EUFMD Commission



World Organisation for Animal

(www.oie.int)

Founded 1924 in Paris, France

Currently 172 member countries

Objectives:

- Transparency
- Scientific information
- International solidarity
- Sanitary safety
- Promotion of Veterinary Services
- Food safety and animal welfare

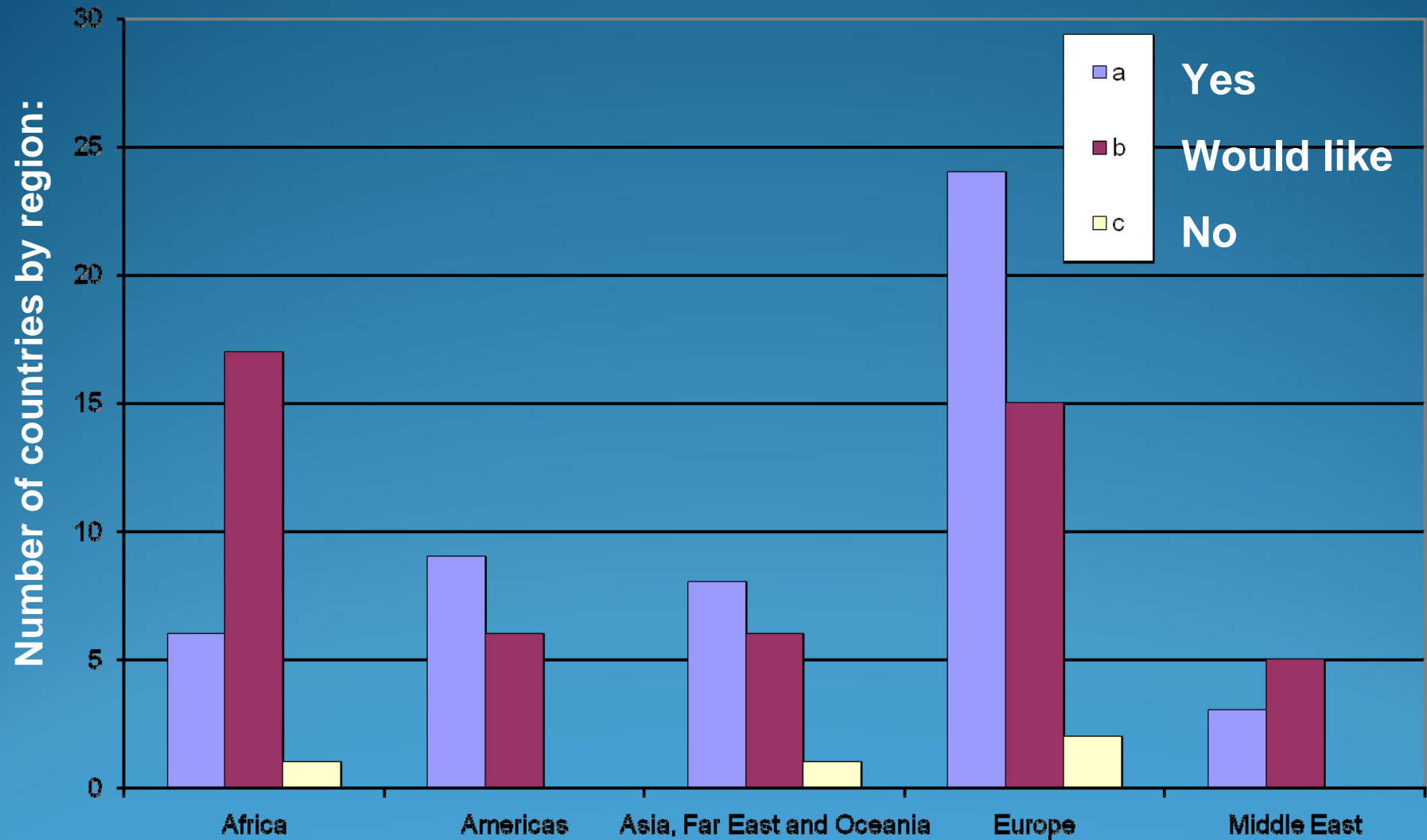
Background:

- Technical Item “The use of epidemiological models for the management of animal diseases” suggested at the annual meeting of the OIE European Regional Representation in 2005 by Denmark
- Accepted by the OIE Administrative Commission
- Invitation to present the topic at the General Session in 2007
- Questionnaire prepared and sent out to all member countries
- Review and Questionnaire Summary prepared by co-author group
- Technical Item Report sent out prior to General Session of the International Committee

Questionnaire Survey:

- Questionnaires sent out from the OIE to all CVOs in the 169 member countries in 2007
- Completed questionnaires returned from 103 countries (61%) listed in Appendix 1 of the written report
- 10 multiple choice questions (when applicable with “Other, specify:.....”)
- Frequently cited categories in open text fields added to results

