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Project acronym: CA FMD-CSF

Project title: Coordination Action for FMD and CSF

Instrument: Coordination Action

Thematic Priority: 8.1 Integrating and Strengthening the European Research Area

Final Scientific Report
D-WP11-1c

Period covered: from 1 January 2005 to 30 June 2008
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Start date of project: 1 January 2005
Duration: 42 months
Project coordinator name: David Paton
Project coordinator organisation name: Institute for Animal Health, Pirbright, UK
Revision: [draft 1]
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Coordination Action for FMD and CSF

Executive Summary

The aim of this coordination action is to gather and share information relevant to the control of two of the most important diseases notifiable to the OIE – foot-and-mouth disease (FMD) and classical swine fever (CSF), both of which have caused devastating outbreaks of disease in Europe and continue to pose serious threats to our livestock industries. This project will promote the efforts of the network of national reference laboratories (NRL) for these diseases by focusing on the coordination, further development and improvement of research, global disease surveillance, risk analysis, vaccine reserves, diagnostic and wild boar issues, laboratory preparedness, eradication strategies and capacity building in European expertise through network resources, consultations, and information exchange on technical issues. General information on the project may be accessed on the project archive site, http://www.foot-and-mouth.org/fmd-csf-ca. [now offline].

This is the final scientific report of the three year project that started in January 2005 and, having granted an extension in time, ended in June 2008. Data collected from information gathering surveys on current research, global disease surveillance, risk research, vaccine reserves, laboratory contingency planning, issues of CSF in wild boar and disease control experiences were analysed and appear in reports from the individual workpackages that are available on the website mentioned previously and provided as links in this report. Several networks and collaborative working groups have been formed as a result of coordination activities notably the OIE/FAO Reference Laboratories Network for FMD and the Vaccine banks Network for FMD.

Significant outputs were gained from international meetings on ‘Coordination of FMD Research’ and ‘Future needs and goals of CSF research’ organised by the CA. Discussions about current research efforts pointed out the specific gaps in research and funding support, the usefulness of global FMD research coordination and forum. To be mindful of the needs of less developed countries, mainly poverty alleviation was reiterated. Gaps in CSF research and current countermeasures were discussed in an EU/USA context. The benefits of international discussion forum were highlighted here as well and both meetings made sets of recommendations on diagnostics, harmonization, vaccines, antivirals, epidemiology and basic research. CA Partners, funded in part by the CA, activity participated in the Global FMD Research Alliance (GFRA), EPIZONE and other international projects.

The paper, ‘Epidemiological surveillance for foot-and-mouth disease: Current status and future strategy’ details the current resources and knowledge on global FMD surveillance. It details gaps in epidemiological data and the conditions required for change; and strategies to improve global coverage are also suggested. One of the
recommendations is to increase and extend collaboration between existing surveillance organizations and to create new international surveillance networks. This project has been instrumental in the creation and sustenance of the OIE/FAO FMD Reference Laboratory Network. Through it and with support from the FAO and OIE participation of this group has increased and joint harmonization, collaboration, cooperation and coordination activities are ongoing. An interactive website, [http://www.foot-and-mouth.org](http://www.foot-and-mouth.org), hosts the ‘Reference Laboratories Information System’, ReLaIS that is a communications tool for this network. It is an information hub and a platform for information exchange that can directly link to the OIE and FAO information systems such as EMPRESi (FAO), WAHIS (OIE) and eventually GLEWS (OIE/FAO/WHO).

The Community Reference Laboratories (CRL) for CSF (TiHo) and FMD (IAH) are participants of this CA and have leading roles in the function of networks of European National Laboratories (NRL). Quality Assurance (QA) in diagnostic testing and reference standards have been discussed in detail at several meetings and recommendations from these will lead to updates of the OIE Diagnostic Manual of Standards. Laboratory compliance and accreditation to the ISO 17025 standard is an ongoing effort for many NRLs. The importance of QA/QC systems for laboratories that certify disease absence and the use certified diagnostic tests that are monitored and evaluated by continuous quality control was the subject of a workshop on the design and analysis of diagnostic test evaluation. Inter-laboratory comparative test exercises on serology and virological assays for FMD have been done as part of the FAO Collaborative Studies for FMD Standardisation.

Workshops on the ‘Design and interpretation of post Foot-and-Mouth Disease-vaccination serosurveillance by NSP tests’ that separately covered scenarios likely to be encountered in Western Europe, Balkan and Mediterranean regions and Baltic and Scandinavian regions. Conclusions and recommendations resulting from these will be a basis for the revision of EU Directive 2003/85/E on FMD vaccination serosurveillance.

A network of Vaccine Banks has been initiated with the support of vaccine bank managers (worldwide) that participated in a workshop held at Pirbright in April 2006. A draft Terms of Reference (TOR) that provides guidance for coordinated activities is under consultation. The key benefit from this network would be the possible formation of a virtual ‘global’ vaccine bank that could potentially provide further emergency backup with vaccine or antigen from another member’s reserves. The participation of commercial companies in this network is planned and crucial.

Generic, EU-oriented laboratory contingency plan (LCP) for FMD and CSF, one for each disease, have been produced and are freely available. They are aids to laboratories to produce their own LCPs. Some laboratories have conducted simulation exercises to test their LCPs and the CSF LCP includes guidelines for conducting simulation exercises.

The problems of CSF in wild boar and vaccination against CSF of wild boar were discussed at several meetings and workshops organised or attended by members of this
WP. These were multidisciplinary meetings some held in co-operation with the EU-funded STREP project “CSF Vaccine and Wild Boar” (e.g. ecologists, virologists, epidemiologists, population biologists) that considered current knowledge, gaps and actions to remedy these shortcomings. Research co-operations, mechanisms for data exchange, models for population dynamics and work towards a decision support system for game management were agreed.

Disease control strategies for CSF and recent FMD control experiences were reviewed. Stakeholders that are in one way or the other involved in control and eradication of CSF, and have a specific interest in the consequences that the use of vaccines may have gathered together in a workshop that discussed the performance of vaccines for eradication, evaluation of such interventions and retail and consumer perceptions of vaccinated meat. Workshop ‘Implementation of Emergency Vaccination programmes in Livestock’ bring together practical experience, theoretical knowledge and lessons learnt from within and outside Europe on technical issues associated with vaccine delivery for a range of infectious diseases of livestock. It was also used as an opportunity to identify gaps which need to be filled to ensure optimal future preparedness for the implementation of emergency vaccination programmes (EVPs).

Communications with stakeholders was enhanced with two information dissemination workshops: ‘Disease Control Workshop: Stakeholders’ Interests in the use of Science/Technology and Decision Making’ and ‘The future of science-based prevention and control of transboundary animal diseases’. A permanent project and general information source is incorporated into the (Reference Laboratories Information System, ReLaIS) for FMD. Information on CSF is available from the CSF CRL. Dissemination activities include presentations from project partners at scientific meetings and symposia, project promotion at various stakeholder meetings and participation in other EU projects.

John Bashiruddin
December 2008
## List of Participants

<table>
<thead>
<tr>
<th>Participant Role*</th>
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<td>United Kingdom</td>
</tr>
<tr>
<td>CR</td>
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<td>Institute of Virology</td>
<td>TiHo</td>
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<td>Office International des Epizooties</td>
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<td>CODA</td>
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<td>CR</td>
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<td>Centraal Instituut Dierziekte Controle Lelystad</td>
<td>CIDC</td>
<td>Netherlands</td>
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<tr>
<td>CR</td>
<td>10</td>
<td>Friedrich Loeffler Institute</td>
<td>FLI</td>
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<td>CR</td>
<td>11</td>
<td>Agence Francaise de Securite Sanitaire des Aliments – Alfort</td>
<td>AFSSA</td>
<td>France</td>
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*CO = Coordinator  
CR = Contractor
Coordination Action for FMD and CSF

Section 1

Project objectives and major achievements during the project period with particular emphasis of the last 18 months

Task and strategic objectives addressed

FP6-2003-SSP-3: 8.1.B.1.4 “New and more environment friendly production methods to improve animal health and welfare, including research on animal diseases such as foot and mouth disease, swine fever and development of marker vaccines.”

Task 1 “Reinforcement of the European networks of community and national reference laboratories and other key research laboratories for infectious diseases included in list-A of the OIE.”

Scientific and Technical Objectives

To strengthen and coordinate existing initiatives for collaborative actions involving:

• The Community Reference Laboratory/National Reference Laboratories network
• The Research Group of FAO’s European Commission for the Control of FMD
• The network of reference laboratories of the Office International des Epizooties
• Other international stakeholders involved in FMD and CSF research

To initiate new collaborative action on:

• Research activities and needs;
• Global surveillance and risk management/research;
• Diagnostic harmonisation and laboratory preparedness;
• Vaccine / antigen banks;
• The problem of CSF in wild boar;
• Refinement of disease management and control options;

To provide:

• D-WP1-1a Inventory of FMD research/programmes/projects/orientations and time-table of expected outputs of identified projects, constraints to uptake.
• D-WP1-2a Inventory of CSF research/programmes/projects/orientations and time-table of expected outputs of identified projects, constraints to uptake.
• D-WP1-3 Workshop for selected RTD programme managers to identify policy objectives and orientations.
• D-WP1-4 Report: Policy objectives and orientations of the major national/international funding bodies.
• D-WP2-1 Position paper on current surveillance and strategy paper on surveillance needs (FMD & CSF).
• D-WP2-2 Agreement reached on collaborative activities of reference laboratories (FMD&CSF).
• D-WP3-1 Workshop (around month 6) and report on European animal health risk research (experts, institutions, themes, gaps, priorities, action points) and review of existing risk models for FMD and CSF introduction into EU.
• D-WP3-2 Workshop (around month 18) and report on global risk assessment for FMD and CSF and report of international workshop on global risk assessment for FMD and CSF virus circulation; overcoming the data gaps.
• D-WP3-3 Workshop (around month 30) and progress reports to FMD and CSF conferences and paper on intelligence based surveillance for disease at ports and border inspection posts; problems and opportunities.
• D-WP3-4 Website of links to relevant risk research databases, information sources, tools.
• D-WP4-1 Inventory of owners, technical advisors and managers of FMD antigen/vaccine banks worldwide.
• D-WP4-2 Workshop on key issues and concerns shared by antigen/vaccine bank technical advisors and managers.
• D-WP4-3 Establish network communications and collaborative links between antigen/vaccine banks and expand network to include participants wishing to establish or participate in vaccine/antigen banks.
• D-WP4-4 Agreed standard protocols for testing and maintaining antigens/vaccines.
• D-WP5-1 Information gathering report on the developments in FMD diagnostic techniques, validation, quality control of FMD diagnostics and reference standards.
• D-WP5-2 Workshop on the developments in FMD diagnostic techniques, validation, quality control and reference standards.
• D-WP5-3 Information gathering report on new developments in CSF diagnostic techniques, validation, quality control of CSF diagnostics and reference standards.
• D-WP5-4 Agreement reached on diagnostic techniques and standards for FMD and CSF.
• D-WP6-1 A global report on the current status of laboratory contingency planning for FMD.
• D-WP6-2 A global report on the current status of laboratory contingency planning for CSF.
• D-WP6-3 The production of a manual for laboratory contingency planning against FMD.
• D-WP6-4 The production of a manual for laboratory contingency planning against CSF.
• D-WP7-1 Inventory of research programmes/projects dealing with CSF and eradication strategies in wild boar.
• D-WP7-2 Policy objectives and orientations of the major national/international regulatory bodies.
• D-WP7-3 Report of task force on long term prospects of control of CSF in wild boar.
• D-WP8-1a Inventory of real time exercises.
• D-WP8-2a Web-accessible inventory of recent FMD real time exercises.
• D-WP8-3 Best practise guidelines in application of emergency vaccination against FMD and CSF.
• D-WP8-4 CSF workshop for task 8.4 and subsequent report.
• D-WP8-5 Report of the working group; Future of FMD and CSF control, options and outlook.
• D-WP9-1 Inventory of key electronic links, key contributors, key stakeholders and needs assessment, options.
• D-WP9-2 Create and administer the restricted- and open-access websites, maintain development.
• D-WP9-3 Report.

To provide a management structure to improve the outputs from collaborative actions.

To involve stakeholders in the scientific and technical developments.
Major Scientific and Technical Achievements

Strengthening and coordination of existing initiatives

The IAH was designated FMD Community Reference Laboratory in 2006. The FMD CRL will liaise between the national laboratories of the Member States and to provide optimal methods for the diagnosis of foot-and-mouth disease in livestock; support the functions of National/Central Laboratories; provide information and carry out further training; perform experiments and field trials in consultation with the Commission directed towards an improved control of foot-and-mouth disease; and, review the contents of Annex XIII to Directive 2003/85/EC defining the tests and standards for foot-and-mouth disease diagnosis within the EU.

