



## **Executive Summary EPIZONE year 2**

It is generally believed that the risk for livestock in Europe increases by factors as intensified international trade and movements of animals, global travel, global warming and intensified contacts between livestock and exotic pathogens. Further, expansion of Europe could influence the overall health status of European livestock. Despite extensive control measures, several introductions of epizootic diseases have been reported in the last decade. Recently introductions of exotic diseases like bluetongue and African swine fever followed by a fast expansion of the infected area has been reported in colder regions of Europe. Effective control measures will be needed to avoid a definitive establishment in European production animals. Overwintering of Bluetongue serotype 8, the expansion of Bluetongue serotype 1 in France and Spain, and that of Crimean Congo haemorrhagic fever in Turkey demonstrate that the list of possible treats for European livestock can hardly be overseen. These formerly exotic diseases remain a serious treat for the entire chain of animal-related food production, from farmers, international traders, to consumers. Well known epizootic diseases, like PRRS, causing limited but serious losses could change into outbreaks with enormous production losses by new variants of PRRSV as reported recently in China. This demonstrates that endemic diseases could also be a serious treat for livestock.

### 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 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 are member of the Executive Committee.

Governance is provided by the Coordinating Forum comprising representatives of all EPIZONE partners. The Coordinating Forum is supported by the administration bureau and the

Management Advisory Board of five democratically elected representatives at director level from all partners. The administration bureau is the operational team responsible for both the administrative and financial obligations. 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).

