Executive Summary EPIZONE year 1

EPIZONE is a Network of Excellence for Epizootic Disease Diagnosis and Control. Epizootic diseases have always been of risk for livestock in Europe. In the last decade many introductions have been occurred, including outbreaks of Classical swine fever, Foot-and-mouth disease, and Avian influenza. In 2006, Bluetongue has been reported in North-West Europe for the first time. It is generally believed that the risk will or has been increased by factors as intensified international trade and movements of animals, global travel, global warming and increased contacts between livestock and exotic diseases in developing countries. In particularly, the recent outbreak of Bluetongue has unequivocally demonstrated that these formerly non spreading diseases in moderate climate zones, now can have significant social and economical impacts on the entire chain of animal-related food production, from farmers, international traders, to consumers. Based on this outbreak of Bluetongue, it could be emphasised that other insect-borne exotic diseases will invade European countries in the future.

Mission and objectives

EPIZONE will develop a network of excellence to improve research on preparedness, prevention, detection, and control of epizootic diseases within Europe to reduce the economic and social impact of future outbreaks of Foot-and-mouth disease, Classical swine fever, Avian influenza, and other relevant epizootic diseases like Bluetongue and African swine fever, through increased excellence by collaboration.

Four main objectives are defined:

- To establish joint scientific integration activities encompassing research on four themed areas, Diagnostics, Intervention Strategies, Surveillance and Epidemiology, and Risk Assessment related to preparedness, prevention, detection, and control of epizootic diseases.
- To develop and implement Strategic Integration activities for establishment of international priorities in scientific activities, strategic review and planning in themed areas.
- To establish Spreading of Excellence between partner institutes and beyond in order to ensure optimal use of scientific resources, expertises, skills, and specific knowledge of (improved or new) methods and of (new or re-) emerging diseases.
- To develop and establish a sustainable and democratic management structure based on a “Virtual Institute” with clear rules, written processes and procedures including mechanisms for review and assessment, and appropriate administrative support as defined by a Consortium Agreement.

Global dimension

EPIZONE comprises 18 institutes of veterinary science, health and agronomy, the Food and Agriculture Organisation (FAO) and 1 Small and Medium Enterprises (SME) from 12 countries (Fig. 1). EPIZONE includes over 250 acknowledged experts in animal diseases and inclusion of China, Turkey, the Food and Agriculture Organisation (FAO), and several partners with an excellent network outside the European Union (EU) ensure a global dimension.

Figure 1 Involved contractors and coordinator contact details

Organisational structure

The activities of EPIZONE are based around a "Virtual Institute" concept, and partnership is supported by a legal Consortium Agreement. The organisational structure of EPIZONE (Fig. 2) comprises a matrix design of joint activities in non-scientific themes 1, 2, and 3, and joint research activities in scientific themes 4, 5, 6, and 7. Each theme contains one or more Work Packages covering a certain expertise and led by a work package leader. The Work Packages within each theme are led by a theme leader assisted by a deputy theme leader, all member of the Executive Committee.

Governance is provided by the Coordinating Forum comprising representatives of all EPIZONE partners. Over this first year, the Coordinating Forum has developed a cohesive and collaborative environment for discussion of network activities, which will ensure success of the network. The Coordinating Forum is supported by a Governing Board of five democratically elected representatives at director level from all partners. The procedure of election and frequency is described in the Consortium Agreement. International scientific advice to the governance is provided by an External Advisory Panel comprising five senior external scientists, including a representative of the OIE (World Organisation for Animal Health).