The OIE/FAO FMD Reference Laboratory Network was formed by the major OIE and FAO Reference laboratories worldwide. It is supported by EUFMD of FAO and OIE, which enhances this network to world-wide coverage and allows it to work towards global harmonisation with technology transfer on major issues of FMD control worldwide.

The Vaccine Banks Network that brings together managers of major FMD vaccine/antigen banks was formed. Present participants are Australia, New Zealand, EU, Canada, USA and Mexico and the United Kingdom.

A Community Reference Laboratory already exists for CSF and coordinates a network of European NRLs which has led to harmonisation of diagnostic methods, quality and proficiency monitoring and the production of an EC approved Diagnostic Manual.

Co-operations that extend the coordination have been made with other EU projects: STREP-project “CSF Vaccine and Wild Boar”, ETPGAH and EPIZONE. Thus existing networks for surveillance, diagnosis, control and research on FMD and CSF have been strengthened by this CA.

New collaborative actions

In 2008 participation from EU countries was enhanced in Global FMD Research alliance (GFRA) through this CA.

Scientific and Technical progress

Provision of Reports for 1 January 2007 to 30 June 2008:

- Annual meeting CSF, D-WP10-1b1, (19 January 2007)
- Annual meeting FMD, D-WP10-1b2, (19 January 2007)
- A global report on the current status of laboratory contingency planning for FMD, D-WP6-1a, (19 January 2007)
- A global report on the current status of laboratory contingency planning for CSF, D-WP6-2a, (19 January 2007)
- Proceedings of annual meeting CSF, D-WP10-2b1, (20 February 2007)
• Annual meeting CSF, D-WP10-1b1, (16 April 2007)
• Proceedings of annual meeting FMD, D-WP10-2b2, (16 April 2007)
• Annual scientific reports, D-WP11-1b, (08 June 2007)
• Annual financial statements, D-WP11-2b, (08 June 2007)
• Annual meeting CSF, D-WP10-1c1, (31 July 2007)
• Inventory of CSF research programmes/projects/orientations, D-WP1-2b, (21 January 2008)
• Inventory of research programmes/projects dealing with CSF and eradication strategies in wild boar, D-WP7-1b, (25 March 2008)
• Best practice guidelines in application of emergency vaccination against FMD and CSF, D-WP8-3, (25 March 2008)
• Inventory of practical control strategies, decision support models and expert consultation on selection and use, D-WP8-4, (21 April 2008)
• Agreement reached on diagnostic techniques and standards for FMD and CSF, D-WP5-4, (02 May 2008)
• Workshop on the developments in FMD diagnostic techniques, validation, quality control and reference standards, D-WP5-2, (incorporating D-WP5-1c), (02 May 2008)
• Workshop for selected RTD programme managers to identify policy objectives and orientations, D-WP1-3, (incorporating D-WP1-4, D-WP1-1b), (29 May 2008)
• Establish network communications and collaborative links between antigen/vaccine banks, D-WP4-3, (11 July 2008)
• Agreed standard protocols for testing and maintaining antigens/vaccines, D-WP4-4, (11 July 2008)
• Information gathering report on the developments in FMD diagnostic techniques, validation, QC, D-WP4-5, (11 July 2008)
• Proceedings of annual meeting CSF, D-WP10-2c1, (11 July 2008)
• D-WP10-extra, (11 July 2008)
• Information gathering report on new developments in CSF diagnostic techniques, validation, QC, D-WP5-3, (30 July 2008)
• Policy objectives and orientations of the major national/international regulatory bodies, D-WP7-2, (30 July 2008)
• Report of task force on long term prospects of control of CSF in wild boar, D-WP7-3, (30 July 2008)
• Workshop for selected RTD programme managers to identify policy objectives and orientations, D-WP1-3, (incorporating D-WP1-4), (22 September 2008)
• The production of a manual for laboratory contingency planning against FMD, D-WP6-3, (22 September 2008)
• The production of a manual for laboratory contingency planning against CSF, D-WP6-4, (22 September 2008)
• Final scientific report, D-WP11-1c (December 2008)
• Final financial statement, D-WP11-2c (January 2009)

Scientific Publications

Please see Annex 1 Section 3.
Coordination Action for FMD and CSF

Section 2

Workpackage Progress for the project period
WP 1: Research Gaps and Duplications

01/01/2005 – 30/06/2008

Leader: Søren Alexandersen (Alexandra Meindl-Böhmer, John Bashiruddin, JB, and Sabine Kühne)

1. Work package objectives and starting point of work at beginning of reporting period

The objectives of this workpackage are to establish an inventory of research projects/programmes in the field of FMD and CSF in Europe and also worldwide. Gaps in research relevant for the efficient control of CSF, identification of major constraints for the long term planning in FMD and CSF research, major actors and policy. The deliverables D-WP1-1a and D-WP1-2a: Inventory of FMD and CSF research programmes/projects/orientations, respectively, and time-table of expected outputs of identified projects, constraints to uptake; D-WP1-1b and D-WP1-2b: Inventory of FMD and CSF research programmes/projects/orientations, respectively, and time-table of expected outputs of identified projects, constraints to uptake and report of task force on maintenance of CSF expertise at European and global level; D-WP1-3: Workshop for selected RTD programme managers to identify policy objectives and orientations, and D-WP1-4: Policy objectives and orientations of the major national/international funding bodies had to be delivered.

2. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

The framework of research institutions that work on FMD differ from that of CSF. FMD research is mainly conducted by few key players. The coordination of applied and basic research in the EU is conducted by the Community Reference Laboratory (CRL) and extended globally by the OIE and/or FAO World and National Reference Laboratories (WRL and NRLs). CSF research is more widely spread among far more working groups. Whereas close contacts exist between the CRL, NRLs and several other laboratories, there are various (small) working groups which have so far not been involved in any formal or informal network and are not necessarily known to each other. Therefore the strategy for data collection on FMD research has differed from that of CSF, but the questionnaire and analysis methods have been co-ordinated.

An Excel form designed to survey research projects, personnel inputs and funders was circulated to all project associates. For FMD the response to this survey was very poor and it was abandoned. It was decided to conduct a survey of published scientific papers instead and the conclusions from it were presented at the joint meeting between IAEA, Animal Production and Health Section of the Joint FAO/IAEA Division and this project that was held in Vienna 4-7th December 2007. With the theme “Coordination of FMD research” it combined the intentions of International initiatives to better understand, develop and manage research areas on FMD. A wide range of observers from international research organizations, government institutions and industry attended this
meeting. Specific gaps areas of research were identified in the areas of vaccines; immunology; communication and harmonization. In many ways this meeting illustrated the benefit of getting as many groups together involved in FMD research to cross fertilize ideas, exchange plans and modify approaches to save duplication and value add to other research lines. The meeting also gave the opportunity of developing countries to voice their needs and aspirations and proceedings are available in D-WP1-3.

To gain an overview of current CSF research and researchers an intensive web-based search was performed. A list of all authors and institutions that had published articles on the disease in peer-reviewed journals within the last five years was compiled. All first authors and institutions involved were then contacted by email and received information on the CA. In addition all National Reference Laboratories for CSF were contacted. A short questionnaire asking for information on project title, short description of the project, field of research (e.g. vaccinology, pathogenesis, and epidemiology), contact person, funding body, start and end date, cooperation and number of person months assigned to the project was prepared and circulated. The results are summarized in deliverable report: D-WP1-2a.

Gaps in information still existed from Asia, especially for CSF and South America especially Argentina, and China and Russia for FMD. A strategy that might identify the perceived gaps in both FMD and CSF research may be to ask the known major players for their information but generally there is great reluctance to provide such information.

WP1 member (JB) participated in WG1 (Basic Research) of the EPTGAH project that brought key stakeholders in animal disease management together to formulate a strategic research agenda.

Several project partners are members of the “Research Group of EUFMD” which is group of twelve FMD experts from the Member States plus the Head of the FAO World Reference Laboratory for FMD. The Research Group meets at least annually, but every two years it organises an international scientific meeting open to all, where the latest research findings relevant to FMD control are presented and discussed. The most recent of these meetings was from 16-19 October 2006 in Paphos in Cyprus, and a similar meeting was held in Erice, Sicily, for 14-17 October 2008. Usually more than 150 participants from many countries both within and outside Europe attend and proceedings of these meetings are available (including Paphos and Erice) are available from the EUFMD website.

The Global FMD Research Alliance (GFRA) was formed in 2003 to develop proposals for collaborative research into the development of new diagnostics and antivirals. The coordinator, D. Paton, attended the Roadmap Meeting in Agra, India on 29-30th November 2006 to discuss ways to help control and eventually eradicate FMD in endemically affected countries. The primary sponsor was the Wellcome Trust with significant support from the European Commission and a number of pharmaceutical companies. More than 50 participants from many different countries considered research gaps and options for developing improved strategies for vaccine use and for the development of novel vaccines. A much wider participation that included key laboratories from Europe was agreed at a GFRA meeting held at Plum Island Animal
Disease Centre in the United States, PIADC. European participation was funded from FMD-CSF CA and Epizone projects.

In order to update report D-WB1-2a, an extensive web-based search for information on CSF research in 2006 and 2007 was performed. Scientific publications were catalogued and systematically analysed for contact details. Identified scientists and research groups were afterwards contacted by email. A questionnaire was distributed asking for information on current research projects, time-tables of expected outputs, co-operations, funding and research gaps. The questionnaire was also passed to the participants of the Annual Meeting of the National Swine Fever Laboratories. The answers were evaluated and are presented in the report D-WP1-2b. The web-based search showed that the majority of CSF related research articles originated in China. However, it was very difficult to get in contact with the scientists. Research is also concentrated in Europe especially in Germany, Spain, Switzerland, The Netherlands, and UK, where CSF in pigs or wild boar was found recently. Another country with some CSF research is Australia. Most research projects will end within the next three years. The communication between European scientists especially within FP6 projects works well. Contacts to South East Asian and Latin American scientists or scientific institutions working on CSF are rare.

With the help of the questionnaire the scientists were asked among others about their opinion to important research gaps. The answers served as a base for a workshop on “Classical Swine Fever – assessment of control tools and research gaps”, which took place in Hannover, Germany 15th to 17th of April 2008. For the workshop leading scientists in the field of CSF, experts from research institutions and industry, members of the EU-Commission as well as representatives of international organizations (OIE and FAO) were invited. The workshop was organized in cooperation with the US Agricultural Research Service. This workshop combined the intentions of the U.S. National Stockpile to assess countermeasures and to analyse gaps of knowledge and tools with the goals of the FMD-CSF CA to identify research gaps. Furthermore it was intended to help to avoid duplications and promote research cooperation within Europe and between Europe and the US. The participants from the US could benefit from recent European experiences in CSF control. On the other side European scientists were interested in CSF research activities in the US.

The workshop was divided into four sessions: diagnostics, vaccines and other countermeasures, epidemiology and control, as well as basic research. In the beginning of each session the presentations were given to get an introduction and overview on running projects, current and long term goals, possible gaps and constraints. After each session there was time for discussion on open questions and research gaps as well as for the assessment of countermeasures. Conclusions and recommendations were compiled and agreed upon at the end of the meeting. The participants agreed that major research gaps exist in the field of control strategies using emergency vaccination with conventional and/or DIVA vaccines. Most of the predictions of epidemiological models have not been tested in the field yet. There are also severe knowledge gaps concerning virus-host interaction and other basic aspects of pathogenesis. Diagnostics in general are well developed. There are promising 2nd generation DIVA chimeric vaccine candidates, but more data are needed on reduction of transmission, efficacy, safety, etc. Emergency vaccination is not yet a generally accepted tool for CSF control. Therefore, risk analysis on safety of products from vaccinated animals, analysis of retailer and
consumer acceptance and international trade conditions should be performed. The outcomes of the workshop are summarized in deliverable reports D-WP1-3 and workshop report “Future needs and goals of CSF research”.

D-WP1-4: Policy objectives and orientations of the major national/international funding bodies. The policy orientations for the major funding bodies were difficult to assess. Answers from the questionnaire (see above, report D-WP1-2b) showed that the main funding bodies are the national governments of affected countries and the European Union (for Europe). Funding by industrial companies is extremely scarce. Ninety one projects were analysed. Some projects could be divided in more than one theme and some projects were founded by more than one organization. The national funding bodies (governments, funds, foundations) support mainly the development of diagnostics as well as research on CSF pathogenesis, epidemiology, immunology, and vaccines. The focal points of EU funded projects are research in the field of diagnostics, pathogenesis, epidemiology, and vaccines. According to the questionnaire only one project was funded by FAO and one by the industry (Table 1).

