

Executive Summary EPIZONE year 3

During recent years the risk of entry of new infectious agents into the EU or spread within the EU has increased due to the rising number of people and animal movements across EU member states. In addition global warming is likely to increase the risk of spreading of arthropod borne diseases such as Bluetongue, African Horse Sickness, Crimean Congo haemorrhagic fever and West Nile Fever. Despite extensive control measures, several new epizootics have occurred over the last few years, including the introduction of BTV in Europe, the threat of Peste de Petit Ruminants from Morocco, and the introduction of New Influenza into Europe from Mexico. Innovative and rapid control strategies will be needed to combat these new epizootic disease outbreaks. EPIZONE aims to apply its integrated research activities to more rapidly develop new cost-effective prevention and control strategies, which will help to effectively combat epizootic diseases and reduce the social impact and costs of such diseases.

Mission and objectives

The mission of our Network of Excellence: EPIZONE is to 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.

This mission can be divided into four main objectives:

- 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

The activities of EPIZONE are based around a "Virtual Institute" concept. The "Institute" comprises 17 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), including over 300 acknowledged experts in animal diseases. 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. The partnership is supported by a legal Consortium Agreement.

List of participants

| | | | |
|---|----------------|--|-------------|
|  | NETHERLANDS | Central Veterinary Institute of Wageningen UR Lelystad, The Netherlands | (CVI) |
|  | GERMANY | Friedrich-Loeffler-Institute, | (FLI) |
|  | UNITED KINGDOM | Institute for Animal Health, | (IAH) |
|  | UNITED KINGDOM | Veterinary Laboratories Agency, | (VLA) |
|  | FRANCE | Agence Française de Sécurité Sanitaire des Aliments, | (AFSSA) |
|  | DENMARK | National Veterinary Institute, Technical University of Denmark | (DTU VET) |
|  | SWEDEN | Statens Veterinärmedicinska Anstalt, | (SVA) |
|  | FRANCE | Centre de coopération Internationale en Recherche Agronomique pour le Développement, | (CIRAD) |
|  | SPAIN | Center of Animal Health, National Institute for Agriculture and Food Research and Technology, | (CISA-INIA) |
|  | ITALY | Istituto Zooprofilattico Sperimentale delle Venezie, | (IZS-Ve) |
|  | CHINA | Lanzhou Veterinary Research Institute, | (LVRI) |
|  | POLAND | National Veterinary Research Institute, | (NVRI) |
|  | TURKEY | FMD Institute Ankara, | (SAP) |
|  | BELGIUM | Veterinary and Agrochemical Research centre, VAR-CODA-CERVA, | (VAR) |
|  | GERMANY | Hannover Veterinary School, | (HVS) |
|  | ITALY | Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna Brescia, | (IZSLER) |
|  | CHINA | Harbin Veterinary Research Institute, | (HVRI) |
|  | ITALY | Food and Agriculture Organization, | (FAO) |
|  | NETHERLANDS | Digital Value, | (DiVa) |

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Figure 1 Involved contractors and coordinator contact details

Organisational structure

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 and is led by a Theme leader assisted by a deputy Theme Leader, all are member of the Executive Committee. The Work Packages covering a certain expertise within each theme are led by a Work Package Leader

Governance is placed under a Coordinating Forum comprising representatives of all EPIZONE partners. The Coordinating Forum is supported by the administration bureau and the Management Advisory Board of four democratically elected representatives at director level from all partners. The administration bureau is the operational team responsible for both the administrative and financial obligations.

Scientific advice to network activities is provided by an External Advisory Panel comprising four international senior external scientists, including a representative of the OIE (World Organisation for Animal Health).