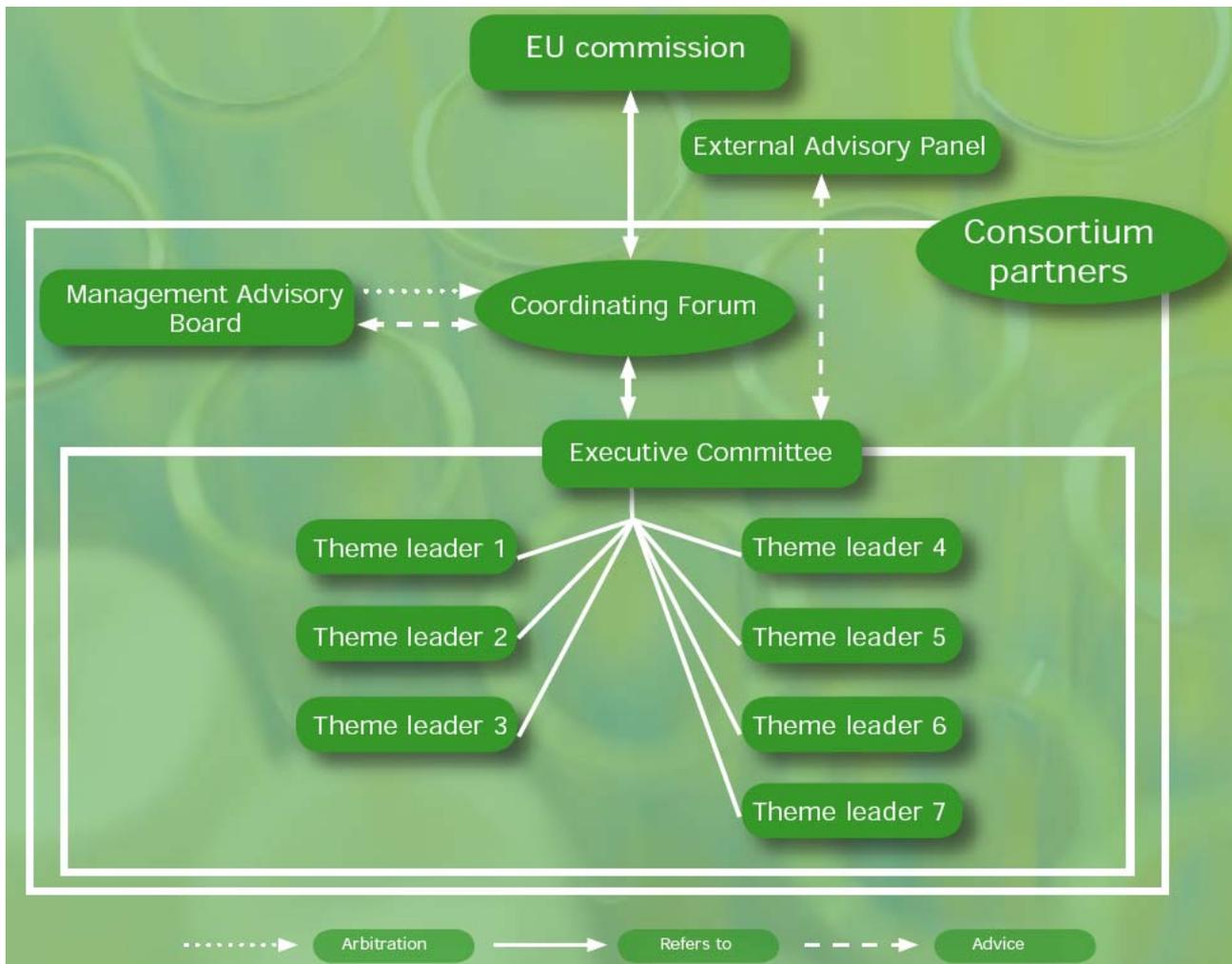


Figure 2 Organisational structure of EPIZONE

In Theme 1 "Structure and Management" WP1.1. is led by the Coordinator and is responsible for the administrative and financial aspects of the network, including the development and implementation of the management structure. The second year's activities were mainly associated with the improvement of management processes and procedures and the first initiatives associated to the sustainability of the network. Therefore "Young EPIZONE" is launched. Young EPIZONE aims at creating a network within EPIZONE, dedicated to PhD students and post-docs (<5 years after PhD graduation). Monitoring and support of collaborations within and between the themes and the work packages is a continuing task of Theme 1. To stimulate this a call for internal scientific proposals was launched and the half yearly management meeting was organised in Lelystad in January 2008. To enhance the exposure of EPIZONE to involved parties and stakeholders WP1.2 Communication focussed on external communication this year. In particular the communication for the second 2<sup>nd</sup> Annual Meeting and the Bluetongue satellite Symposium, both open for internal and external delegates.

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. A major task of the network currently is to establish an outline for a strategic research plan (SRP) and to watch over the standards of EPIZONE

outputs. Therefore review procedures for proposals and reports have been written. Internal and external cooperation between scientists was facilitated through scientific meetings as the annual meeting in Brescia and scientific missions. Contacts were established with external collaborators (i.e. EDEN) and connections with institutes, international organisations and stakeholders were improved. To integrate existing knowledge on collections of samples and laboratory materials and to make such resources accessible to partners, inventories on reference materials of major epidemic diseases were further enlarged. For CSFV, ASFV, AI and BTV a lot of this information is now accessible to all the partners through the EPIZONE website.

Theme 3 is responsible for spreading excellence within and outside the network. Training and workshop activities were continued in year 2 by the organisation of 2 workshops on Influenza, one organised in June 2007 by IZS-Ve and one laboratory-based held in Montpellier in July 2007 and co-organised by CIRAD and IZS-Ve, with laboratory staff from African countries. In Brescia the Bluetongue satellite symposium was a great success. Seven short-term trainings were sponsored for 8 EPIZONE members. Five institutions were the beneficiaries of these short-term training missions. Regarding education, progress was done on the constitution of a core group for the definition of an integrated offer on an international master specialised on epizootic diseases. This group which involves Universities has met in April 2008. An action plan was decided during this meeting and should hopefully come to a formal agreement between EPIZONE partners and Universities by the end of this year.

In Theme 4 "Diagnostics", the second project year was especially used to focus on the interaction and networking of the partner institutes.

Therefore, within WP 4.1 several activities for harmonization and standardization of real-time RT-PCR assays for FMDV, CSFV, AIV, NDV and BTV were performed. A ring trial succeeded in the optimization of CSFV-specific real-time RT-PCR diagnostics in the EU. Laboratories with a sub-optimal protocol changed to the highly sensitive and specific standard method or improved their own protocol. Reference material for PCR validation was produced, and a first CSFV-RNA-reference panel was distributed. This so-called "EPIZONE REFERENCE RNA PANEL CSFV" can be used by all EPIZONE partners for a further harmonization of CSFV real-time PCR diagnostics (WP4.1), DNA-Chip diagnostics (WP4.2) as well as pen-side testing (WP4.4) and is a perfect example for interaction also between the WPs in theme 4. In WP4.2 "DNA chip", design of a unique pan viral DNA chip and DNA chips for accurate sub-typing of important epizootic viruses were finished as a complementary approach of the different WP partners. A combined "EPIZONE Pan Viral DNA Chip" is under evaluation and will be tested during workshops and in a ring trial. In WP4.3 "DIVA Diagnostics", two workshops were conducted for CVO's, laboratory diagnosticians and epidemiologist. Both workshops, gave a unique opportunity to discuss national and international challenges and solutions in the use of FMDV marker assays. Also available information on DIVA diagnostics in CSFV, FMDV and HPAI were collected in three different reviews. Finally, in WP4.4 "pen-side tests" the interaction of experts of EPIZONE in that field was enhanced and the different methods and experiences of the different groups were exchanged and discussed. As a main result, the loop mediated amplification methods appear to be emerging as a front-runner and focal point for further investigation by the EPIZONE partners. In addition it was considered useful to include the participation of commercial partners in the area of point of care testing in discussions.