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Major problems encountered and corrective actions.

The lack of information offered on current projects is a major problem. However, trends in the areas of information covered can be seen in the published record over the past six years.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

The policy orientations for the major funding bodies were difficult to assess, because the majority of projects is funded by national organisations (governments, funds, foundations). With the help of a web-based search, questionnaires sent out to research and diagnostic institutes, and a workshop on “Classical Swine Fever –assessment of control tools and research gaps” we could achieve studies on the current research themes and topics, the funding organizations as well as current and long term research goals and research gaps.

4. Co-operation with other projects/associated partners
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<th>Date</th>
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<tr>
<td>11.10.2005-31.05.2006</td>
<td>John Bashiruddin</td>
<td>WG1, ETPGAH</td>
<td>FMD &amp; CSF</td>
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<tr>
<td>29.11.2006-01.12.2006</td>
<td>David Paton</td>
<td>The Global Roadmap for improved Control of FMD in Endemic Settings, GFRA</td>
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<td>04.12.2007-07.12.2007</td>
<td>Xuepeng Cai</td>
<td>LVRI, Lanzhou, China</td>
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<td>Dorothee Paefgen</td>
<td>Intervet, the Netherlands</td>
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<td>Dragos Grandinaru</td>
<td>Institut Pourquier, Montpelier, France</td>
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<td>04.12.2007-07.12.2007</td>
<td>Juan Lubroth</td>
<td>FAO, Rome, Italy</td>
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<td>04.12.2007-07.12.2007</td>
<td>Cyril Gay</td>
<td>ARS, USDA, USA</td>
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<td>Aldo Dekker</td>
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<td>Cyril Gay and others from PAIDC</td>
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<td>01.06.2007- 30.06. 2008</td>
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<td>Christianne Bruschke</td>
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<td>Helen Crooke</td>
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<td>01.06.2007- 30.06. 2008</td>
<td>Klaus Depner</td>
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<td>Larry Elsken,</td>
<td>Global Vaccine Manager Center for Veterinary Biologics Licensing and Policy</td>
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<td>Samia Metwally,</td>
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<td>Rob Moormann,</td>
<td>Division of Virology Central Veterinary Institute of Wageningen UR Lelystad The Netherlands</td>
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<td>Eugen Olaru,</td>
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<td>Nicole Pionkowski,</td>
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<td>Guillermo R. Risatti,</td>
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5. **Major Publications**

None.
WP2: Global disease surveillance

01/01/2005 – 30/06/2008

Leaders: David Paton, DP, John Bashiruddin, JB, (FMD) and Trevor Drew, TD (CSF)

1. Work package objectives and starting point of work at beginning of reporting period

   The overall objective of this workpackage is to coordinate FMD and CSF reference laboratories to maximise surveillance information on the prevailing strains of FMD and CSF globally. Final deliverables: D-WP2-1, Position paper on current surveillance and strategy paper on surveillance needs; and D-WP2-2, Agreement reached on collaborative activities of reference laboratories, were due for this reporting period.

2. Progress towards Objectives
   (tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

   The FMD part of the WP was being managed by the coordinator and the project manager.

   The OIE generously offered to take a greater role than originally planned in the information-gathering exercise and the collation of the information obtained. The questionnaire that was prepared by workpackage leaders and project associates was distributed by OIE to all member countries. The OIE collated this information, and it was analysed under the supervision of IAH, VLA and OIE and the results are reported in the position paper.

   The “position paper”, D-WP2-1, is an overview of the current status of FMD world wide and an account of the key Institutional and Governmental entities and their efforts in the control of FMD. It summarises gaps, strengths and weaknesses and suggests ways of both improving global surveillance coverage and of reinforcing international cooperation in the field of surveillance. Since the start of this project and the writing of this report a number of detailed scientific publications have independently addressed aspects of the global surveillance of FMD these have been used and listed in the paper.

   There are numerous organisations active in the field of FMD epidemiology and control but global coverage varies widely from comprehensive and detailed to isolated and patchy, vary in reliability, transparency, capability and capacity. A series of strategies designed to improve the level, quality and coverage of the global epidemiological intelligence for FMD are suggested. Arguably the most important need is for Global Coordination of control efforts.

   Work continues to consolidate and sustain the OIE/FAO FMD Reference Laboratory Network. Annual meetings were held in 2006, 2007 and 2008. Collaborative activities including the production of combined annual laboratory reports since 2005
summarising the surveillance information gathered by the network as a whole, and laboratory trials on vaccine matching and vaccine recommendations have been achieved.

A ‘Reference Laboratories Information System’, ReLaIS, website development as a communications and exchange tool for the OIE/FAO FMD Reference Laboratories Network and others is live and openly available. Besides providing an information hub for FMD it will also provide a user updatable database for sequences, on line tools for the manipulation and reporting of sequence information that will harmonise phylogenetic analysis, and a mapping interface for the display of sample information. It will also report sample result information directly to the OIE and FAO information systems such as EMPRESi (FAO), WAHIS (OIE) and eventually GLEWS (OIE/FAO/WHO) and technical meetings have been conducted with OIE and FAO to facilitate laboratory information exchange. This Network and this website are, in part, products of this project and annual reports and reports of meetings can be accessed on ReLaIS in fulfilment of D-WP2-2.

In the case of a new outbreak of CSF it is extremely important to determine the genetic type of the virus fast and efficiently. To simplify this task, the World Wide Web database of CSF virus isolates held at the Community Reference Laboratory was created, and a standardized approach for genotyping was established. In the meantime, the database contains 624 and 657 sequences from the 5’ UTR (150 nt) and the E2 glycoprotein (190 nt) genomic fragments, respectively, thus making it almost impossible to choose the correct sequences by hand for performing the initial alignments needed for the phylogenetic calculations. This made it necessary to develop a program that can determine the genotype of a new isolate automatically, once the sequence is available.

The program was implemented with the following functions:

- Check the input sequences for internal gaps longer than tree bases, proper gene fragment and stop codons in the correct reading frames.
- Check if the input sequence has identical counterparts in the database.
- Display a list with the names of all isolates with identical sequences.
- Calculate a pair-wise alignment for the new sequence with all sequences from the database.
- Calculate and display the phylogenetic tree. The tree is generated for up to five sequences that can be determined by the user and a standard set of sequences (5’UTR or E2). The tree is calculated with the neighbour-joining algorithm and displayed as a graphic.

The program is integrated into the database and accessible by WWW.
Major problems encountered and corrective actions.

No problems identified. Jean-François Valarcher left the IAH in December 2005. David Paton assumed responsibility for the FMD part of the workpackage with support from John Bashiruddin and Tony Garland. For CSF fiches for areas and individual countries were prepared by VLA but a position and strategy paper was never produced.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

There were no deviations from the work programme.

4. Cooperation with other projects/associated partners

<table>
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<th>Date/Period</th>
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<th>Organisation/Institution/Project</th>
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<td>01.01.2005-30.06.2008</td>
<td>Juan Lubroth, Keith Sumption, Sophie Dobscheutz</td>
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<td>OIE</td>
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<td>Tony Garland</td>
<td>Consultant, Woking, UK</td>
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<td>Paul-Michael Agapow</td>
<td>Consultant, bioinformatics, UK</td>
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<td>01.01.2005-30.06.2008</td>
<td>Irene Greiser-Wilke, Sabrina Dreier, Bernd Zimmermann, Volker Moennig</td>
<td>EU Reference Laboratory for Classical Swine Fever, TiHo, Hannover, Germany</td>
<td>CSF</td>
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</table>

5. Major Publications

http://www.foot-and-mouth.org/ especially the provision of the sample/results database through an informative map interface.
WP3: Risk Research

01/01/2005 – 30/06/2008

Leader: Larry Paisley (from January 2006), Matthias Griener previously

1. Work package objectives and starting point of work at beginning of reporting period

Contribute to internationally agreeable, efficient and harmonised approaches to risk assessment for FMD and CSF introduction to livestock populations in EU member/accession/candidate countries through (a) formation of a European network for exotic animal disease risk research, (b) development and implementation of a coordinated framework for global geographical risk assessment, (c) systematic documentation and review of risk assessment studies. Final deliverables were due for this reporting period.

2. Progress towards Objectives

(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

Objective (a): formation of a European network for exotic animal disease risk research was fulfilled to a certain extent.

A questionnaire was designed to obtain information about experts, institutions and themes. Seventy individuals from 26 countries received the questionnaire and thirty-two filled questionnaires were returned. The answers represent thirty-two distinct organisations, institutions, working groups or institutional units. The information was suitable to fully answer the question raised and has been summarised in the Cumulative Report of D-WP3-1, which is available in the Partner Area of the project's web space. Partner institutions and individuals/orrganisations have been requested to continuously update their information as necessary.

A second questionnaire was been designed and sent to about eighty individuals, whose email addresses were reported in questionnaire 1. Here, the status of participation in the WP was requested. Twenty-one colleagues responded to this questionnaire with an indication of their preferred association with the project. Ten respondents chose the option to be active member (or active member/consultant). These active members were invited to the first project meeting held in Copenhagen 10-11 November 2005. At this meeting the participants identified a number of areas for discussion on the state of FMD and CSF risk research including “levels” of risk assessment studies, standard terminology, agreement between client and consultant, general scientific procedures, specific issues regarding release assessment, small vs. big assignments, reporting and communication. Recommendations regarding these areas were formulated and reported in the minutes of the meeting.

Objective (c), systematic documentation and review of risk assessment studies, has been completed and a publication is in preparation.
To date approximately 53 FMD/CSF risk assessments (RA) have been located. Each RA has been categorized as an FMD RA a CSF RA or a general RA that includes FMD and/or CSF as a hazard. It was decided to concentrate our efforts on non-import risk assessments because Work Package 7.1 of the EPIZONE project was working on “Standardization of Import Risk assessments”. Sixteen RAs remained after the import RAs were excluded.

Reviews: A template for the review of FMD CSF risk assessment was developed in Excel and Word. With this template each risk assessment was identified by its citation, contact details, client, abstract, hazards, components and communication. These reviews were used to construct summary figures for the reviewed risk assessments. The assessments were characterized by the hazard and commodity assessed, as qualitative or quantitative, published or unpublished, peer reviewed or not and whether or not the assessment followed the OIE risk assessment guidelines that include an exposure assessment, release assessment, consequence assessment and risk characterization. These are all searchable fields in the online database. This work continued throughout the project time. It is intended that these assessments will be made available to all partners at the FMD-CSF website.

Quality audits: An audit worksheet was developed in Excel to quantitatively rate the quality of the risk assessments based on risk assessment peer review and quality audit guidelines. Specific questions were asked regarding the report, general items regarding methodology, guidelines followed, handling of uncertainty, literature cited and conclusions, quantitative assessment methods, sensitivity analysis and risk communication. Each question can be answered with items in a drop-down list which in turn assigns a numerical score for the answer. When all questions have been answered an overall audit score is calculated depending on whether the assessment is qualitative, semi-quantitative or quantitative. Each participant in the project was assigned four or five papers/reports on which to review and conduct a quality audit. Each report/paper was at least assessed two/three times to evaluate the subjectivity/robustness of the quality audits. The completed Quality audits are available here.

A jointly authored manuscript entitled “Quality Audits for Non-Import FMD and CSF Risk Assessments” is in preparation.

An international workshop on global risk assessment for FMD and CSF was held on November 30-December, 2000 at the UFZ Centre for Environmental Research, Leipzig, DE). Major discussions concerning the risk assessment reviews and guidelines for quality assessment of risk assessments ensued. One major decision made in the course of this WP was to apply risk assessment quality assurance methods to the risk assessments reviews. The participants intend to produce a joint publication regarding this exercise. The report on the resolutions of the international workshop on global risk assessment for FMD and CSF virus circulation, overcoming data gaps is posted at the website under WP3 information in D-WP3-1.

3. **Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)**

The online database was established but participants have not used the online database for data entry because it was created only after the workshop in November 2005. Due to the server crash in 2007 the database was lost.
Participation from some partners was less than optimal. I am unsure why this was the case but perhaps it is because they are interested in risk assessments but are not risk assessors.