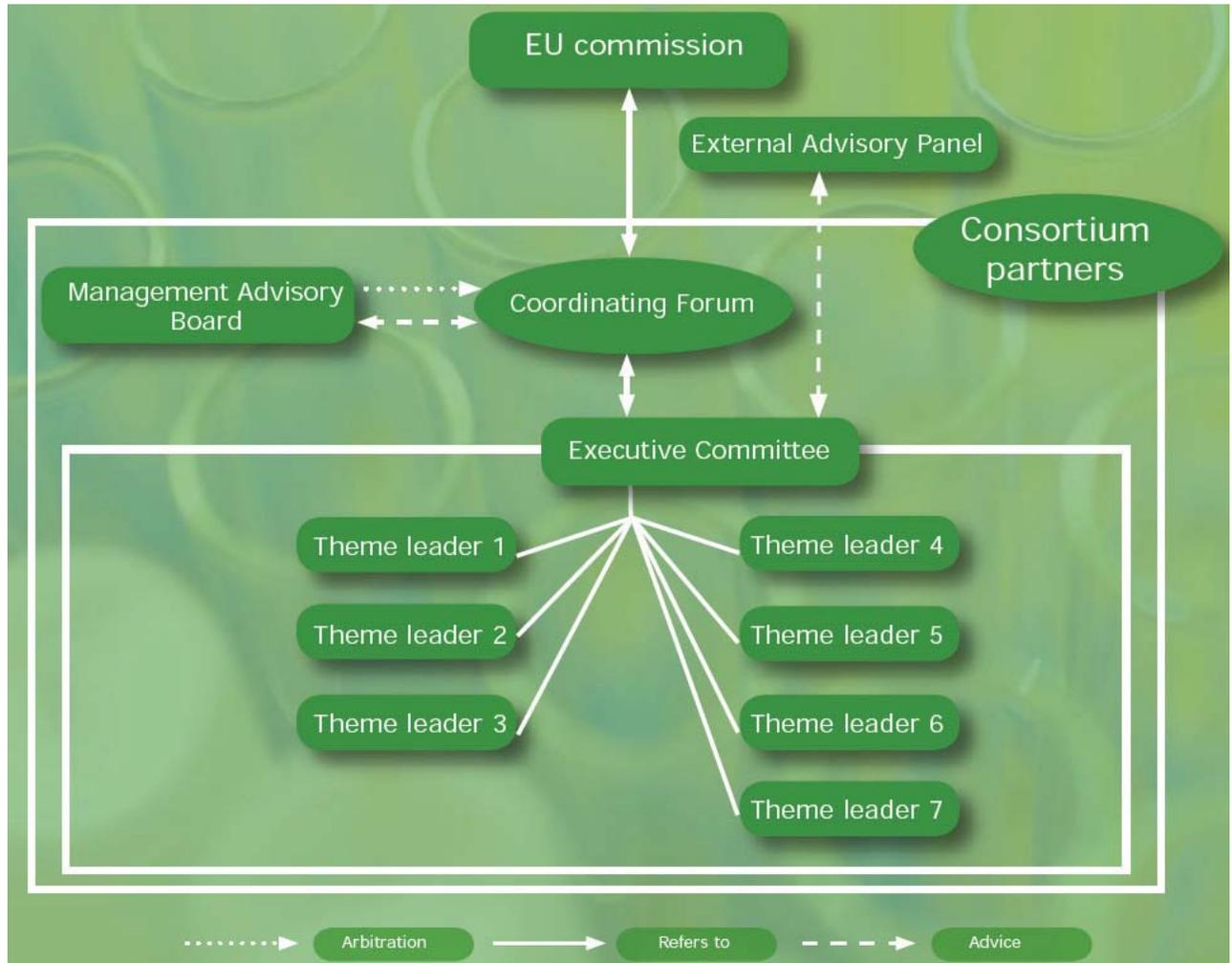


Figure 2 Organisational structure of EPIZONE

Within Theme 1 “Structure and Management”, WP1.1, “Virtual Institute”, focuses on the development and implementation of structured administrative and financial management of the network, and WP1.2 includes communication. During the third year of the network, management processes and procedures were optimized wherever appropriate and a hard closure of the financial budgets was installed to ensure the use of unspent budgets in the following period of the network. To raise the preparedness regarding Peste de Petit Ruminants after the outbreak in Morocco, a ring trial on PPRV detection was organised by CIRAD for EPIZONE institutes, financed from EPIZONE joint funds (WP1.1). Meetings of EPIZONE WPs, committees and boards continue to be very important for EPIZONE and therefore were facilitated again during the half yearly meeting in Lelystad (Jan 2009) and the EPIZONE 3rd annual meeting in Antalya, Turkey. A first exploration was made regarding options for a sustainable structure for the network beyond the EU funded period. To improve the exposure of EPIZONE for its participants but also for its stakeholders and interested parties outside the network, the newsletter “EPIZONE update” was launched on the internal as well as the external website. Also

frequently asked questions (FAQ) were added to the websites to enhance the use of it (IC1.3).