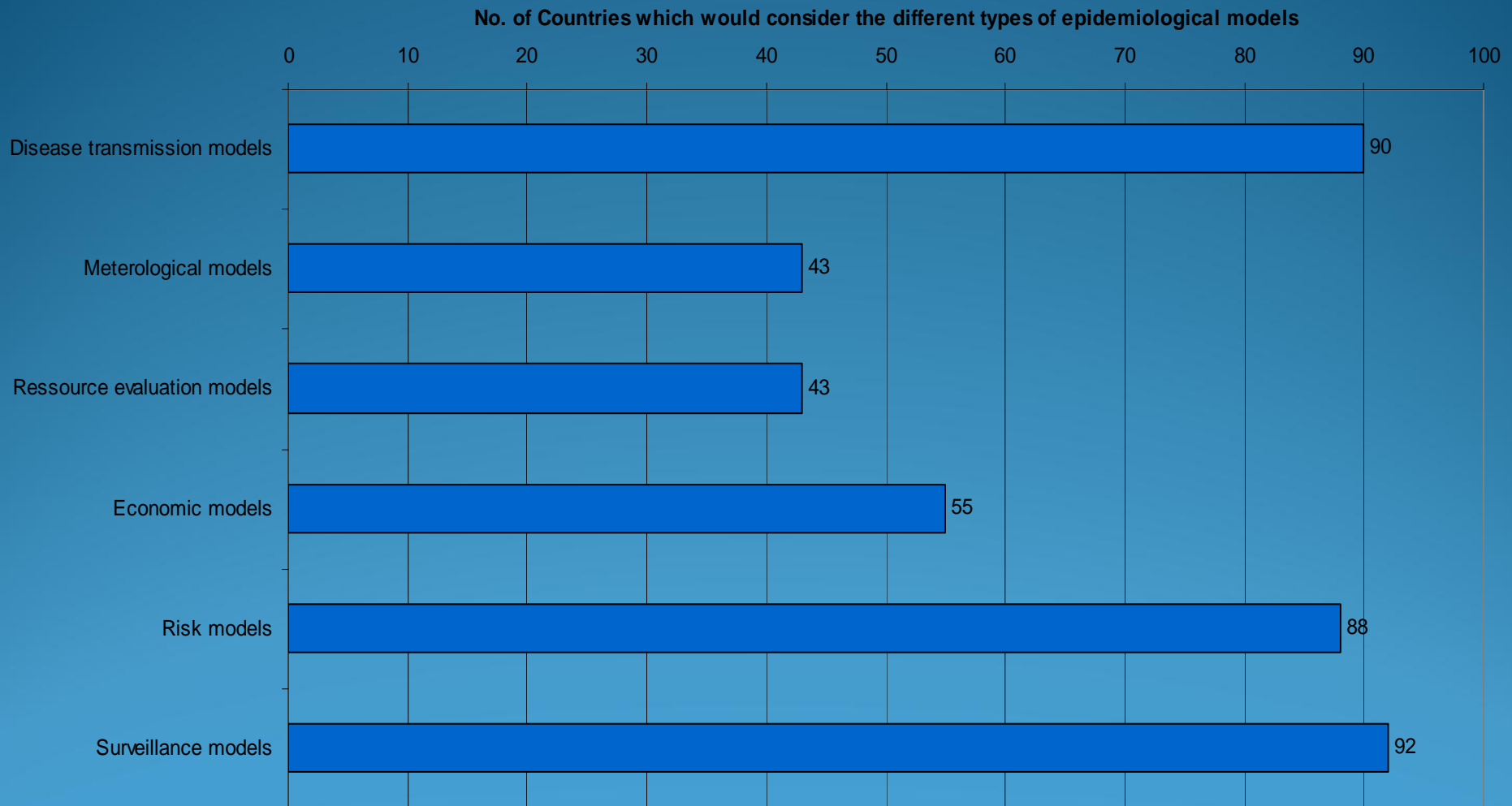
Overall Use of Epidemiological Models:



Reasons for Not Considering the Use of Models

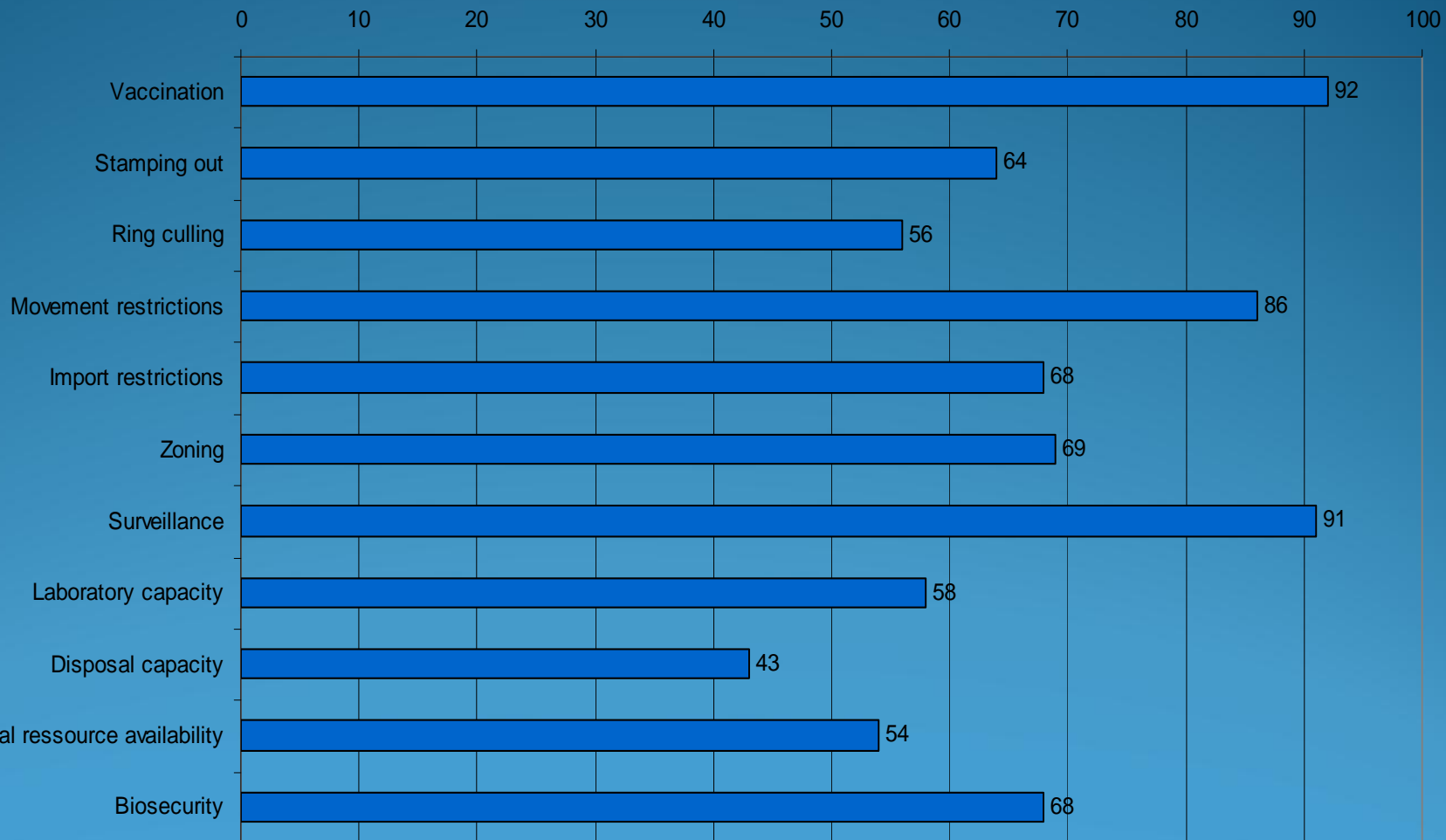
- Only 4 countries have neither used nor considered to develop epidemiological models
 - 2 countries saw few or no benefits from the use of models
 - 1 country would not trust decisions supported by model results
 - 2 countries considered the costs and/or difficulties to exceed the benefits
 - 3 countries needed to know more

Types of Epidemiological Models:

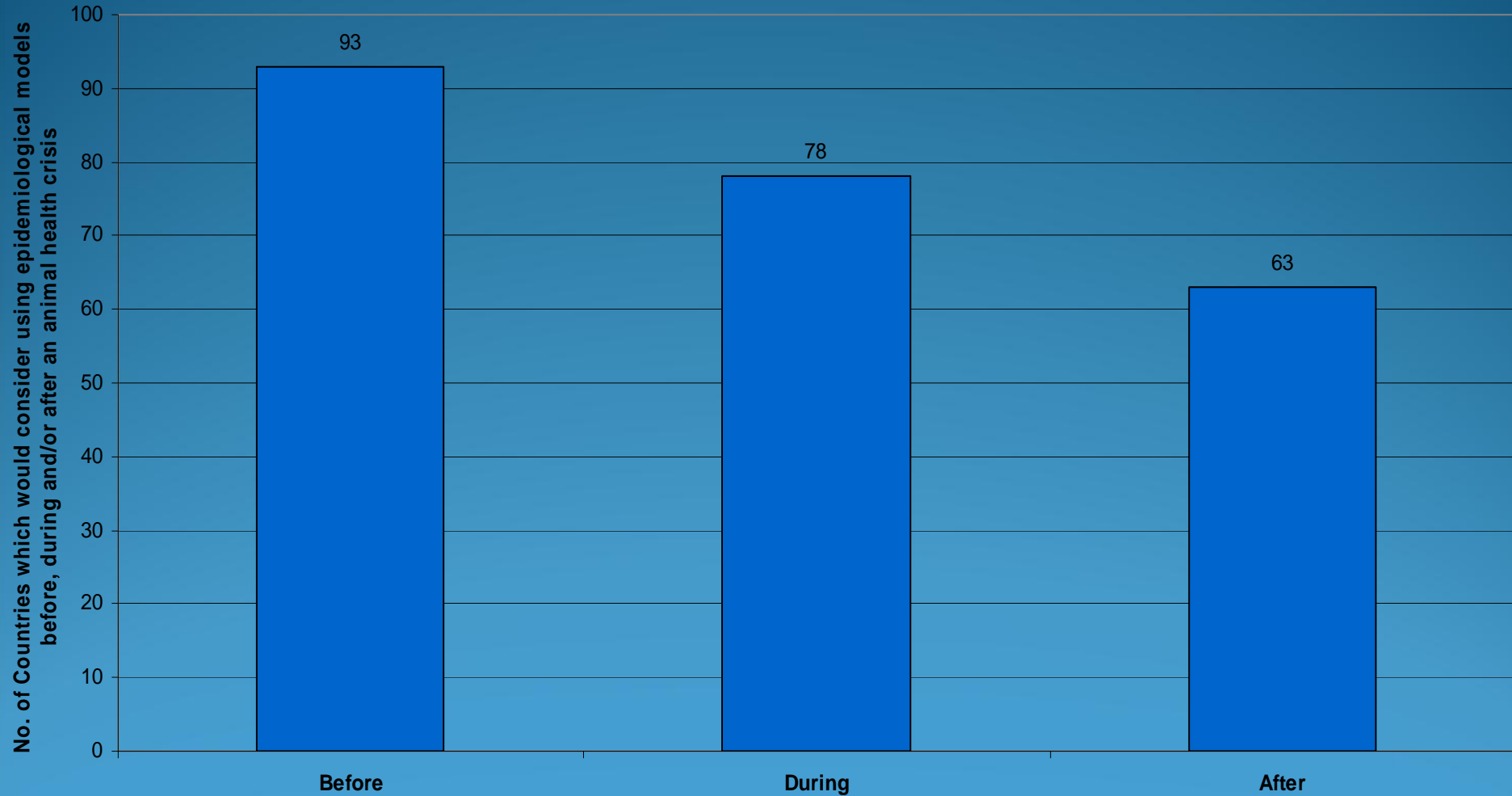


Types of Disease Management Activities:

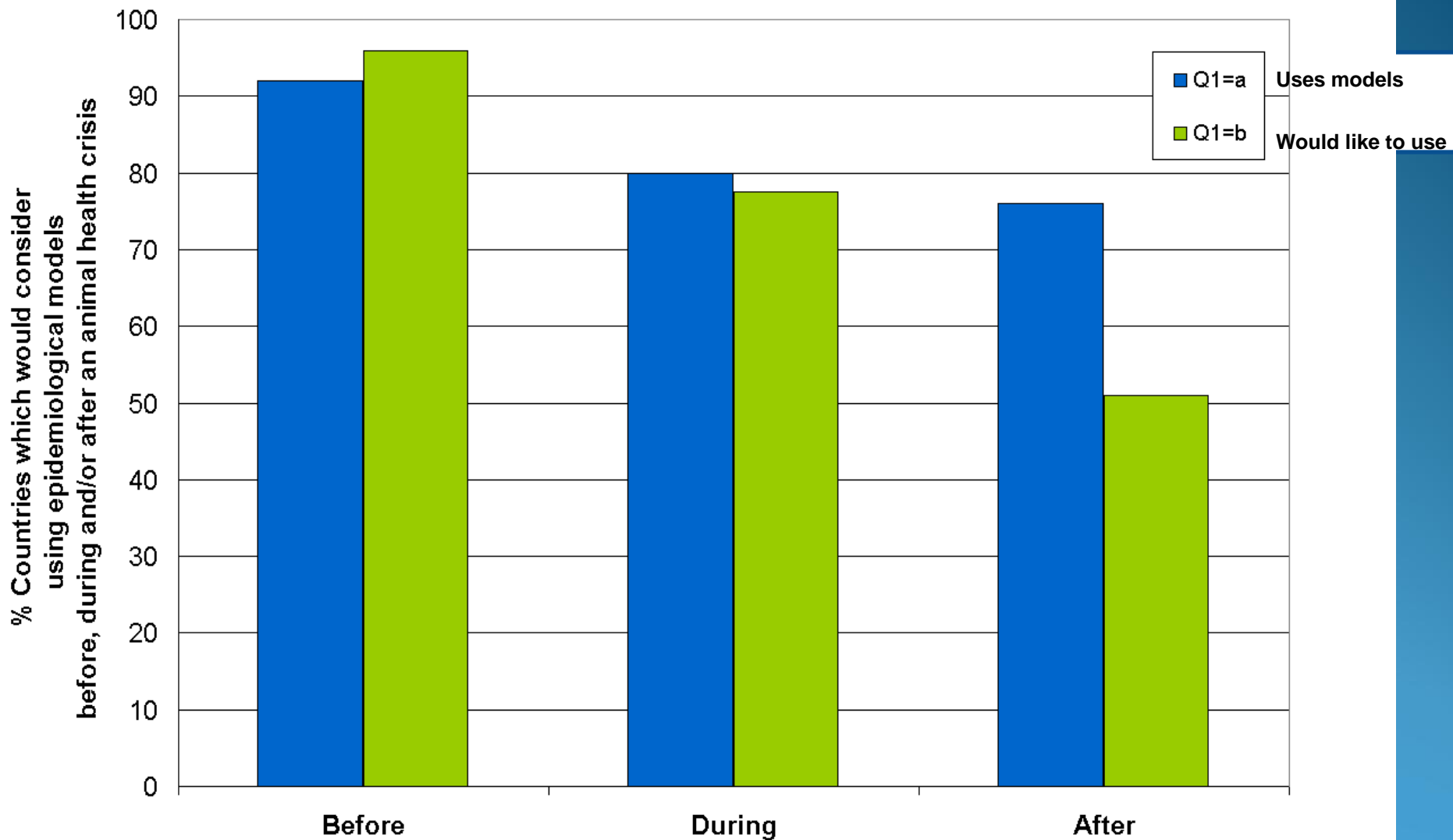
No. of Countries which consider this disease management activity would be supported by the use of epidemiological models