4. Cooperation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/ Institution/Project</th>
<th>Contribution to FMD/CSF</th>
</tr>
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<tr>
<td>06/12/06</td>
<td>Larry Paisley</td>
<td>EPIZONE</td>
<td>Import RAs</td>
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6. Major Publications

<table>
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<tr>
<th>Author</th>
<th>Paisley, L., Adkin, A., de Vos, C., Mintiens, K., Saatkamp, H., Dewulf, J., Boklund, A. and van Langen, H.</th>
</tr>
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<tbody>
<tr>
<td>Date</td>
<td>In preparation</td>
</tr>
<tr>
<td>Title</td>
<td>Quality Audits for Non-Import FMD and CSF Risk Assessments.</td>
</tr>
<tr>
<td>Publication/Publisher</td>
<td></td>
</tr>
<tr>
<td>Key Words</td>
<td>FMD, CSF risk assessments, quality audits</td>
</tr>
<tr>
<td>Comments</td>
<td>Supported by FMD-CSF-CA funding.</td>
</tr>
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</table>
WP4: Vaccine Reserves

01/01/2005 – 30/06/2008

Leader: Paul Barnett

1. Work package objectives and starting point of work at beginning of reporting period

The overall objective of this workpackage is to co-ordinate antigen/vaccine bank activities around the world in order to develop standards for vaccine bank antigens, ensure a better control of FMD in the event of an outbreak and reduce the cost of individual membership. The deliverables were as follows: D-WP4-1 Inventory of owners, technical advisors and managers of the FMD antigen/vaccine banks worldwide; D-WP4-2 Workshop on key issues and concerns shared by antigen/vaccine bank technical advisors and managers; D-WP4-3 Establish network communications and collaborative links between antigen/vaccine banks and expand network to include participants wishing to establish or participate in vaccine/antigen banks; D-WP4-4 Agreed standard protocols for testing and maintaining antigens/vaccines.

2. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

Owners, technical advisors and managers of FMD vaccine banks that were interested in the formation of a vaccine banks network were identified via a questionnaire sent to eleven countries. Responses to the questionnaire were received from South Africa, Argentina, Korea, Botswana, New Zealand, North America and Australia representing key vaccine bank managers from around the World (D-WP4-1). A workshop was held at Pirbright in April 2006 where those that expressed an interest to form a network were invited. The workshop discussed common concerns and experiences and heard invited papers on current OIE regulations and guidelines for the establishment of vaccine banks; the efforts of EUFMD towards the standardization and harmonisation of practices and cooperation between members; and the efforts within WP4 of this CA in the gathering of information and co-ordination between vaccine bank managers. The recommendations of the workshop on vaccine banks were reported in D-WP4-2.

D-WP4-3 reported unanimous support to the creation of an international FMD vaccine Bank Network. A Memorandum of Understanding was developed and a further meeting was planned by the final year to encompass those who wished or could participate further. It was agreed internally that to actively progress this further and more efficiently, the Network, in the first instance, should remain limited in membership and that the respective countries represented should already have access to vaccines and/or antigens of similar quality. On the 15th May at 8.00 pm GMT a teleconference was held in the final year of this project, respecting those participating and their global locality. This teleconference represented Australia, New Zealand, EU countries, Canada, USA, Mexico and the United Kingdom and included Karin Arhling, Richard Drummond, Hernando Duque, Alf Fussel, Andre van Halderen and Jill Mortier. Three documents were circulated prior to this teleconference namely, (a) the revised Memorandum of Understanding for an
International Network of Vaccine Banks for Foot-and-mouth Disease Vaccine, following input from some of the participants (b) consideration of the Standards/protocols that should be followed by the banks and (c) Methods and format for reporting these key standards and protocols to the network.

Regarding the MOU there were no concerns over the text or arrangements within the document though it was agreed that all participants would need to provide names and details of appropriate signatories to the CA project manager for inclusion into the final MOU in order to activate it, and that this may take sometime.

As previously reported D-WP4-4, many of the standards/protocols that were suggested as the basis of Annex 2 were directly taken from the new OIE chapter on Vaccine Reserves to which the work package leader had been principal author, and the aim of the tabled document was to suggest that, by agreement, the most appropriate test (or a minimum sets of tests) be performed periodically to check the integrity of stored antigens. Following agreed protocols would also allow for assurance of quality and security of shared antigens and collaborative studies may also lead to alternative approaches for quantification of vaccine efficacy. Overall it was recognised that harmonised test procedures, common source of antigen and their over-riding manufacturing standards was a good basis for reagent exchange between Network participants.

The reporting system, exemplified by the final document discussed at the teleconference, was unanimously supported, particularly as the test approaches were already being done routinely by all. The need for each partner to seek approval for information exchange was noted. Such a reporting system would add an additional means of establishing the global picture for FMD and effectiveness of certain vaccine strains, as well as current source on vaccine developments in the FMD field. It was agreed that a secure web based data entry and repository could be established. The need to have a face-to-face meeting was discussed and agreed and it was felt appropriate that it be combined with another meeting such as that which occurs annually at OIE in May given the travelling distance for some partners. It was felt that following the signing of the MOU this could be arranged and in the meantime there should be a start to the accumulation of data on antigen stocks.

Both D-WP4-3 and D-WP4-4 were successfully achieved, but to move further forward it is important that momentum remains on this coordinated activity on antigen/vaccine banks around the world in order to develop standards for vaccine bank antigens, ensure better control of FMD in the event of an outbreak and reduce the cost of individual membership. A telephone conference was held between UK, Canada and NZ on the 27 November 2008 to discuss the MOU. It was clear that the MOU was a stumbling block and it was agreed to rename it and amend its format to a ‘Terms of Reference’. Separate bilateral MOU documents may have to be prepared for the sharing of materials. Clearly, it will be some time before these documents have all the necessary signatories, but additional financial support should be placed from a new EU collaborative project to maintain the progress that has already been achieved and develop this aim further. This will provide an established ratification of the MOU, the infrastructure and process to hold routine meetings of the Network, and support of its web based reporting system to allow the exchange of information or reagents, which will undoubtedly be useful in the efficient control of FMD outbreaks.
Major problems encountered and corrective actions.

There have been no major problems.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

There were no deviations.

4. Cooperation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
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<th>Contribution to FMD/CSF</th>
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<tbody>
<tr>
<td>04.04.2006-05.04.2006</td>
<td>Rodolfo Bellinzoni</td>
<td>VETIA SA</td>
<td>FMD</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Katharina Brehm</td>
<td>National Reference Laboratory for FMD, Germany</td>
<td>FMD</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Bryan Charleston</td>
<td>IAH, Pirbright</td>
<td>FMD</td>
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<tr>
<td>15.05.2008</td>
<td>John Bashiruddin</td>
<td>CA manager</td>
<td>FMD</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Herve Coupier</td>
<td>Botswana Vaccine Institute</td>
<td>FMD</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Hernando Duque</td>
<td>North American Foot-and-Mouth Disease Vaccine Bank</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Alf Fussel</td>
<td>EC Commission, DG SANCO/E2</td>
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<tr>
<td>04.04.2006-05.04.2006</td>
<td>Dorothy Geale</td>
<td>Ministry of Agriculture &amp; Forestry, New Zealand</td>
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<td>04.04.2006-05.04.2006</td>
<td>Yiseok Joo</td>
<td>NVRQS, Korea</td>
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<td>Eduardo Maradei</td>
<td>SENASA</td>
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<td>Paul Manser</td>
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<td>04.04.2006-05.04.2006</td>
<td>Shree Narayan Singh</td>
<td>Biovet Pvt Ltd, India</td>
<td>FMD</td>
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<td>Bill Turner</td>
<td>Animal Health Australia</td>
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<td>04.04.2006-05.04.2006</td>
<td>Wilna Vosloo</td>
<td>OVI, South Africa</td>
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<tr>
<td>Karin Ahring</td>
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<td>Hernando Duque</td>
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<td>Richard Drumond</td>
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<td>Alf Fussel</td>
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<tr>
<td>Andre van Halderen</td>
<td>MAF, New Zealand</td>
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<td>Jill Mortier–(Observer)</td>
<td>Australian Government</td>
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</table>

5. **Major Publications**

None.
WP 5: Diagnostics,

01/01/2005 – 30/06/2008

Leader: Kris De Clercq (FMD) and Barbara Thuer (CSF)

1. Work package objectives and starting point of work at beginning of reporting period

The Scientific Committee on Animal Health and Animal Welfare (SCAHAW) of the European Commission reported in 2003 on “Diagnostic Techniques and Vaccines for Foot-and-Mouth Disease, Classical Swine Fever, Avian Influenza and some other important OIE List A Diseases”. It recommended that “a virtual laboratory structure” should be organised between laboratories and that efforts to improve diagnosis of FMD and CSF should be co-ordinated.

The objectives of this WP are therefore to co-ordinate and organise a platform for the discussion on the developments of FMD and CSF diagnostic techniques, validation, quality control of FMD/CSF diagnostics and reference standards to improve the mutual recognition of test results.

For FMD two deliverables (Deliverable D-WP5-1a and D-WP5-1b: Information gathering reports on the developments in FMD diagnostic techniques, validation, quality control of FMD diagnostics and reference standards) was submitted to the EC in November 2005 and November 2006.

Deliverable D-WP5-2 (incorporating D-WP5-1c): Workshop on the developments in FMD diagnostic techniques, validation, quality control and reference standards (incorporating information gathering report on the developments in FMD diagnostic techniques, validation, quality control of FMD diagnostics and reference standards) and deliverable D-WP5-4: Workshop on the developments in FMD diagnostic techniques, validation, quality control and reference standards were submitted in April 2008.

1. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

While most of the more recently developed CSF vaccines and some diagnostic kits are validated according to World Organisation for Animal Health (OIE) standards, not all of the well-established traditional vaccines and diagnostic tests were subject to these validation procedures and requirements. Thus, an assessment of classical swine fever diagnostics and vaccine performance was performed. In addition, current strategies for differentiating infected from vaccinated animals were reviewed, as well as information on the control of CSF in wildlife. The results were published in 2006 (Blome et al., 2006) (see below).
In addition, CSF NRLs in Europe were contacted and asked to provide their evaluation data on various diagnostic tests. Information was collected and analyzed and data were made available to the other laboratories via the internet. However, access to this area is restricted. Passwords can be obtained from the CRL for CSF (crl@tiho-hannover.de).

Reference materials to be used for RT-PCR, virus isolation and Ag-ELISA (CSFV positive serum/blood/tissue) as well as for neutralisation assays and Ab-ELISA (CSFV antibody positive serum) have been produced by the CRL and have been characterized. Upon demand they are available from the CRL (crl@tiho-hannover.de).

Furthermore, an inventory of reference materials available at the CSF laboratories was established in cooperation with “WP 2.2 Strategic integration - shared resources” of the Network of Excellence “Epizone”.

For Classical Swine Fever (CSF) a “Diagnostic Manual establishing diagnostic procedures, sampling methods and criteria for evaluation of the laboratory tests for the confirmation of classical swine fever” was adopted by the EU in Commission Decision 2002/106/EC of February 1st 2002. Within the framework of this CA information on new developments in the field of CSF diagnostic techniques and reagents, sampling strategies, validation and on the developments of reference standards was collected and the “Diagnostic Manual” was revised accordingly. The updated version is currently being discussed with DG SANCO and will be presented to the “Standing Committee on the Food Chain and Animal Health” (SCoFCAH) in autumn 2008. The technical part, proving detailed information on laboratory techniques for the diagnosis of CSF, was updated and the new version was approved by all National Reference Laboratories for CSF (NRLs) during their Annual Meeting 2007. The revised version is publicly available at the OIE Reference Centre.

In cooperation with the FMD subgroup of this work package and in collaboration with the Society for Veterinary Epidemiology and Preventive Medicine (SVEPM) a workshop took place in the context of the “Second International Meeting on the Design and Analysis of Diagnostic Test Evaluation Studies” in Brussels in June 2006. The objective of this workshop was to optimise and harmonise guidelines on diagnostic test validation.

Additionally, a workshop on inter-laboratory comparison testing was conducted in November 2007 together with the FMD subgroup. In the context of this meeting a questionnaire on the participants experience with proficiency testing was circulated. The main topic of the workshop was to reach an agreement on the definition, differences and intentions of ring trial, proficiency tests and interlaboratory comparison tests.

As results of the workshop on interlaboratory comparison testing, an advisory board has been established for the interlaboratory comparison test, which is conducted by the CRL for CSF on an annual basis. This advisory board has already given its recommendations for the ILCT 2008.