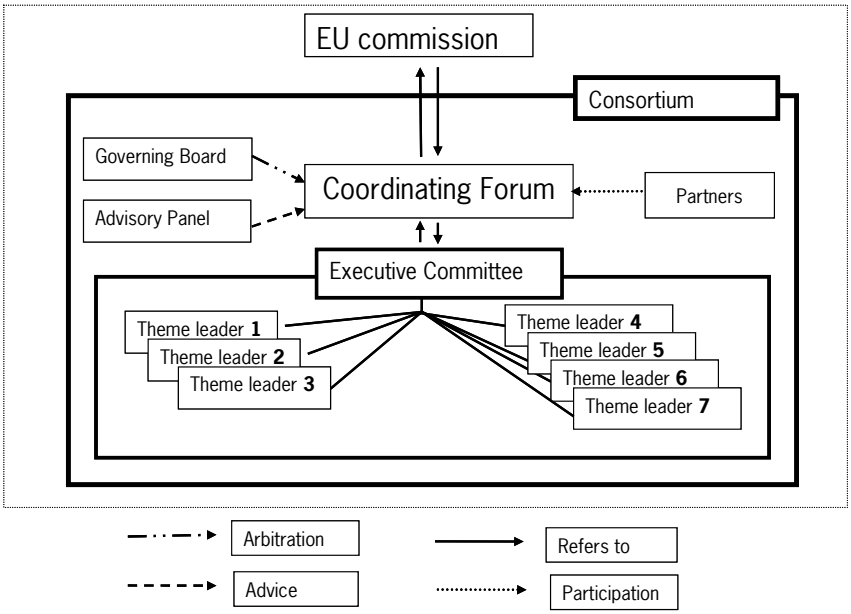

Figure 2 Organisational structure of EPIZONE

Theme 1 "Structure and Management", led by the Coordinator's representatives, is responsible for the administrative and financial aspects of the network, including the development and implementation of the management structure.
A significant proportion of the first year's activities was associated with the development of procedures, processes of the project finances and reporting, and support to the new collaborations within and between the themes and the Work Packages. Further, administrative tasks of the Coordinating Forum was supported.

Theme 2 "Strategic Integration", is responsible for the effective and strategic integration of the scientific research activities of the network. This includes scientific coordination and strategic planning, shared resources, and expertise development (WP2.1, WP2.2 and WP2.3)
An outline for a five-year strategic research plan was established. To include all major epizootic diseases and to cover unmet research needs, an inventory was made to list major epizootic diseases, and internal discussions were organised. Results from these activities were taken into account for the coming Joint Programmes of Activities. Integration of existing and fragmented knowledge will affect synergistically on progress in research on epizootic diseases. Accessibility of collections of samples and laboratory materials will result in the same and for this purpose, inventories of reference materials were organised. For Classical swine fever and African swine fever this information will be made accessible to all the partners in web-based databases shortly. For Blue tongue, Avian influenza and Food-and mouth disease actions were initiated in the first year. Cooperation between and meetings of scientists, thereby developing expertise within EPIZONE, was facilitated by the network. Another possibility of integration, exchanges of scientists, was stimulated by organisation of short term missions and training courses.
The broadest way of supporting integration on the level of scientists was the organization of the 1st Annual Meeting of EPIZONE "EPIZONE INSIDE OUT". This meeting, held at the National Veterinary Research Institute in Lublin and Pulawy in Poland, provided an ideal opportunity for networking and was judged a great success by EPIZONE partners, members of the Governing Board as well as the External Advisory Panel.

Theme 3 "Spreading Excellence" aims to spread knowledge within and outside EPIZONE. Two Work Packages have been included, 'Communication' (WP3.1) and 'Education" (WP3.2).
"Communication" has built a private and public website for internal and external communication purposes, and published a quarterly newsletter as a more active information source. For recognition of EPIZONE, visual guidelines and publicity material, including brochures and posters, became available. "Education" has supported a workshop on Influenza, held in Italy in June 2007. In addition, inventories of existing distance learning systems and education activities has been made. A dedicated web-page with web-links sorted by disciplines has been created, and a catalogue of available education activities will follow in the next year.

Theme 4 "Diagnostics" includes four Work Packages in the field of diagnosis of epizootic diseases; 'real-time PCR diagnostics' (WP4.1), DNA-chip-based diagnostics' (WP4.2), 'DIVA-diagnostics' (WP4.3), and 'Pen-side tests for antigen and genome detection' (WP4.4).
Prevention and control of epizootic diseases starts with the detection of infected animals. In recent years, a new generation of diagnostic tests became available, however, it is obvious that these new diagnostic tools needs further optimizing, extensive validation, broad harmonisation and acceptance. DIVA vaccines (DIVA=differentiation of infected from vaccinated animals) in combination with DIVA diagnostics create new control strategies for epizootics. Development of so-called pen-side assays is progressing very fast. Use of these for epizootics, in particular for notifiable diseases, is under discussion.
Novel molecular diagnostics in the different institutions was collected and evaluated. A review about real-time PCR diagnostics for Foot-and-mouth disease virus, Avian influenza virus, New castle disease virus, Classical swine fever virus and Bluetongue virus will be published. Availability of DIVA diagnostic systems was reviewed too. Awareness of new control strategies by the DIVA principle to people involved in crisis management was realized, and supported by a FMD-workshop on DIVA diagnostics in collaboration with two other European Union (EU) funded projects (CA-FMD-CSF and FAO EUFMD). Another new development is that of pen-side diagnostics. Experts agreed that the state of the art showed that these must not be applied in the absence of confirmatory tests. A first generation of these rapid pen-side tests (e.g. for Avian influenza) are under extensive validation. Diagnostic tools will support or confirm clinical diagnosis. DNA-chip-diagnostics aims to design a dedicated DNA chips for accurate sub-typing of important epizootic viruses, or for discovery/detection of unknown viruses causing disease by a pan viral DNA chip.