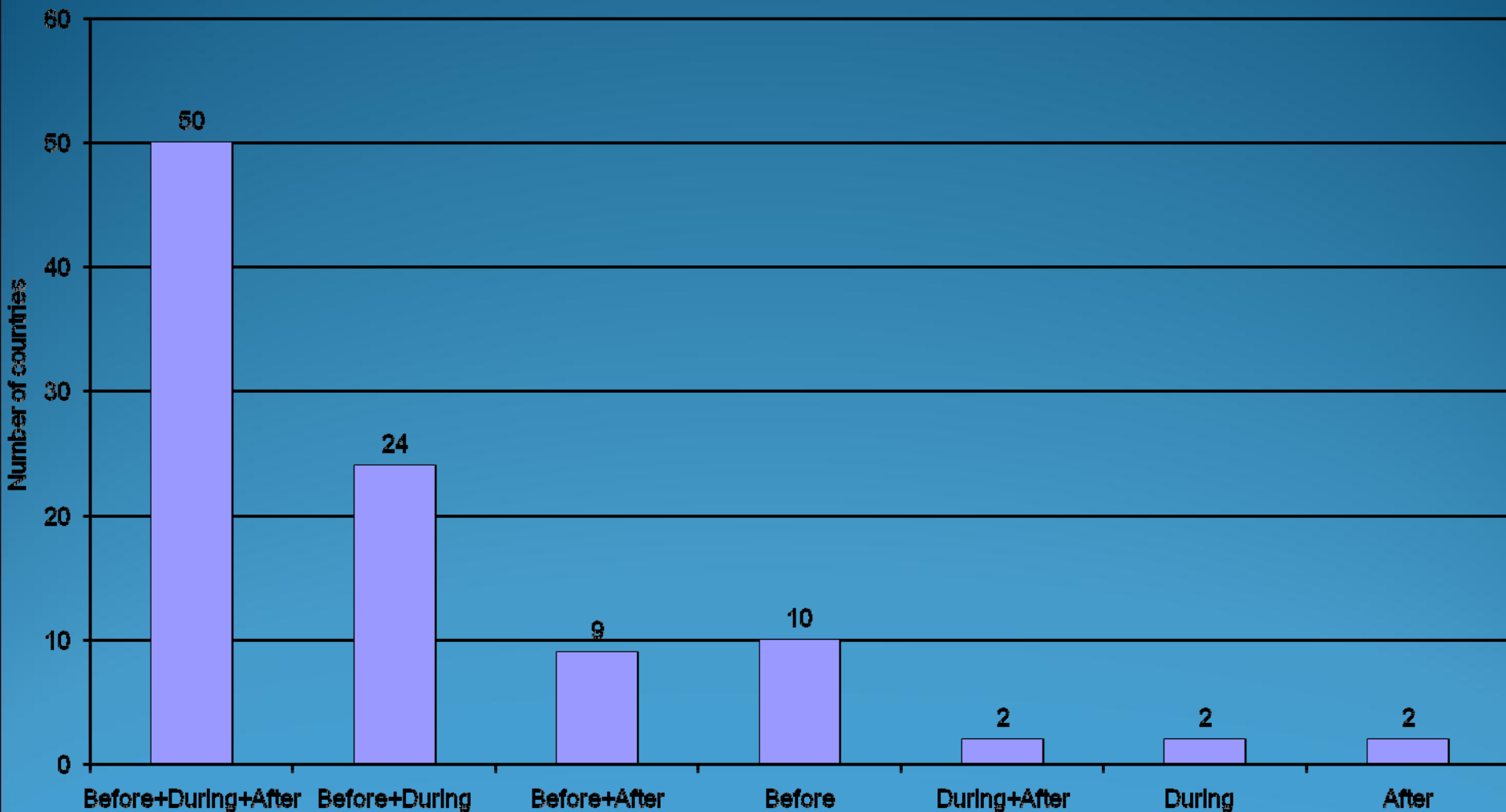
Timing the Use of Epidemiological Models:



Timing the Use of Epidemiological Models:

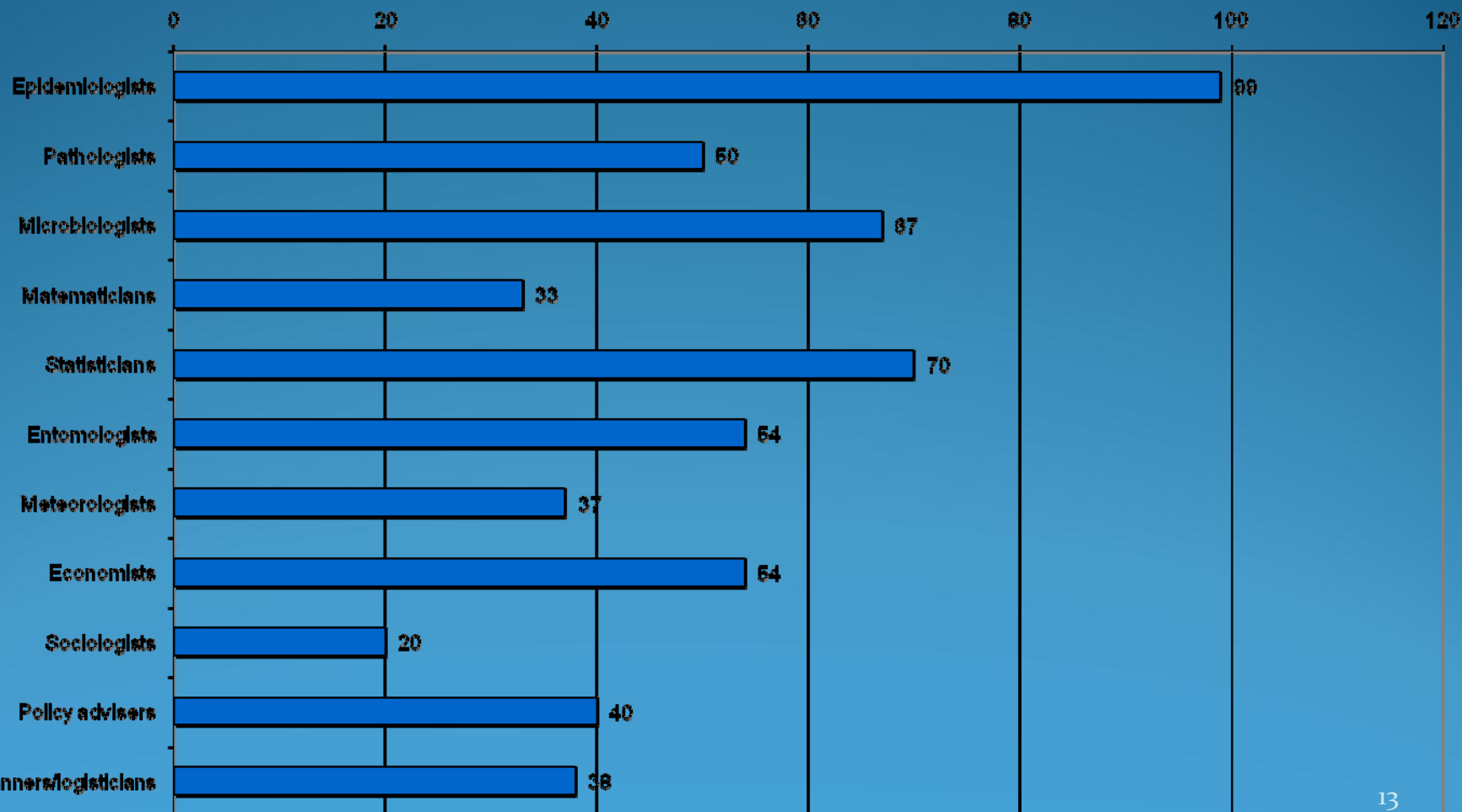


Timing the Use of Epidemiological Models:



Professions Involved in Development of Epidemiological Models

No. of Countries which have or would involve which professionals in the development of epidemiological models



Limitations in the Use of Epidemiological Models

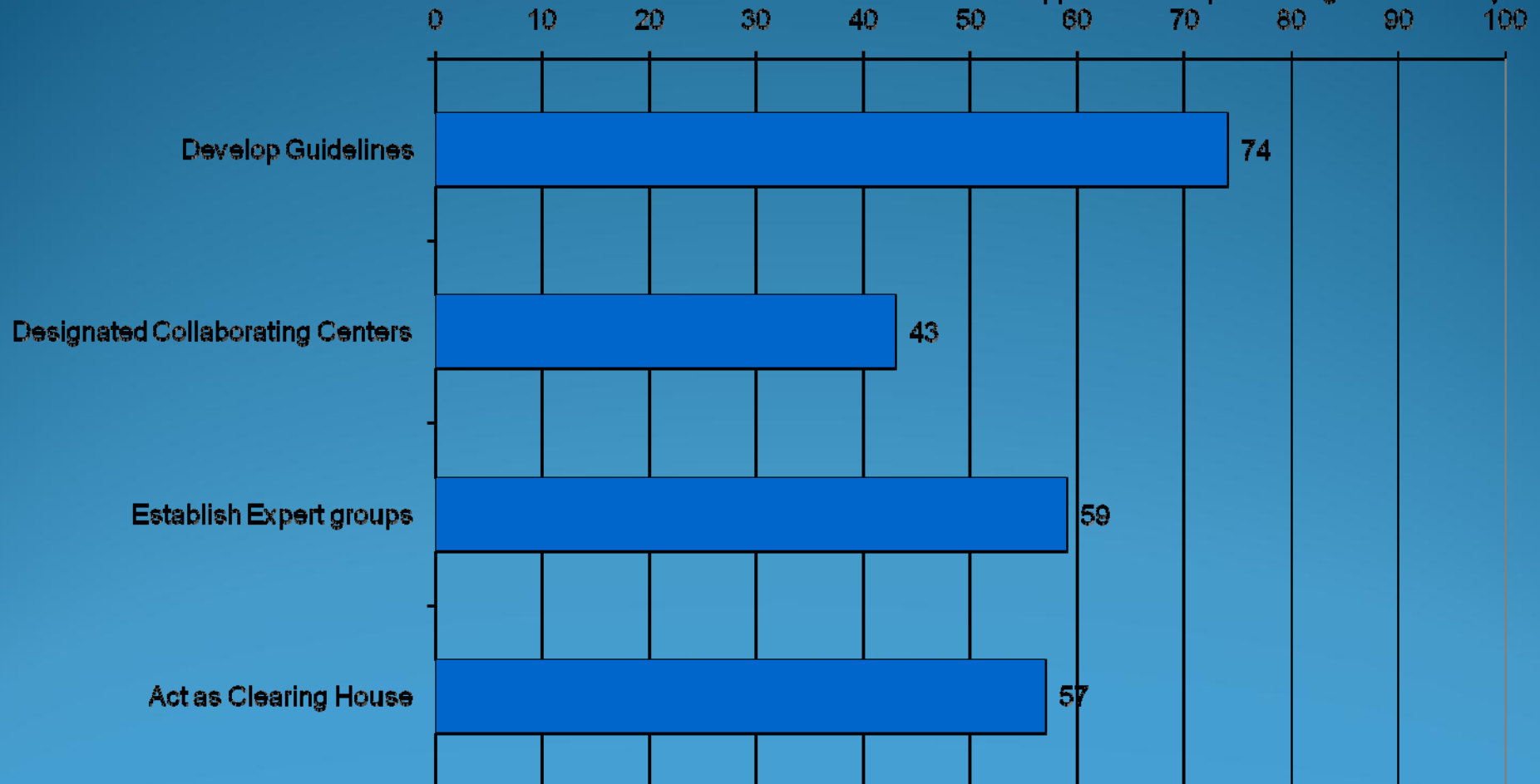
% of countries	Lack of resources		
Lack of expertise	No	Yes	Total
No	12	28	40
Yes	33	27	60
Total	45	55	100