Theme 2 Strategic Integration, is responsible for the effective and strategic integration of the scientific research activities of EPIZONE. This includes scientific coordination and strategic planning, and expertise development. To structure these activities a Strategic Research Plan (SRP) has been established. To secure the standards of EPIZONE outputs, the network has agreed on review procedures for proposals and reports which are available from the website.

Internal and external cooperation between scientists was facilitated through scientific missions and the EPIZONE 3rd annual meeting. Contacts with related (EU) projects were tightened during this meeting at which 10 such projects presented themselves. Moreover links with institutes, international organizations and stakeholders were improved through meetings and bilateral contacts. To integrate existing knowledge on collections of samples and laboratory materials and to make such resources accessible to partners, additional inventories on reference materials of major epizootic diseases were made.

For optimal use of its databases EPIZONE has established a database user forum to discuss and improve data base development and maintenance. Databases with information on cell lines, antibodies, clinical specimen of infected animals, and pictures of animal diseases have been established and made accessible through the EPIZONE website (this includes CSFV, ASFV, AI and BTV).

Theme 3 is responsible for spreading excellence within and outside the network. Training and

workshop activities were continued in year 3 by the organisation of a workshop on swine disease in China (July 2008) and another workshop on biorisk management at laboratory level in April 2009. The increased success of the short-term trainings was confirmed in year 3 with eleven short-term trainings sponsored for 13 EPIZONE members. The average duration of these trainings were 4 weeks and eight institutions were the beneficiaries of these short-term training missions. E-distance learning programmes were launched for 9 persons on "Veterinary epidemiology and animal health" and "Introduction on quantitative risk assessment". In the first year of Young EPIZONE, rapid and interesting results were achieved owing to the high commitment, dynamism and enthusiasm of its members. They have gathered over 100 members, organised 3 meetings with guest speakers from industry, research institutes and governmental institutions and prepared several posters, web pages and workshops.

In Theme 4 "Diagnostics", all four working packages could achieve a clear progress in harmonization of methods or detection techniques as well as in development and distribution of reference materials, and networking between the working group members was further enhanced. In WP4.1 all partners were part of numerous real-time RT-PCR ring trials (e.g. for PPR, BTV, AIV, NDV), a common review article on real-time PCRs for 5 selected epizootic diseases was published, and several "EPIZONE Reference RNA" panels were distributed and will be also used as common theme 4 control materials. In WP4.2 the finalized "EPIZONE Chip" for pan-viral detection was distributed to the partners and tested during a workshop. Furthermore, easy-to-use sub-typing chip systems were published. A web server with microarray software will allow sharing of data and analysis within the network. In WP4.3 the different partners worked together in validating commercially available (marker) ELISAs (e.g. for CSFV) as well as in determining new marker detection methods like "genetic DIVA", and the important collaboration with theme 5 in "vaccine technologies" was further intensified. In WP4.4, the working group explored all together the use of isothermal methods and LFDs for the fast and easy

amplification and detection of nucleic acids, and a number of assays have been developed or assessed. Furthermore, novel detection systems were evaluated and presented to all EPIZONE partners e.g. for “pen-site” detection of FMDV.