Theme 5 "Intervention Strategies" aims to improve control of epizootic diseases in Europe by integrating research divided in four Work Packages. These includes 'Vaccine Technologies' (WP5.1), 'Host responses to infection' (WP5.2), 'Adjuvants and immunomodulators' (WP5.3), 'Antivirals' (WP5.4).
Development of effective intervention strategies is a huge task and require integration of research in all of these areas. To achieve this, joint meetings of WPs have been organized as face-to-face meetings in combination with EPIZONE meetings (e.g. the Annual meeting), as additional meetings or teleconferences. This personal contact between participants was established to spread existing knowledge, to collect all expertise, and to share information on reagents and protocols available. This information will be incorporated in two databases, one for expertises and one for protocols. Development of these databases has taken place by consultation within the Database user forum of EPIZONE. In order to translate these mainly inventorial actions to integrated research activities, all participants have contributed to the development of a plan for integrating activities in Theme 5 which will be implemented in the next Joint Program of Activities.

Theme 6 "Surveillance and Epidemiology" will harmonise, standardise, improve, and develop efficient surveillance as well as optimised methods to investigate the epidemiology of epizootic diseases. This theme include 'Surveillance and Epidemiology of Emerging Viral Diseases in Aquaculture" (WP6.1), 'Field Epidemiology and Surveillance of Avian influenza and Avian paramyxovirus (WP6.2), 'Experimental Epidemiology' (WP6.3), and 'Molecular epidemiology' (WP6.4).

For aquaculture, progress is made on surveillance and epidemiology of Viral haemorrhagic septicaemia virus, Infectious haematopoietic necrosis virus, and Koi Herpes Virus, varying from options for implementing Geographic Information System (GIS), harmonization of methods for diagnosis and sequencing to sharing information of isolates and newly developed methods by databases. For Avian influenza and Avian paramyxovirus progress has made to improve and harmonise EU surveillance programs. Further, a sequence database 'FLUZONE' for AI and 'PARAZONE' for Avian paramyxovirus, including that of isolates in the repositories of partner laboratories, will be established shortly. 'Molecular epidemiology' include Foot and mouth disease, Swine fevers, Rinderpest, Peste des petits ruminants, Blue tongue, Rift valley fever and also bacterial diseases such as e.g. Contagious bovine pleuropneumonia to study genetic relationships between pathogens. To support this, two web-based molecular epidemiology servers are included. The experience with these two servers has been shared. Future molecular epidemiology web-servers should be constructed with free software to ensure the durability of the databases and ease their management. In addition to "field epidemiology", transmission of disease can also be studied under experimental conditions. The emphasis of 'Experimental Epidemiology' is to get acquainted with and start the collection of the work of the different partners. Previously performed (transmission) experiments on Foot-and-mouth disease and Swine vesicular disease were exchanged and future research was discussed and planned as well as the modelling part of the work, the mathematical background, and some practical examples of models.

Theme 7 "Risk assessment" concentrates on standardisation (WP7.1) and the collection of appropriate data for use in risk assessments (WP7.2, WP7.3 and WP7.4), activities suited to the network approach rather than undertaking risk assessments per se.
The theme has established a network of risk assessors and scientists from 13 partner institutes interested in the risk of introduction of epizootic diseases into the EU. Still, risk assessment is a relatively small area of interest within EPIZONE. It is however very important; standardised and transparent methods must be used for risk based surveillance and control of epizootic diseases on EU-level. A workshop on this tool will be planned for the next Joint Program of Activities to enable scientists from other disciplines to understand the fundamentals of risk assessment. This task needs a lot of communication as all kind of expertises are involved. Therefore a lot of meetings were organized to share and discuss progress. In addition, a workshop was organized to discuss requirements for an on-line database. Further, individual partner institutes were visited throughout the year to elicit probabilities on Classical swine fever diagnosis. A questionnaire has been designed by the network of experts to elicit opinion on the probabilities of introduction of diseases due to climate change, and will serve as the basis of a workshop during the second year.

A few months after the official start of EPIZONE, our network had to face the Bluetongue outbreak in North-West Europe in 2006. A first spin-off of EPIZONE became visible, as a very quick, direct cooperation and communication resulted in an effective and very helpful exchange of information to harmonise the control of this outbreak on EU level.