Limitations in the Use of Epidemiological Models

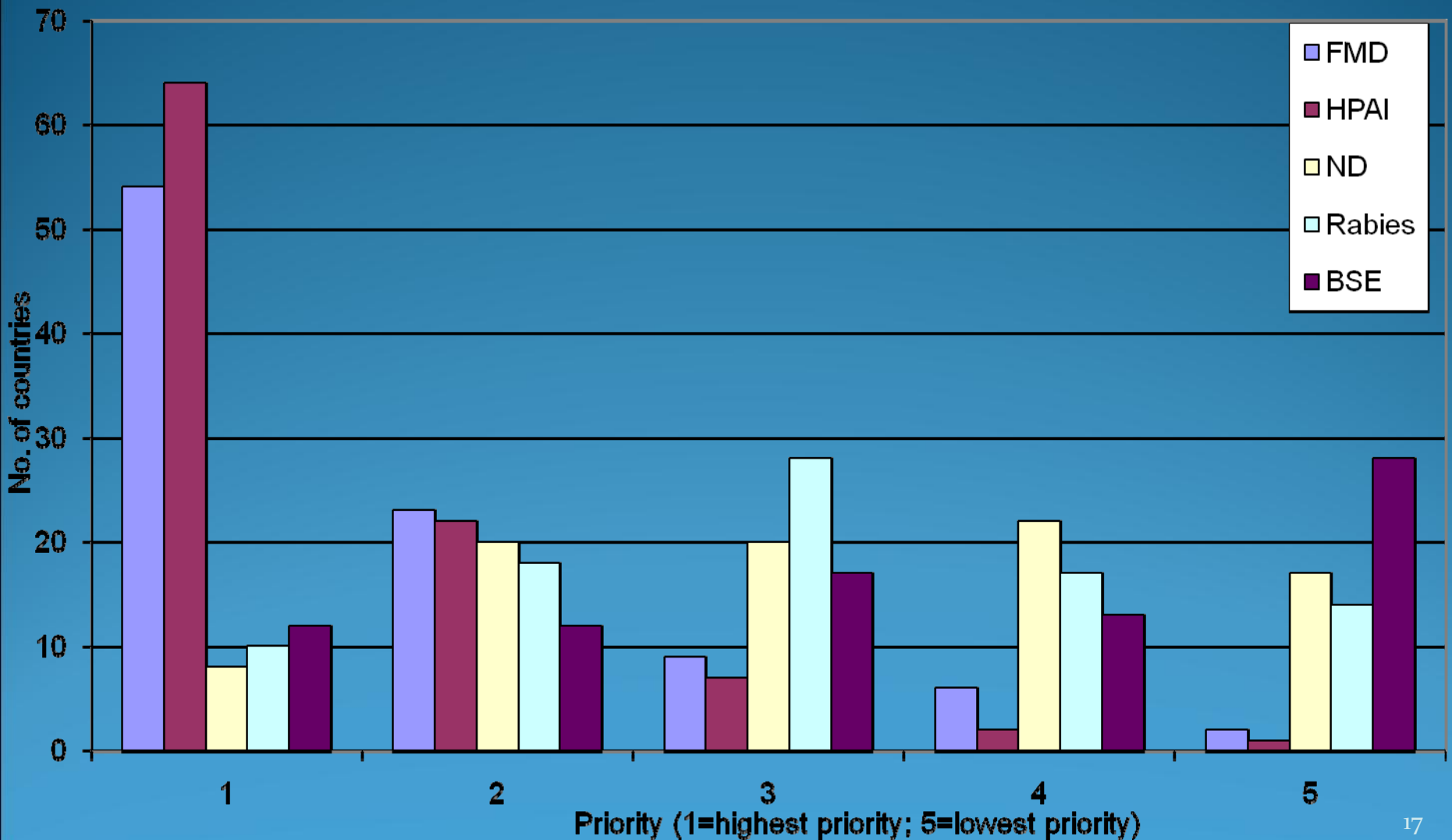
- Of the 103 countries that completed the questionnaire, only 12 countries neither lack resources nor expertise.
- Seven of those 12 made comments on other limitations, mainly related to lack of data.
- The majority of OIE member countries have therefore experienced limitations on the use of epidemiological models.

Desired OIE Support:

No. of countries which think that the OIE could enhance the application of epidemiological models by ...



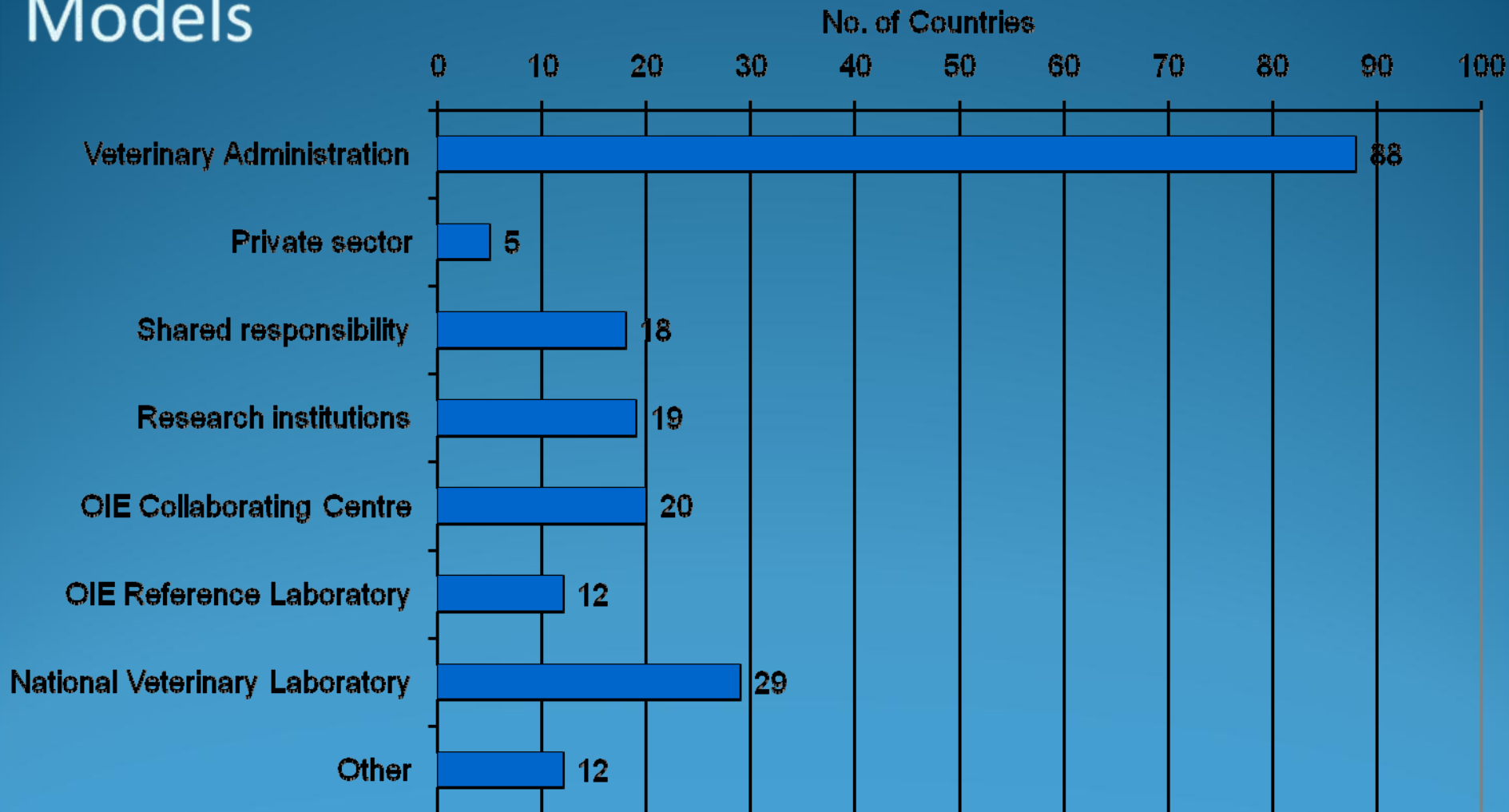
Priority Diseases for Epidemiological Modeling