The FMD group (Partner 6) of this workpackage:
(1) Concentrated on external quality assurance and best practice in use of internal quality monitoring. Information has been gathered from all over the world concerning the developments in FMD diagnostic techniques, validation, quality control of FMD diagnostics and reference standards:

To increase the quality of FMD diagnostics, a Quality Assurance (QA) system is deemed essential for laboratories involved in certifying absence of FMDV or antibodies against the virus. Therefore laboratories are encouraged to fully validate their diagnostic tests and to install a continuous Quality Control (QC) monitoring system. Continuous monitoring of diagnostic assays using control charts will alert the interpreter of changes in assay performance. P6 compared the Shewhart and the exponentially weighted moving average (EWMA) control charts with respect to the day to day monitoring of internal quality control samples for the foot and mouth disease solid phase competition enzyme-linked immunosorbent assay. Both chart types are equally sensitive to shifts, but the EWMA method seems to provide the best balance between false rejection and false acceptance. Information on this study is published in the Rev. sci. tech. Off. int. Epiz., 2005, 24 (3).

Moreover, knowledge on performance characteristics of diagnostics is essential to interpret results correctly and to calculate sample rates in regional surveillance campaigns. Different aspects of QA/QC of classical and new FMD virological and serological diagnostics are discussed in respect to the EU FMD directive (2003/85/EC). We recommended only accepting trade certificates from laboratories participating in international proficiency testing on a regular basis.

A report of 15 pages entitled ‘The importance of quality assurance/quality control in diagnostics to increase the confidence in global foot-and-mouth disease control.’ was made by Partner 6 and Partner 1 (De Clercq K., N. Goris, P. V. Barnett, and D. K. MacKay, 2008) and provided as Deliverable D-WP5-1b.

(2) Gathered information from all over the world concerning internal quality monitoring and ring-testing.

P1 organised a serological ring-test and a virological ring-test in collaboration with P6.

2.1. Serological ring-test

The aims of the FAO EUFMD Phase XVIII were: (1) the introduction of the solid phase competition ELISA (SPCE), (2) the preparation of secondary standards by national laboratories (based on the reference sera derived from Phase XVII), (3) the use of calibrated tests to examine local negative serum panels and proficiency panels, (4) standardisation of quality control procedures. To this end, steps have been taken to prepare and validate the SPCE for detection of serotypes A and Asia 1 (See Anderson et al., 2003; Paiba et al., 2004). Secondly, large batches of the new reference sera selected in Phase XVII have been prepared for distribution to a wider range of testing laboratories, along with a proficiency test panel. Test sera and SPCE reagents were distributed to 22 laboratories and their results collated and compared. Prospects for future studies were discussed. Results are published in the EUFMD RG meeting report.

The aim of the FAO Phase XIX FMD Inter-laboratory Comparative Test Exercise on Serology was to assist National FMD Laboratories in developing and maintaining accurate and reproducible FMD diagnostic tests. Three panels of coded samples were distributed to be tested by different serological and virological assays for FMD
diagnosis. The priority FMDV serotypes were O, Asia 1 and especially A, although SAT 2 was also represented. Sera from vaccinated and infected animals were considered a priority for the serology panel as well. Particular tests were not specified, but labs were invited to select tests and interpret results as if the samples were from animals being examined prior to import (i.e. when serotype/strain of infecting virus and vaccination status would be unknown).

The serology panel consisted of 12 coded serum samples and was dispatched to 34 participants along with a template for results and a set of instructions. The participants were also requested to provide information on their tests to evaluate the homogeneity of methods and to enable some analysis of possible causes for discrepant results. Test results have been submitted from about 20 participants so far. The collating and analysis of results is in progress, have been presented at the FAO EUFMD meeting (Oct 2006) and will be published (Yanmin Li, Nigel Ferris, Pip Hamblin, Nesya Goris, Geoff Hutchings, Bob Statham and David Paton).

2.2. Virological ring-test

FMD diagnosis is dependent on early reporting of disease, which must be confirmed by objective tests. The index case of a new FMD introduction may present with only one or a few animals on a farm initially showing signs of disease. FMD may also be confused with other vesicular diseases such as swine vesicular disease affecting pigs and vesicular stomatitis of cattle and pigs, besides the not infrequent appearance in animals of similar lesions or lameness caused by other means, e.g. footrot, trauma or agents of known or unknown aetiology other than FMD. Consequently, diagnostic test procedures should be rapid, sensitive and specific. The three most widely used methods for virus detection are currently virus isolation (VI) in cell culture, antigen ELISA and RT-PCR. Also real time RT-PCR is introduced in the laboratories these days.

Following a recommendation at the meeting of the European Commission for the Control of Foot-and-Mouth Disease held in Gerzensee, Switzerland in September 2003 (Anon, 2003) a proficiency panel for virological testing (by VI, RT-PCR and antigen ELISA) was established by the FAO World Reference Laboratory (FAO WRL) and distributed to a limited group of laboratories. Five European FMD laboratories agreed to participate in this initial phase of the study to test the ability of each laboratory to detect FMD virus in 20 coded samples using in-house routine RT-PCR and virus isolation procedures. The aim was to judge whether the proficiency panel of samples was fit for the purpose of evaluating the sensitivity and specificity of routine FMD diagnostic procedures. The results were communicated to the FAO European Commission for the Control of FMD.

P6 collaborated with P1 to organise and analyse an international collaborative study (proficiency test – ring test) for real time RT-PCR in European National Reference laboratories for FMD and for interested laboratories outside the EU. The same panel as described above with minor changes was used. The results were communicated to the Research Group of the FAO European Commission for the Control of FMD (N.P. Ferris, D.P. King, G.H. Hutchings, Y. Li, N. Goris and D.J. Paton). - FAO Collaborative Studies for FMD Standardisation: Phase XIX - Virological Assays.

The aim of Phase XIX is to complete a proficiency testing study for virology and serology. The virological aim is to evaluate the ability of laboratories to discriminate between FMD positive and negative samples by testing two proficiency test panels (one
infectious and one non-infectious) for the presence of FMD virus by means of virus isolation, RT-PCR and antigen ELISA.

Panel 1 consisted of 20 coded samples prepared from 11 vesicular epithelia, eight of which were derived from submissions of suspect cases of FMD or swine vesicular disease (SVD), while another three were derived from epithelia from naïve animals. Fifteen samples were derived from six FMD virus positive epithelia representing four different serotypes (two each of types O and A and one each of types SAT 2 and Asia 1), one from a sample which had been found to be negative by antigen ELISA and virus isolation but positive by FMD RT-PCR and another from SVD positive epithelium. Some of the FMD virus positive samples were prepared from 10-fold serial dilutions of two of the initial suspensions. The participants were invited to test the samples by their available RT-PCR procedures and to inoculate cell cultures that they routinely uses for FMD diagnosis in attempts to isolate virus and to confirm the specificity of any isolated virus. Panel 2 consisted of 12 coded samples prepared from inactivated, cell culture supernatant fluids. Ten were derived from the propagation of four different FMD virus serotypes and SVD virus and a further two prepared from un-inoculated cell cultures. Dilutions were prepared to yield moderate and weak concentrations of antigen of FMD virus types O, A (two different strains) and Asia 1 and also moderate concentrations of FMDV type SAT 2 and SVDV. The participants were invited to test the samples by antigen ELISA. Packages were distributed to 35 laboratories in 34 countries in different parts of the world. Twenty four laboratories received both panels, ten others received panel 2 only, while another laboratory solely received panel 1. Template data sheets for result entry and for providing information on test procedure were also supplied to each participant by email and for return to the FMDWRL. Test results have been submitted from several participants so far. The collating and analysis of results is in progress, have been presented at the FAO EUFMD meeting (Oct 2006) and are published (Ferris et al., 2006).

2.3. Other ring-tests

- IAEA is not organising a real ring-test but follows the internal quality of diagnostic kits and tests that are distributed to laboratories in Africa and Asia.
- Panafota organises a yearly interlaboratory comparative testing amongst South American countries.
- Since January 2005, there is a new OIE system for validating commercial tests that has mostly been used so far for BSE testing. The contact person at OIE is Francois Diaz.

(3) Organised a workshop on validation: ‘The Design and Analysis of Diagnostic Test Evaluation Studies” in collaboration with the CSF group (Partner 2), OIE (Partner 3) and the Society for Veterinary Epidemiology and Preventive Medicine (SVEPM) in Brussels, 20-22 June 2006. The objective of this workshop was to optimise and harmonise guidelines on diagnostic test validation. The OIE guidelines on validation were discussed and changes proposed. A workgroup was established and a proposal for new guidelines will be worked out and proposed to OIE by January 2007.

(4) Organised three workshops on the design and interpretation of post Foot-and-Mouth Disease-vaccination serosurveillance by NSP tests in collaboration with International Organisations in 2007. Given the current FMD-free status without
vaccination in Europe and the possibility of a future outbreak with vaccinate-to-live
used as an emergency measure, the goal of the first three workshops was to make
participants familiar with: (1) NSP tests available, other relevant tests and their use, (2)
computer tools for the calculation of the required number of samples to be taken, (3)
the legislation relevant for NSP testing, (4) the detection of carrier animals and relevant
potential control measures, (5) the requirements for personnel and lab resources. The
participants were asked to make conclusions and propose recommendations on (1) the
design and implementation of a survey to substantiate freedom from infection with a
certain degree of confidence after vaccination, (2) the guidance to interpretation on the
follow-up of seropositive animals/herds/flocks, (3) the guidance to the use of laboratory
test results in decision-making and (4) the identification of resources (laboratory,
veterinarians) required. Workshop 1 focused on countries of the Western European
region, workshop 2 on the Balkan and Mediterranean region, workshop 3 on the Baltic
and Scandinavian region. At each workshop, observers from EU DG SANCO, EU DG
RESEARCH, FAO EUFMD, OIE, EFSA, EPIZONE and EU CA FMD-CSF were represented
as well. Countries and observers were divided into groups, each group having to (1)
make the best possible survey design for a given scenario, (2) follow-up the seropositive
herds/animals/flocks and (3) identify the necessary resources. Results were presented by
each group in a plenary session. The approaches showed a clear degree of similarity,
despite the use of different working groups/countries. A plenary discussion session at
the end of each workshop produced conclusions and recommendations, which will be
a basis for the revision of EU Directive 2003/85/E on FMD vaccination serosurveillance.

Following recommendations were made: (1) Conclusions on the infection status of the
herds after FMD outbreaks in a vaccinated population should only be based on a survey
system including at least clinical, serological and epidemiological investigations; (2)
The performance characteristics of the survey system should be determined. When the
desired confidence level cannot be reached, spatial clusters analysis should be
considered; (3) The term ‘demonstrate absence of infection’ should be replaced by
’substantiate absence of infection’; (4) Contingency plans should include a clear flow
chart for the follow-up of seropositive herds, which must take into account at least the
requirements of Appendix 3.8.7. of the Terrestrial Animal Health Code. Serological
investigation should be based on a combination of NSP assays with well-defined
performance characteristics; (5) All large ruminants should be tested to substantiate
freedom from infection in a vaccinated population after FMD outbreaks. While
evidence of virus circulation must lead to the declaration of an outbreak, consensus
should be sought on the slaughter of reactor animals only, in case there should be
evidence that these animals are carriers, instead of the whole herd removal as currently
required in Article 57(3). Consideration should be given to finding out if there would be
a consensus on the latter; (6) A change in the definition of an outbreak in OIE
Guidelines and EU Directives is needed where carriers are concerned; (7) The relative
confidence attainable with “herd-based” and “individual” certification needs to be
explored for different herd sizes and prevalence; (8) Consideration should be given to
an amendment of the Directive in order to allow a within-herd sampling scheme based
on a 5% prevalence and a 95% confidence for vaccinated pigs; (9) The vaccination of
small herds should be further discussed; (10) To refine the application of NSP tests,
more work could be done in predicting the expected prevalence of infection within and
amongst vaccinated herds; (11) Functional FMD expert groups should be created in
every country (cf. article 78 of Council Directive 2003/85/EC for the EU Member States\(^1\)), including in non-EU countries.

These workshops were organized in cooperation with FAO EUFMD, Epizone, TAIEX, FMD ImproCon, EU DG RESEARCH, EU DG SANCO, OIE, FAVV-AFSCA and the Veterinary Administration of the Republic of Slovenia. The reports of these workshops were sent to the Coordinator as Deliverable D-WP5-2 (incorporating D-WP5-1c). The results will be published.

\(5\) organised a workshop on Ring Trials and Proficiency Testing in collaboration with international organisations in 2007. The objective of the Workshop on Ring Trials and Proficiency Testing was to make recommendations for Good Laboratory Practice (GLP) concerning proficiency testing, in order to improve QA/QC of laboratory tests for FMD/SVD and CSF. Representatives of FMD/SVD and CSF National Reference Laboratories from EU countries, Associated Countries and FAO EUFMD countries and observers were invited and have participated. Presentations outlining the problems with regard to the organisation, participation, reporting, follow-up and feedback of proficiency testing were given at this workshop, followed by a plenary discussion session and conclusions and recommendations session, which will be a basis for the revision of Proficiency tests organised for FMD, SVD and CSF.