The aims in Theme 5 Intervention strategies were to continue joint activities already started and initiate new joint activities. Meetings between participants of all WPs in Theme 5 were organised by FLI in October 2007, and at the Annual EPIZONE meeting. Planning and review of progress was also discussed by WP and TLs at 2 additional meetings. Two review articles have been written and will be submitted for publication, one by WP5.1 participants on, "Antigen delivery systems for veterinary vaccines" and one by WP 5.3 participants on " Adjuvants and immunomodulators in large animals". Working groups set up in each WP based on either specific diseases or technologies have continued to coordinate projects to standardise protocols and share expertise and reagents. The ASFV group has organised two joint vaccine experiments using funding from other projects and including expertise from different partners. A BTV discussion group has been established and so far information on research activities collected and a plan for future joint activities prepared. All 4 WPs contribute to these

experiments. Together with WP 4.3 a review of DIVA vaccination strategies has been prepared. Contacts have been made with external organisations (Galvmed and ETPGAH) and with companies involved in vaccine development.

#### Theme 6 Surveillance and Epidemiology

For aquaculture in WP6.1, progress has been made on surveillance and epidemiology of viral haemorrhagic septicaemia virus, infectious haematopoietic necrosis virus, and Koi herpes virus, the latter is a rapid emerging disease in EU. Emphasis is made on the generation of quantitative data of disease situation in EU and implementation of Geographical information system (GIS), molecular epidemiology, emerging diseases and serology. The establishment of a GIS for aquaculture and the collection of quantitative data on the notifiable diseases by veterinary scientists will, together with disease modelling capabilities, provide new concepts for disease monitoring. For avian influenza (AI) in WP6.2 sequencing protocols of partner institutes were collated and distributed among partners for comparison. Sequencing data generated from the involved partners was integrated into the database GISAID (Global Initiative on Sharing Avian Influenza Data) that will be served and used by the international community beyond the EPIZONE network and also include stakeholders from related fields and that through the provided data will increase the insight into the epidemiology of AI.

Transmission of a disease can also be studied under experimental conditions. Work conducted 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. A paper on meta-analysis of transmission parameters was published in peer reviewed journal and a further paper is in preparation. In WP6.4 molecular epidemiology is studying genetic relationships between pathogens (including foot-and-mouth disease, swine vesicular disease, swine fevers, rinderpest, peste des petits ruminants, bluetongue, Rift Valley fever and also bacterial and mycoplasmal diseases such as e.g. contagious bovine pleuropneumonia). To support this, two web-based molecular epidemiology servers are being developed.

Theme 7 Risk Assessment focuses on advancing the discipline of risk assessment through the standardisation of methods and the collection of appropriate data. Despite the availability of the OIE and EFSA guidelines, there remain differences in the approaches used by organisations, and different countries within Europe, when undertaking risk assessments. In addition, criteria for determining whether or not data are appropriate for risk assessments do not exist. The aim of this theme is to promote common approaches as well as encouraging collaboration between scientists from all disciplines to generate useful risk assessment data. To assess the need for standardization of animal and animal product import risk assessments WP 7.1 reviewed and characterized existing assessments using a template that was jointly developed by the WP participants. The quality of the risk assessments was quantitatively rated based on risk assessment peer review and quality audit guidelines. The results will help to improve and standardize the format of risk assessments and to bring the guidelines for preparing risk assessments into accord with the needs of the authorities that ask for risk assessments.

Work package 7.2 builds a European Online Data Base on Epizootic Diseases using a standard data set defined by the partners of the work package. The data base succeed in developing a way to retrieve surveillance data (diagnostic results for diseased and non-diseased) animals from existing national data bases, link the information on the pathogens isolated from cases to sequence data bases and incorporate all data into a geographic information system. Work package 7.3 evaluates a technical aid that helps to assess the risk that classical swine fever is present in a herd. The results represent a big step forward towards to feeding the electronic tool with the field data required to detect classical swine fever in affected farms in different countries. In WP7.4 experts are consulted to identify and prioritise potential disease threats to Europe as a result of changing environments. An expert opinion workshop was held where a questionnaire based on a qualitative risk assessment framework was used to obtain data to assess the impact of climate change on the risks of incursion of vector-borne livestock viruses into the EU. The results of the expert opinion workshop allow predictions on emerging animal diseases in the next decades.