Priority Diseases for Epidemiological Modeling

- Other priority diseases:
 - More than 30 additional diseases were listed in the responses
 - 29 countries listed Classical Swine Fever
 - 20 countries listed Bluetongue
 - Brucellosis (14 countries), Rift Valley Fever (13 c.), Bovine Tuberculosis (12 c.), Peste des Petits Ruminants (10 c.), Contagious Bovine Pleuropneumonia (9 c.), African Swine Fever (8 c.), Sheep and Goat Pox (5 c.)

Governance/Management of Epidemiological Models

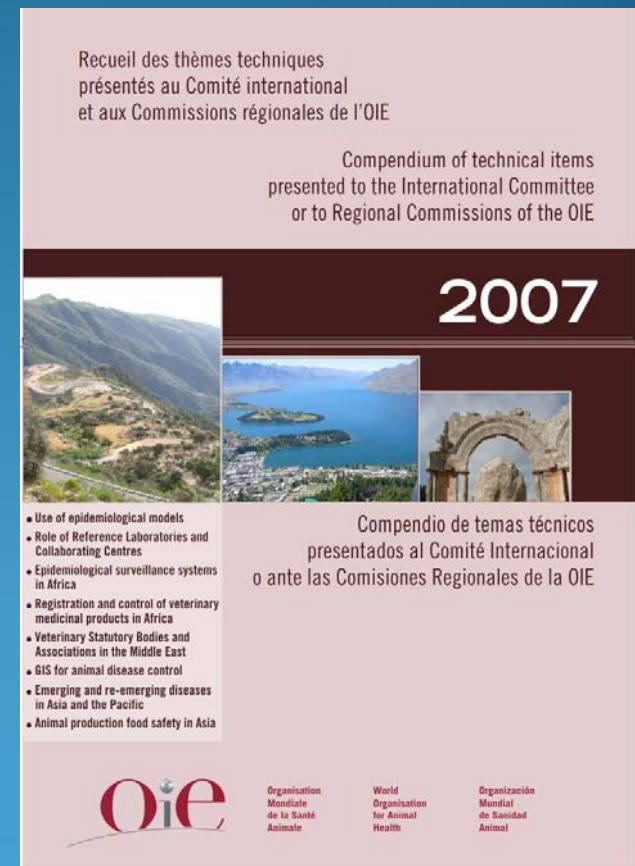


Conclusions:

- **Almost all member countries not yet using epidemiological models have the desire to do so**
- **The majority of the member countries have experienced some limitations on the use of epidemiological models**
- **Lack of expertise and resources are the most frequent reasons for not using models**
- **There are strong wishes and needs for OIE support to enhance the application of epidemiological models for the management of animal diseases**

OIE Paper on Modeling:

- **Compendiums of technical items presented to the International Committee and to Regional Commissions**
- The "technical items" in these compendiums are on topics of current interest chosen by OIE Member Countries and Territories and consist of reports by leading international experts in the field.
The texts are published in the languages in which they were presented to OIE Member Countries and Territories (English and, where appropriate, French, Spanish or Russian) at annual General Sessions of the OIE International Committee or at biennial Conferences of the five OIE Regional Commissions.
- **Compendium 2007 OIE General Sessions topics:**
- *Use of epidemiological models for the management of animal diseases, C. Dubé, G. Garner, M. Stevenson, R. Sanson, C. Estrada, P. Willeberg*
- *Role of OIE Reference Laboratories and Collaborating Centres in providing permanent support for the objectives and mandates of the OIE, A.A. Gajadhar*



Definition of epidemiological models:

“The definition of “epidemiological models” is very important for this technical item. However a clear definition of the term doesn’t seem to exist in the veterinary field.

Epidemiological models are usually defined as a mathematical and/or logical representation of the epidemiology of disease transmission and its associated processes. These quantitative models provide a representation of the transmission dynamics of animal diseases among animals, and/or among groups of animal in time and/or space.

An epidemiological model therefore facilitates the evaluation of the efficacy of the potential control measures and provides estimates of the future magnitude, duration and geographical extent of an outbreak given the application of specific control measures.

However, in relation to the management of animal diseases epidemiological models could be defined more broadly to include a range of statistical/mathematical models, which do not necessarily provide just a description of disease spread. Related aspects to be considered include e.g. the design of surveillance systems.”

Resolution no. XXXIII 2007:

RESOLUTION No. XXXIII

The Use of Epidemiological Models for the Management of Animal Diseases

CONSIDERING THAT

1. Epidemiological modelling is a valuable tool that can assist disease managers and policy makers in identifying and evaluating existing and/or novel approaches to disease control and risk mitigation.
2. Almost all Member Countries that responded to the survey and that are not currently using epidemiological models, expressed the desire to do so.
3. A majority of Member Countries have expressed limitations with regards to the use of epidemiological models due to lack of expertise and resources, while some countries reported shortage of suitable data.
4. Epidemiological modelling is a specialised field that requires an adequate level of expertise.
5. One of the benefits of model construction is the identification of the gaps of knowledge necessary to build it. This approach may suggest further research to better understand the biology of the infection or influence the collection of suitable data.
6. There is general recognition of the value of modelling to support policy development through retrospective analyses and contingency planning.
7. The role of predictive modelling during an animal health crisis as a tool to support tactical decision-making needs more elaboration.
8. Any epidemiological model ultimately depends for its validity on the accuracy and completeness of the data underpinning it.
9. There is significant value associated with international collaborations on model development and validation.
10. Veterinary Services are the most involved in all steps of epidemiological modelling such as development, application and usage of results and these services therefore need to be strengthened worldwide through international collaboration and technical support.