Following recommendations were made: (1) The Community Reference Laboratories for CSF and FMD/SVD will use the proposed ISO 17043/43 standard to guide the development of proficiency testing schemes for the organisers and participants. They will use Guide 43 in conjunction with ILAC G13, until ISO17043 is formally published. The Community Reference Laboratories for CSF and FMD/SVD will develop a Standard Operating Procedure that outlines the proficiency testing scheme. This will not be too prescriptive and they will try to harmonise between FMD and CSF in first instance. This document will then be provided to the Community Reference Laboratories for other exotic viral diseases; (2) The primary goal of Proficiency Testing schemes is to evaluate lab (individual test and/or test system) performance against assigned values (qualitative or quantitative). Secondary purposes must be clearly separated in design and reporting. The scope and purpose of the Proficiency Testing exercises need to be clearly stated in advance; (3) The scope of the Proficiency Test needs to be fit for purpose and the purpose should be clearly defined in advance. Moreover, the scope of the Proficiency Test (outbreak, surveillance, etc.) should be agreed and clearly communicated to the National Reference Laboratories prior to the start of the Proficiency Test; (4) Statistical guidelines need to be followed where relevant. The design of PTS should be done so as to maximize the power of statistical analysis. Both trueness and precision should, if possible, be addressed; (5) Criteria for lab conformity must be set PRIOR to the start of the Proficiency Test. The scope will define whether the individual results and/or the complete test system is evaluated. DG-Sanco should provide a list of contacts for the National Reference Laboratories; (6) An Advisory Board should be established at the beginning of each Proficiency Testing exercise. The membership of this board should be limited to ~4 persons, but this should not be too prescriptive. Although, members have to be appointed at the beginning of the Proficiency Test and communicated to all participants, representatives should mainly be from participating labs, participants should be statistically represented and the Community Reference Laboratory should

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\(^1\) In article 78 it is stated that the group shall compose of epidemiologists, veterinary scientists and virologists in a balanced way
represent the EU opinion (A representative from regulatory bodies is not essential). (7) Reporting of a PTS should give (1) Feedback: the Community Reference Laboratories should provide a draft report prior to the annual meeting, the final report should include feedback from Proficiency Test participants (questionnaire?) and the report should include details of the scope, criteria, statistical approaches, findings, conclusions on non-conformities and recommendations; (2) Confidentiality: the consensus from the workshop was to maintain confidentiality between participants, decoded results will be provided to DG Sanco (for EU Member States); (3) Follow up: corrective actions to address non-conformities will be agreed between Community Reference Laboratory and National Reference Laboratory and communicated to DG SANCO; (4) To whom: to all the Proficiency Test participants and DG Sanco. Proficiency Test reports could be placed on a restricted access website.

These workshops were organized in cooperation with FAO EUFMD, Epizone, TAIEX, FMD ImproCon, EU DG RESEARCH, EU DG SANCO, OIE. The results will be published.

The objectives of this work package as described above have been fully met.

Reports available online:

- **D-WP5-1a**
  Information gathering report on the developments in FMD diagnostic techniques, validation, quality control of FMD diagnostics and reference standards.

- **D-WP5-1b**
  The importance of quality assurance/quality control in diagnostics to increase the confidence in global foot-and-mouth disease control.

- **D-WP5-2**
  Three workshops on the design and interpretation of post Foot-and-Mouth Disease vaccination serosurveillance by NSP tests. See files below.

  - **Vaccination Serosurveillance by FMD NSP Tests - Part 1**
    Workshop on the design and interpretation of post Foot-and-Mouth Disease (FMD)-vaccination serosurveillance by NSP tests: Part I (dense cattle countries).

  - **Vaccination Serosurveillance by FMD NSP Tests - Part 2**
    Workshop on the design and interpretation of post Foot-and-Mouth Disease (FMD)-vaccination serosurveillance by NSP tests: Part II (sheep-cattle area, South-East Europe).

  - **Vaccination Serosurveillance by FMD NSP Tests - Part3**
    Workshop on the design and interpretation of post Foot-and-Mouth Disease (FMD)-vaccination serosurveillance by NSP tests: Part III (Scandinavian and Baltic region).

- **D-WP5-3**
  Information gathering report on new developments in CSF diagnostic techniques, validation, quality control of CSF diagnostics and reference standards.

- **D-WP5-4**
  Ring Trials and Proficiency Testing for FMD/SVD and CSF National Reference Laboratories.

- **D-WP5-4**
  Agreement reached on diagnostic techniques and standards for CSF.
Major problems encountered and corrective actions.

No major problems were encountered.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

There were no major deviations from the project work programme.

4. Co-operation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/ Institution/Project</th>
<th>Contribution to FMD/CSF</th>
<th>Comments</th>
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<tr>
<td>01.07.2005 – 30.06.2008</td>
<td>Meindl-Böhmer, Alexandra Kühne, Sabine</td>
<td>CRL, Hannover, Germany</td>
<td>Coordination of WP activities; contacts to NRLs and others</td>
<td>In addition: Databases and reference materials; EPIZONE</td>
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<td></td>
<td>Koenen, Frank and various other experts (e.g. Volker Kaden, Mathias Kramer; Christoph Staubach, FLI, Germany; Sophie Rossi, ONCFS; France; Vittorio Guberti, IZS, Italy)</td>
<td>CODA, Brussels, Belgium</td>
<td>Cooperation with WP 5 – Diagnostics and WP 7 – Wild Boar</td>
<td>Diagnosis of CSF in wild boar; Sampling, monitoring and surveillance of wild boar populations; cooperation of the CA and the STREP project “CSFVaccine and Wild Boar”</td>
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<td>01.09.2006 – 30.06.2008</td>
<td>Hoffmann, Bernd</td>
<td>FLI, Island of Riems, Germany</td>
<td>Cooperation in WP 5 - Diagnostics</td>
<td>Cooperation especially on RT-PCR related topics; EPIZONE</td>
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<td>01.01.2007 – 30.06.2008</td>
<td>Uttenthal, Åse</td>
<td>DTU, Lindholm, Denmark</td>
<td>Cooperation in WP 5 - Diagnostics</td>
<td>DIVA diagnostics, EPIZONE</td>
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<td>01.01.2005-30.06.2008</td>
<td>All NRLs for CSF (especially H. Crooke, United Kingdom; K. Depner, Germany; M. Hofmann, Switzerland; F. Koenen,</td>
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<td>Validation data; Review of diagnostics; Help in amending Commission Decision 2002/106/EC</td>
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<td>01.01.2007 – 31.12.2007</td>
<td>FAO EUFMD EPIZONE TAIEX OIE DG RESEARCH DG SANCO Belgian Food Agency Veterinary Administration of the Republic of Slovenia</td>
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<td>01.01.2005- 31.12.2006</td>
<td>Additional contact persons from all NRLs for</td>
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5. **Major Publications**


WP 6: Laboratory preparedness

01/01/2005 – 30/06/2008

Leader: Åse Uttenthal

1. Work package objectives and starting point of work at beginning of reporting period

The large epidemics of foot-and-mouth disease (FMD) and classical swine fever (CSF) that have occurred in Europe in the last decade have illustrated the need for better contingency plans including also laboratory preparedness. By now many laboratories have a quality management system put in place and are accredited (or in the process of being so) according to international standards (e.g. ISO 17025). In parallel, many efforts are currently undertaken to develop laboratory contingency plans (LCPs). Thus, the first aim of this WP was to determine the current status of laboratory contingency planning for FMD and CSF.

Deliverable reports: D-WP6-1a, A global report on the current status of laboratory contingency planning for FMD; D-WP6-2a, A global report on the current status of laboratory contingency planning for CSF; D-WP6-3, The production of a manual for laboratory contingency planning against FMD; D-WP6-4, The production of a manual for laboratory contingency planning against CSF; D-WP6-1b, Addendum to global report (D-WP6-1a) and D-WP6-2b, addendum to global report (D-WP6-2a) had to be delivered.

2. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

A) Foot-and-mouth disease (FMD)

Key background materials for the work package were assembled and evaluated. Inter alia these included: The European Union Council Directive 2003/85/EC of 29 September 2003 on Community measures for the control of foot-and-mouth disease. Appendix XV. Functions and duties of National Laboratories; The Proceedings of the EUFMD Workshop on Contingency Planning for foot-and-mouth disease laboratory diagnostic activities. University of Cordoba April 2003; and the Guidelines for Laboratory Contingency Plans as developed by the United Kingdom Disease Emergency Response Committee (DERC) for Laboratories in 2005. The framework for a generic, EU-orientated, laboratory contingency plan (LCP) has been developed, taking cognisance of the European legal obligations and the procedural guidelines listed above. Drafts were circulated for comment and the Manual for Laboratory Contingency Planning against FMD has been produced (D-WP6-3).

A questionnaire was devised and circulated to elicit information on the global status of preparedness in FMD laboratories. Within time, 25 out of 67 laboratories (38%) replied to the questionnaire and 3 others replied later to give an overall response of 28/67
(42%). Of these 28 labs 19 (42%) had a LPC in place. A full report has been written on the result of the questionnaire (D-WP6-1a). The generic LCP for FMD (D-WP6-4) will be available as guidance for laboratories that wish to produce laboratory specific LCP.

B) Classical swine fever (CSF)

In order to assess the current status of laboratory contingency planning for CSF all 25 European NRLs for CSF and 15 additional CSF laboratories (in total 40 laboratories of 36 countries world-wide) were contacted in the beginning of the project and asked whether (a) the lab was in possession of a Laboratory contingency plan (LCP) and (b) if the lab had ever performed an exercise on laboratory preparedness. LCPs were collected from those laboratories that were in possession of such a plan and which were willing to distribute it for the use of the CA (see D-WP6-2a). The plans were partly translated into English and used as basis for the preparation of a manual on laboratory contingency planning.

A working group of laboratory experts on CSF was then established and a workshop on “Laboratory contingency planning and laboratory exercises” was conducted at the premises of the Community Reference Laboratory (CRL) for CSF in Hannover, Germany in February 2008 in close cooperation of the NVI, Denmark, the CODA-CERVA, Belgium and the CRL, Germany. Twelve invited participants from 11 countries participated in this workshop. Participants were chosen as they came from countries with existing Laboratory contingency plans.

As results of this workshop

- Guidelines for laboratory contingency planning, (Alexandra Meindl-Böhmer, Åse Uttenthal, Frank Koenen: 2008), and
- Guidelines for performing a (real-time) laboratory exercise on classical swine fever, (Åse Uttenthal, Frank Koenen, Alexandra Meindl-Böhmer: 2008)

were produced. These manuals are now publically available at the web space of the CA and also at the website of the CRL for CSF for the use by the laboratories: D-WP6-4.

As a result of the initial assessment it also became obvious that only few laboratories performed exercises and it was decided to write a publication on how to perform a laboratory exercise “Real-time Laboratory Exercises – Experiences from two National Laboratories for Classical Swine Fever”, which was published in 2007 (see below). The publication describes the experiences of two national reference laboratories for CSF. Pitfalls and shortcomings that were encountered during the laboratory exercises are depicted and lessons learnt are analysed. Thus, a general guideline for planning and conducting “real-time” laboratory exercises was generated, which can be used by other laboratories working on infectious diseases.

Presentations on the progress of the workpackage were given at the Annual Meetings of NSFIs for CSF in 2005, 2006 and 2007. The guidelines on laboratory contingency planning and laboratory exercises were presented in more detail during the Annual Meeting 2008.

**Major problems encountered and corrective actions.**

No problems were encountered. However, D-WP6-1b and D-WP6-2b Addenda to global reports for CSF and FMD were not produced.
In 2007 CSF laboratories were contacted again. As no significant changes to the previous survey were found and no new results were gained, it was decided not to produce a separate addendum to the global report on the current status of laboratory contingency planning for CSF as described in D-WP6-2a.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

There were no deviations from the project work programme.

4. Cooperation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/Institution/Project</th>
<th>Contribution to FMD/CSF</th>
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<tbody>
<tr>
<td>01.01.2006-31.12.2006</td>
<td>Tony Garland, John Bashiruddin, David Paton</td>
<td>Community Reference laboratory for FMD, Pirbright, UK</td>
<td>FMD</td>
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<tr>
<td>June 2006</td>
<td>M. Dalla Pozza</td>
<td>ISZ Venezia</td>
<td>CSF-LCP</td>
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<tr>
<td>19.02.2008-20.02.2008</td>
<td>Please see participant list of workshop</td>
<td>various</td>
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5. Major Publications

A global report on the current status of laboratory contingency planning for Classical Swine fever. Åse Uttenthal and Alexandra Meindl-Böhmmer. Submitted to the CA authorities in fulfilment of Deliverable D-WP6-1b.