The aims in Theme 5 Intervention strategies are to share knowledge and expertise, implement standardised protocols, share reagents and develop novel joint strategies to improve disease control by Intervention Strategies. A meeting, organised by CISA/INIA in El Escorial near Madrid in October, was attended by 50 participants from 10 partners and 15 participants from Young EPIZONE. This included offered presentations, keynote talks and discussions amongst core working groups on BTV, ASFV and RVFV and individual WPs. A review on “Antigen delivery systems for veterinary vaccine development: Viral-vector based delivery systems” was published in the high impact Vaccine Journal and includes authors from 7 partners. Samples from two joint animal experiments, to test different strategies for ASFV vaccination were further analysed. Information on the use of microarrays and RT PCR to study host transcriptional responses to infection has been shared in WP5.2. An Internal Call (IC5.5) has generated new monoclonal antibodies for bovine and porcine immune response proteins. These reagents will be distributed to different partners. Participants in WP5.3, Adjuvants and Immunomodulators, provide expert input into the use of adjuvants in vaccination experiments. A further focus has been the development of liposomes and other methods for delivery of molecules and genes in large animals and fish. In WP 5.4 a harmonised approach to test antivirals, moving from studies in cell culture to in vivo studies in animals, is being developed. Traditional small molecule antivirals as well as silencing RNAs to inhibit virus replication are being evaluated. In vivo experiments to test small molecule inhibitors of CSFV and siRNAs targeted against PPRV were carried out.

Theme 6 Surveillance and Epidemiology The aim of this theme is to harmonise, standardise, improve, and develop efficient surveillance programmes as well as optimised methods to investigate the epidemiology of epizootic diseases. For aquaculture in WP6.1, progress is made on surveillance and epidemiology of Viral haemorrhagic septicaemia virus, Infectious haematopoietic necrosis virus, and Koi Herpes Virus, varying from 8 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 viruses and Avian paramyxoviruses (WP6.2) progress has made to improve and harmonise EU surveillance programs. Further, a sequence database ‘FLUZONE’ for Avian Influenza and ‘PARAZONE’ for Avian paramyxovirus, including that of isolates in the repositories of partner laboratories, will be established shortly. In addition to “field epidemiology”, transmission of disease can also be studied under experimental conditions. In WP6.3 this year led to inputs into improved design of transmission experiments not only through collaboration between partners and the distribution and sharing of conducted experiments, but also through interdisciplinary close collaboration between virologists and modellers. This increases the understanding how data is generated through the experiments and is used in transmission models.

WP6.4 ‘Molecular epidemiology’ has focussed on standardization and harmonisation of molecular epidemiology analysis including 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 were included. Extra in theme 6 and this year were 2 one year (internal call) projects, IC 6.5 ‘WILDSURV Harmonization’ has used questionnaires for inventories of running wildlife surveillance programmes for classical swine fever virus in wild boar and for lyssavirus (rabies virus) in foxes,

raccoon dogs and bats. An optimized lyssavirus surveillance protocol for bats and a draft surveillance protocol for classical swine fever virus in wild boar have been made. To enhance harmonisation of wildlife surveillance programs for classical rabies in foxes and raccoon dogs a number of recommendations will be forwarded to the recently started EFSA project group on rabies monitoring in wildlife. In IC6.6 'BTV epidemiology' a major achievement was a shared database with outbreak data of Bluetongue virus serotype 8 from Belgium, France, Luxembourg, Germany and the Netherlands. All outbreak data (2006 and 2007) were analysed for those 5 countries including a detailed spatio-temporal risk factor analysis for 2006 and a time-space descriptive study for 2007. Additionally, risk maps were generated for the infected region under study as well as for each country separately. Existing surveillance programmes were evaluated. The scientific results of this project was presented and discussed at the 3rd Annual EPIZONE Meeting during a satellite symposium.

Theme 7 Risk Assessment focuses on advancing the discipline of risk assessment through the standardisation of methods and the collection of appropriate data. To assess the need for standardization of animal and animal product import risk assessments, WP 7.1 reviewed and characterized existing assessments. The quality of the risk assessments was quantitatively rated based on peer review and quality audit guidelines. The results showed that a substantial proportion of the reviewed risk assessments failed to comply with international guidelines. WP 7.1 will help to improve the format of risk assessments and to bring the guidelines for preparing risk assessments into accordance with the needs of the authorities asking for such risk assessments. Work package 7.2 builds a European Online Data Base on Epizootic Diseases using a standard data set. The data base can retrieve surveillance data from existing national data bases, link the information on pathogens to sequence data bases and incorporate all data into a geographic information system. Work package 7.3 evaluates an electronic tool that helps to assess the risk of classical swine fever being present in a herd. In WP7.4 experts identify and prioritise potential disease threats to Europe as a result of changing environments and visualise them using a geographic information system. The results should allow predictions on emerging animal diseases in the next decades.