Resolution XXXIII (cont.):

THE COMMITTEE

RECOMMENDS THAT

1. The OIE should develop general guidelines for epidemiological model development, verification, validation and use.
 2. Member Countries should be encouraged to establish OIE Collaborating Centres on epidemiological modelling, which should provide training in the development and application of such models and provide advice to the Member Countries wishing to develop or choose models for use in animal health emergency preparedness, response and analysis.
 3. Member Countries should ensure the completeness and quality of data inputs into the OIE World Animal Health Information System (WAHIS) to make the best use of data stored in the WAHID database for epidemiological modelling.
 4. The OIE should publish a special edition of the *Scientific and Technical Review* on the application of epidemiological modelling on aspects related to the support of animal disease management and assessment of the economic impact of such diseases.
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OIE Collaborating Centers (1):

- Animal Disease Surveillance Systems and Risk Analysis

- Centers for Epidemiology and Animal Health
USDA-APHIS-VS-CEAH

2150 Centre Avenue, Building B
Fort Collins, Colorado 80526-8117
UNITED STATES OF AMERICA

Tel: (1.970) 494.70.01

Fax: (1.970) 472.26.68

E-mail: cristobal.zepeda@aphis.usda.gov

<http://www.aphis.usda.gov/vs/ceah/ceahpage.htm>

OIE Collaborating Centers (2):

- Veterinary Training, Epidemiology, Food Safety and Animal Welfare
- Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise 'G. Caporale'
Via Campo Boario
64100 Teramo
ITALY
Tel: (39.0861) 33.22.79
Fax: (39.0861) 33.22.51
E-mail: caporale@izs.it

OIE Collaborating Centers (3):

- Research and Training in Population Animal Health Diagnosis and Surveillance Systems
- International Epilab, National Veterinary Institute
Technical University of Denmark
Bulowsvej 27, DK-1790, Copenhagen V
DENMARK
Tel: (45) 72.34.62.43
Fax: (45) 72.34.60.01
E-mail: hvi@vet.dtu.dk
<http://www.food.dtu.dk>

OIE Special Edition on

“Models in the management of animal diseases”

4. The OIE should publish a special edition of the *Scientific and Technical Review* on the application of epidemiological modelling on aspects related to the support of animal disease management and assessment of the economic impact of such diseases.

Preliminary OIE plans to publish the special edition entitled: “Models in the management of animal diseases “ in April 2011 – proposed table of contents with 20 - 25 papers to be submitted - solicitation of contributions as a follow – up to this workshop!

Please see me during the workshop if you are interested in submitting a full paper!

Follow-up:

- The OIE Director General establishes an *ad hoc* Working Group on Epidemiological Modeling and Animal Disease Management, 2008 to meet at CEAH, Ft. Collins on 13 – 15 August 2008
- CEAH decides to host an expert workshop on Epidemiological Modeling preceding the OIE WG meeting

OIE Ad hoc Group on Epidemiological Modeling and Animal Disease Management:

- Prof. Vincenzo Caporale, Italy
- Dr. Armando Giovannini, Italy
- Dr. Preben Willeberg, USA
- Dr. Caroline Dube, Canada
- Dr. Graeme Garner, Australia
- Dr. Andre Gil Rodriguez, Uruguay
- Dr. Cristobal Zepeda Sein, CEAH (Rapporteur)
- Dr. Kim Forde-Folle, CEAH (Liason)

OIE WG Terms of Reference:

Meeting of the Ad hoc Group on Epidemiological Modelling and Animal Disease Management

Fort Collins, Colorado, United States of America, 13 to 15 August 2008

Epidemiological modelling is a valuable decision support tool that can assist disease managers and policy makers in identifying and evaluating existing and novel approaches to disease control and risk mitigation. A majority of OIE Members have expressed limitations with regards to the use of epidemiological models due to lack of expertise and resources, while some Members reported shortage of suitable data. During the 75th General Session the International Committee of OIE adopted the recommendation (in form of a Resolution) that OIE should develop general guidelines for epidemiological model development, verification, validation and use.

As the construction and development of models may rather involve the work of modelling experts and researchers, the OIE and collaborating experts decided that detailed guidance on these aspects should be limited to the minimum necessary for application-oriented comprehension. The proposed main objective of this *Ad hoc* Group is therefore the development of OIE guidelines on the use of epidemiological models for the management of animal disease. It is recommended that the main emphasis of these guidelines would be on proper use of epidemiological models with particular view how Veterinary Authorities can take advantage of access to existing models. However, there is growing awareness of the importance of model users understanding the basic principles of the model in question and of how it has been validated and verified, in order to minimize the risk of misuse or misinterpretation of resulting model predictions. In consequence certain basic technical issues on model construction and development might need to be briefly covered.

The *Ad hoc* Group is invited to consider the basic principles of the *Terrestrial Animal Health Code* and examine potentially existing cross-references in other chapters, to include these, if scientifically justified and if relevant to the proposed working objective.

CEAH Invitation to workshop:

The purpose of this epidemiological modeling workshop is to provide a forum for the exchange of knowledge regarding the principles, methods, and applications of simulation models of epidemiological systems. The presentations and discussions resulting from this workshop will enable an OIE-selected ad hoc group to develop guidelines which will serve as a reference to OIE member countries regarding the role epidemiological models have in answering questions related to highly infectious animal diseases. It is recommended that these guidelines be written in such a manner as to caution users against the over-reliance of model generated solutions.

Specifically, the objectives of the OIE ad hoc group are to:

- Provide guidance on the most appropriate use of epidemiological models;
- Develop a list of items to consider when using models to inform decision making;
- Outline a recommended approach to verifying and validating models in order to assure confidence;
- Discuss the value of technology transfer and the recommended approach to adapting existing models for use in other countries;
- Outline a preferred approach to applying field data and soliciting subject matter expert input relevant to the model; and
- Consider the importance of and develop mechanisms for sharing suitable data, epidemiological knowledge, and model results.

Thank You for Your Attention !