WP 7: Wild Boar

01/01/2005 – 30/06/2008

Leader: Volker Moennig

1. **Work package objectives and starting point of work at beginning of reporting period**

   Many European Countries have large wild boar populations. As a general trend population sizes are increasing to levels at which infectious diseases such as Classical swine fever (CSF) can be maintained endemic within wild boar (meta) populations for many years once introduced. At present (nearly) all Member States of the EU are practically free of CSF in domestic pigs. However, CSF was recently or still is currently present in parts of the wild boar population in several (geographic) regions of EU Member States, e.g. in France, Germany and the Slovak Republic. It is also present in several Eastern European countries, some of which will shortly join the EU (Bulgaria, Romania).

   The presence of CSF in wild boar populations poses a continuous threat to domestic pig populations as a variety of routes of direct and indirect contact enable the infection to be spread from wild boar to domestic pigs or vice versa. Consequently, disease control must encompass both domestic and wild pig populations. The prerequisite and the basis of each promising strategy to control CSF in wild boar require a thorough knowledge and analysis of:
   
   - (a) Wild boar ethology,
   - (b) Pathogenesis and course of CSF infection in wild boar,
   - (c) Influence of interfering human activities, e.g. feeding, hunting, and vaccination.

   The Objective of WP 7 “Wild Boar” is therefore to review strategies for the control and eradication of CSF in wild boar and research related to these issues.

   Deliverables were: **D-WP7-1**, Inventory of research programmes/projects dealing with CSF and eradication strategies in wild boar; **D-WP7-2**, Policy objectives and orientations of the major national/international regulatory bodies; and, **D-WP7-3**, Report of task force on long term prospects of control of CSF in wild boar.

2. **Progress towards Objectives**

   (tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

   In order to get an overview of the CSF situation in wild boar in Europe an extensive literature review and web search was performed. In addition international organisations e.g. Food and Agriculture Organisation of the United Nations (FAO) were contacted and asked to provide names and addresses of scientists working in the field of wild boar. Afterwards scientists were asked to provide information on current research programmes.

   In addition the National Reference Laboratories (NRL) of European countries were asked to provide information on the estimated size of the wild boar populations and the
number of samples investigated for CSF. The results of these queries can be found in the deliverable report: D-WP7-1a.

For updating this report, an extensive web-based search for new articles on wild boar published between 2005 and 2007 was performed. Scientific publications were catalogued and systematically analysed. The scientists and research groups with their addresses were added to a list which was already established in 2005. One scientist per group was contacted by email and informed about the CA. A questionnaire was distributed asking for information on current research projects. The answers were evaluated, and with the geographical information maps were created depicting areas where research on wild boar is performed (see D-WP7-1b).

In co-operation with the EU-funded STREP project “CSF Vaccine and Wild Boar” (SSPE-CT-2003-501599, Coordinator Dr. Frank Koenen, CODA, Belgium) a core working group was established and a first workshop was held at the premises of the Community Reference Laboratory for CSF (CRL) on November 16th/17th 2005. The group consisting of epidemiologists, wildlife biologists and virologists focussed on recent outbreaks/epidemics of the disease in wild boar populations, mathematical modelling of the disease and discussed future research demands. A second workshop was held on April 5th/6th at the Friedrich-Loeffler-Institute, Wusterhausen, Germany, to which additional experts from EU member states (Belgium, France, Germany and Italy) were invited. Recent models were discussed and gaps in our knowledge that need to be filled were identified. Research co-operations and exchange of data were agreed upon.

In October 2006 a workshop of the wild boar working group was held at Kykkos, Cyprus in advance of the wild boar symposium. In contrast to the previous workshops this time emphasis was put on wild boar behaviour and ethology. To this means the group was composed of virologists, wildlife biologists and wildlife epidemiologists. In cooperation with the Institute for Wildlife Research at the University of Veterinary Medicine Hannover a network of European wildlife biologists working on wild boar was established. The aims of this network are amongst others to facilitate the exchange of information and data between scientists, to unify monitoring of population densities within Europe, to analyse the influence of interfering human activities, and in the end to develop a decision support system for game management.

In April 2007 a workshop on “Modelling CSF in wild boar” has taken place in Munich, Germany as a follow up meeting of the workshop in Wusterhausen. The workshop was organized in co-operation with the STREP project “CSF Vaccine and Wild Boar”. The participants presented their improved models for population dynamics, infection of wild boar and eradication strategies. The partners agreed to use the SEIR model developed by the scientists from Bologna (Vittorio Guberti, Massimo Fenati).

During a workshop on Classical Swine Fever – Assessment of control tools and research gaps in April 2008 in Hannover, Germany amongst others main research and knowledge gaps in wild boar were discussed. This lack of knowledge hampers effective and quick eradication of CSF in wild boar and the development of long term strategies. The presentations, discussions and conclusions of this workshop are summarised in the report: “Future needs and goals of CSF research”, available at the CA website.
In order to get additional information from leading wild boar specialists a questionnaire was compiled and sent out. The questionnaires asked the experts for their opinion regarding main research gaps, constraints which hamper eradication of CSF and the development of long term strategies and best practice guidelines. The answers are listed and summarised in the deliverable report D-WP7-3 “Report of task force on long term prospects of control of CSF in wild boar”. Deliverable report D-WP7-2 Policy objectives and orientations of major national/international regulatory bodies was delivered together with report D-WP7-3, because there were no new policy objectives.

3. **Deviations from the project work programme, and corrective actions taken/suggested**

   (identify the nature and the reason for the problem, identify contractors involved)

   Deliverable report D-WP7-2 was delivered together with report D-WP7-3, because there were no new policy objectives.

4. **Co-operation with other projects/associated partners**

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<tr>
<th>Date/Period</th>
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<th>Organisation/Institution/Project</th>
<th>Contribution to FMD/CSF</th>
<th>Comments</th>
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<tr>
<td>01.01.2006-31.12.2006</td>
<td>Meindl-Böhmer, Alexandra</td>
<td>CRL for CSF, Hannover, Germany</td>
<td>CSF</td>
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<td>Depner, Klaus</td>
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<td>Rossi, Sophie</td>
<td>Office nat. de la chasse et de la faune sauvage, Gieres, France</td>
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<td>Ulf Hohmann</td>
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<td>Wild life biologist</td>
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Cooperation with STREP-project “CSFVaccine and Wild Boar” (SSPE-CT-2003-501599), Coordinator Dr. Frank Koenen, Coda, Ukkel, Belgium.

5. Major Publications

None.
WP 8: Refinement of disease management and control options

01/01/2005 – 30/06/2008

Leader: Keith Sumption (FMD) and Willie Loeffen (CSF)

1. Work package objectives and starting point of work at beginning of reporting period

The overall objectives of WP8 are to identify potential changes to disease management options arising from new scientific or production system developments, and assist decision making on short and longer term disease management options of FMD and CSF (WP leaders: Partner 9 and Partner 4). The partners have gathered and analysed information that has been reported in D-WP8-1, Inventory of practical control strategies, decision support models and expert consultation on selection and use; D-WP8-2, Web-accessible inventory of recent FMD control experiences; D-WP8-3, Best practice guidelines in application of emergency vaccination against FMD and CSF; D-WP8-4, Report of CSF working group from Task 8.4; and D-WP8-5, Report of the working group; Future of FMD and CSF control, options and outlook.

2. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

Two reports on inventory of control strategies for CSF (D-WP8-1a) and recent FMD control experiences (D-WP8-2a) were produced. Most of the progress was on FMD real-time alert exercises/simulation exercises. Best practice guidelines on emergency vaccination were due February 2007.

A workshop on the Implementation of Emergency Vaccination programmes in Livestock was held at FAO, Rome, Italy on 2-4 April 2007. The aim of this exercise was to bring together practical experience and theoretical knowledge from within and outside Europe on technical issues associated with vaccine delivery for a range of infectious diseases of livestock. The meeting/workshop spread the time evenly between formal presentations and structured working group activities with opportunities to discuss, consider and recommend how best the lessons learned could be applied to future FMD and CSF outbreaks in Europe. It was also used as an opportunity to identify gaps which need to be filled to ensure optimal future preparedness for the implementation of emergency vaccination programmes (EVPs).

The FMD presentations dealt with recent experience of the use of emergency vaccination against FMD in The Netherlands and Uruguay and the contingencies for future vaccination in the UK and The Netherlands. Emergency vaccination against CSF is rare in Europe but recently it has been approved in Romania to control an upward trend of the incidence of the disease in that region. Domestic pigs, wild pigs and wild boar are vaccinated in Romania. In Russia, parts of the Federation have endemic FMD and both reactive emergency vaccination and ongoing prophylactic vaccination programmes are
used to control the disease there. Vaccination programmes are used against Bluetongue in Italy and against Highly Pathogenic Avian Influenza (HPAI) were also discussed and the proceedings are presented in D-WP8-3.

A workshop on ‘Improved eradication of classical swine fever (CSF) using emergency vaccination programmes’ was held in Hannover, Germany on 25-26 September 2007. Strategies for vaccination and the consequences of vaccination were discussed. The proceedings that include recommendations are in D-WP8-4.

Major problems encountered and corrective actions

The limited number of questionnaires that has been received (Task 8.1), and the necessity to send out several reminders, has delayed the writing of the report. This will have no effect on the outcome, but the initial time schedule was not met. The report was written mainly using publicly available sources now.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

The proposed deviation to WP 8 task 2 was gather information on experiences from simulation exercises, given the lack of relevant recent experience in FMD in countries applying the EC Directive.

4. Cooperation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Organisation/ Institution/Project</th>
<th>Contribution to FMD/CSF</th>
</tr>
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<tbody>
<tr>
<td>Nov 2006-Jan 2006</td>
<td>CVO’s and CSF researchers from countries with recent CSF outbreaks</td>
<td>Questionnaire</td>
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<tr>
<td>02.04.2007-04.04.2007</td>
<td>23 Participants in Rome Workshop</td>
<td>FMD &amp; CSF</td>
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<tr>
<td>25.09.2007-26.09.2007</td>
<td>Participants in the Hannover Workshop</td>
<td>CSF</td>
</tr>
</tbody>
</table>

5. Major Publications

None.
WP 9: Central Network Resource

01/01/2005 – 30/06/2008

Leader: John Bashiruddin

1. Work package objectives and starting point of work at beginning of reporting period

The overall objectives are to develop an FMD and CSF network, through an electronic communications centre which will provide a platform of internet-based tools to be used by partners and other interested parties, to enable: (1) Effective information exchange between partners on technical and administrative CA-related FMD and CSF activities (restricted-access website); (2) Information related to the CA to be imparted to the wider scientific community and to other stakeholders with an interest in the control of FMD and CSF (open-access website); (3) Feedback to be imparted from the wider stakeholder community, so that concerns and issues can be identified and then considered by the CA network.

Each reporting period has D-WP9-1 (Inventory of key electronic links, key contributors, key stakeholders and needs assessment, options), D-WP9-2 (Create and administer the restricted- and open-access websites, maintain development) and D-WP9-3 (Report).

2. Progress towards Objectives
(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

A web-based communications platform was developed that contained general information and resources relevant to FMD. Open and restricted areas were created that catered for dissemination of information including partnerships, workplans and outputs from this project and links to other information services and project websites, and private working spaces for exclusive use by members of this project. This site will be closed at the end of August 2008 at the end of the project. However, a new website (Reference Laboratories Information System) developed for the FMD Reference Laboratories Network (see WP2) as the information and communications platform for network members will contain all the outputs of this project in a public space. The public will be automatically redirected from the old to the new site. Information on CSF may be accessed from the CSF CRL site.

Two extra workshops were organised under this WP to encourage stakeholder interest and inputs. The “First Disease Control Workshop: Stakeholders’ Interests in the use of Science/Technology and Decision Making” was held on 12 May 2006 at the Institute of Animal Health – Pirbright. The participants included representatives from the National Farmers Union (UK), British Veterinary Association, Royal College of Veterinary Surgeons, Royal Veterinary College, Veterinary Laboratories Agency, Elm Farm Research Centre, COPA-COGECA, European Livestock Association, NBvH (Dutch Smallholders Association), European Livestock and Meat Trading Union, Federation of Veterinarians of Europe, Defra, SVS-Scotland, the Netherlands Ministry of Agriculture, Institute of Veterinary Medicine Hannover, IAH-Pirbright and others. Discussion
focused on (a) the use of diagnostic tests; (b) control measures; and (c) stakeholders’ involvement in disease control.

The “Second International Disease Control Workshop Stakeholders’ Interests in the use of Science/Technology and Decision Making: The future of science-based prevention and control of transboundary animal diseases” was held in conjunction with the European Livestock Association in Brussels on 17-18 October, 2007. It was attended by 66 participants that are listed. The programme and presentations are available (here).

A final report from the Stakeholder Representative, Mary Marshall, that includes Recommendations from both Disease Control Workshops are available:


Deliverable reports for WP9 are also available:

- D-WP9-1a, 2a, 3a;
- D-WP9-1b, 2b, 3b;
- D-WP9-1c, 2c, 3c.

Major problems encountered and corrective actions

No major problems were encountered.

3. Deviations from the project work programme, and corrective actions taken/suggested (identify the nature and the reason for the problem, identify contractors involved)

Extra workshops were undertaken in 2006 and 2007 to encourage stakeholder participation.

4. Co-operation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/Institution/Project</th>
<th>Contribution to FMD/CSF</th>
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<td>01.01.2007-30.06.2008</td>
<td>WP3.2, WP6.4, WP7.2</td>
<td>EPIZONE</td>
<td>FMD &amp; CSF</td>
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</table>
5. Major Publications

WP 10: Coordination and Dissemination Meetings – FMD and CSF

01/01/2005 – 30/06/2008

Leader: John Bashiruddin and Sabine Kühne (Alexandra Meindl-Böhmer)

1. Work package objectives and starting point of work at beginning of reporting period

The objectives of WP 10 were to ensure good communications between the members of the CA and associates, to monitor the progress of the CA and to ensure that reports were produced in a timely manner, to oversee the direction of the CA and the use of the financial means, to ensure that the activities of the CA were used to strengthen existing structures that promote collaborative effort so as to provide synergy and not competition or duplication and to disseminate information on the progress of the CA through a series of annual meetings in collaboration with DG SANCO.

Within this reporting period D-WP10-1c1, 1c2 (Annual Scientific Meeting FMD and CSF), D-WP10-2c1, 2c2 (Proceedings of Annual Meeting FMD and CSF) and D-WP10-3 (Minutes of steering group meetings) had to be delivered.

2. Progress towards Objectives
   (tasks worked on and achievements made with reference to planned objectives, identify contractors involved)

It was decided at a previous steering meeting that joint annual FMD and CSF meetings were to be held. The FMD/CSF Annual Project Meeting was held at IAH, Pirbright on 17th December 2006 and is reported in (D-WP10-1b1, 1b2).

The CO ascertained from conversations with CRs that a Steering Group Meeting was not needed in 2007/2008.

The Annual Meeting organised by the Community Reference Laboratory for CSF, Hannover, Germany took place at Hannover on June 4-5, 2007. A total of 83 participants from 35 countries that came from the NRLs for CSF of 26 of the EC Member States, 1 Acceding Country, (Croatia), Bosnia, Canada, Macedonia, Norway, Russia, Serbia, Switzerland and the USA attended the meeting. In addition, representatives of DG SANCO and the FVO, Grange, Ireland also participated.

Presentations were grouped in seven major sessions which focused on:
- CSF situation in Europe
- CSF situation in candidate and neighbouring countries
- Progress of Coordination Action and specific targeted research projects
- Diagnostic Manual and Technical Annex accompanying it
- Reports on Community Reference Laboratory activities
- Diagnosis and surveillance of CSF

Presentations given at the meeting can be accessed on the website of the CRL for CSF. However, this is a restricted area which is not open to the public! Passwords can be
obtained on demand from the CRL (crl@tiho-hannover.de). Agenda conclusions and
proceedings were reported in D-WP10-1c1 and D-WP10-2c1, respectively.

A similar meeting was held in Hannover on May 5-6, 2008 and the proceedings and
presentations were reported in D-WP10 (extra).

Similarly, Annual Meetings of the FMD NRLs organised by Community Reference
Laboratory for FMD, Pirbright, UK have taken place at Brussels in 22-23 November
presentations are available to registered users in a special area of ReLaIS but, on the
insistence of the EU, this area is not open to the public. Permission may be obtained
from the CRL.

Additional coordination and dissemination of the work of the CA to a world audience
has also been afforded by joint meetings held under WP1 and reported in D-WP1-3
FMD, D-WP1-3 CSF, and in WP4.

Major problems encountered and corrective actions

No major problems were encountered.

3. Deviations from the project work programme, and corrective actions taken/suggested
(identify the nature and the reason for the problem, identify contractors involved)

There were no major deviations from the project work programme.

4. Co-operation with other projects/associated partners

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/Institution/Project</th>
<th>Contribution to FMD/CSF</th>
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<td>01.01.2007-30.06.2008</td>
<td>various</td>
<td>NRLs for FMD and CSF</td>
<td>FMD/CSF</td>
</tr>
<tr>
<td>01.01.2007-30.06.2008</td>
<td>various</td>
<td>IAEA</td>
<td>FMD</td>
</tr>
<tr>
<td>01.01.2007-30.06.2008</td>
<td>various</td>
<td>ARS, USA</td>
<td>CSF</td>
</tr>
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</table>

5. Major Publications

None.
WP 11: Management and Administration

01/01/2005 – 30/06/2008

Leader: David Paton (John Bashiruddin, Alexandra Meindl-Böhmer and Sabine Kühne)

1. **Work package objectives and starting point of work at beginning of reporting period**

   The objectives of this workpackage are the financial management of the CA including the management of the receipt and distribution of financial support from the EC and to inform DG Research of the progress of the CA, including the preparation and delivery of financial statements and the submission of technical reports.

   Within this reporting period D-WP11-1c (Annual Scientific Reports) and D-WP-11-2c (Annual Financial Statement) have to be delivered.

2. **Progress towards Objectives**

   *(tasks worked on and achievements made with reference to planned objectives, identify contractors involved)*

   There were no funds from DG Research to be redistributed to the Partners in this reporting period. The Project Scientific Officer approved the Scientific Report from the Second reporting period. The Administration of Finance Unit of DG Research approved the Financial Report for the Second Period. An extension in time of 6 months was granted.

   **Major problems encountered and corrective actions.**

   No major problems were encountered. Changes in names of a CR and legal entities of others meant that some additional administrative tasks needed to be carried out.

3. **Deviations from the project work programme, and corrective actions taken/suggested**

   *(identify the nature and the reason for the problem, identify contractors involved)*

   There were no major deviations from the project work programme.

4. **Co-operation with other projects/associated partners**

<table>
<thead>
<tr>
<th>Date/Period</th>
<th>Name</th>
<th>Organisation/Institution/Project</th>
<th>Contribution to FMD/CSF</th>
</tr>
</thead>
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<tr>
<td>01.01.2007-30.06.2008</td>
<td>A. Meindl-Böhmer, S. Kühne, B. Laüder</td>
<td>Germany</td>
<td>FMD and CSF</td>
</tr>
</tbody>
</table>

5. **Major Publications**

   None
Coordination Action for FMD and CSF

Section 3

Consortium Management

This project seeks to build on the existing networks of FMD and CSF laboratories within Europe that centre upon the EUFMD and its research group and on the FMD CRL and CSF CRL and its annual meetings of NRLs. Thus this CA involves partners from community and national reference laboratories, other key research laboratories, decision makers and representatives of international organisations experienced in co-operating in European (and worldwide) projects and stakeholders representing livestock keepers.

The management of the CA is described in the relevant workpackage (WP10) and a report may be seen above. There are no major deviations from the plan; there have been some changes in named personnel as follows: Dr. John Bashiruddin is the CA manager and co-workpackage leader for WP1 and for WP2 together with Dr. David Paton who is also the FMD sub-group leader and Coordinator of the Action. Dr. Sabine Kühne replaced Dr. Alexandra Meindl-Böhmer as the CSF sub-group manager. Dr. Tony Garland, Mary Marshall (stakeholder representative) and Dr. Paul Agapow are sub-contractors to the coordinator. There have been some changes to the list of workpackage leaders in the third reporting period as described above. These changes will not affect the overall delivery of the project objectives.

Although there are no specific project activities of Partners 10 and 11, who do not receive project funding, to report their participation is documented elsewhere for WP1 and 9.

Co-operations that extend the coordination have been made with other EU projects: STREP-project “CSF Vaccine and Wild Boar”, ETPGAH and EPIZONE.

A project status bar chart up to the end of 2007 follows. Activities completed in 2008 include:

- Workshops for WP1 on gaps in FMD and CSF research;
- Strategy for FMD surveillance and control for WP2, and continued joint activities of the OIE/FAO FMD Reference Laboratories Network;
- WP4, formation of the Vaccine Banks Network of managers and continued communications;
- WP6, provision of generic laboratory contingency plans for CSF and FMD;
- Updates on the CSF/Wild Boar problem, WP7;
- Establishment of a web based laboratory information system for FMD, WP9;
- Final project reports and access to on line deliverable reports.
Coordination Action for FMD and CSF

Annex 1

Plan for using and disseminating knowledge

Section 1 - Exploitable knowledge and its Use

There are no commercially exploitable results. However, access to current laboratory information on samples received by the World Reference Laboratory for FMD is available through the mapping facility of ReLaIS, FMD Database. Generic laboratory contingency plans for CSF and FMD that could be used as a basis for similar documents throughout the EU are openly available through the project website.

Overview table

<table>
<thead>
<tr>
<th>Exploitable Knowledge (description)</th>
<th>Exploitable product(s) or measure(s)</th>
<th>Sector(s) of application</th>
<th>Timetable for commercial use</th>
<th>Patents or other IPR protection</th>
<th>Owner &amp; Other Partner(s) involved</th>
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Section 2 – Dissemination of knowledge

Overview table

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<th>Type of audience</th>
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<th>Size of audience</th>
<th>Partner responsible /involved</th>
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<td>150 registered users</td>
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<td>IAH</td>
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<td>Researchers</td>
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<td>&gt;300</td>
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<td>23 to 25</td>
<td>International Meeting</td>
<td>CSF Reference</td>
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<td>No</td>
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<td>Partner responsible /involved</td>
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<td>7</td>
<td>05-02-2007</td>
<td>on Design and Analysis of Diagnostic Test Evaluation Studies,</td>
<td>Laboratories</td>
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<td>IAH</td>
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<td>WS1, Ukkel, Belgium, ReLaS, FAO, Rome</td>
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<td>ReLaS, FAO, Rome</td>
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<td>9</td>
<td>26-28-04-2007</td>
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<td>Epizone Annual</td>
<td>International</td>
<td>EU</td>
<td>30</td>
<td>IAH</td>
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<td>Evaluation Studies, WS2, Ukkel, Belgium,</td>
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<td>Workshop on the use of vaccine for the eradication of CSF,</td>
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<tr>
<td></td>
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<td>Hannover, Germany</td>
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<td>25 to 26-09-2007</td>
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<td>Coordination of FMD Research, Vienna</td>
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<td>Worldwide</td>
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<td>IAH/IAEA</td>
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<tr>
<td>14</td>
<td>03 to 07-12-2007</td>
<td>Future needs and goals of CSF research,</td>
<td>Stakeholders</td>
<td>Worldwide</td>
<td>45</td>
<td>TiHo</td>
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<td>15</td>
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<td>EU</td>
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<td>16</td>
<td>09 to 11-01-2008</td>
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<td>UK</td>
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</tbody>
</table>
Section 3 - Publishable results

Although there is no exploitable result directly from this CA some related publications arising from cooperation between laboratories are listed below:


Gloster J, Doel C, Gubbins S, Paton DJ. Foot-and-mouth disease: Measurements of aerosol emission from pigs as a function of virus strain and initial dose. Vet J. 2007 Sep 7; [Epub ahead of print]


Inoue T, Parida S, Paton DJ, Linchongsunbongkoch W, Mackay D, Oh Y, Aunpomma D, Gubbins S, Saeki T. Development and evaluation of an indirect enzyme-linked immunosorbent assay for detection...


Valarcher JF, Gloster J, Doel CA, Bankowski B, Gibson D. Foot-and-mouth disease virus (O/UKG/2001) is poorly transmitted between sheep by the airborne route. Vet J. 2007 Jul 11;


**Selected Scientific Publications on CSF, 2005-2008.**

- **Blome, S., A. Meindl-Böhmer, G. Nowak, and V. Moennig.** Disseminated intravascular coagulation does not play a major role in the pathogenesis of classical swine fever. Submitted.


**Publications on related pestiviral diseases:**


