



FMD and CSF Coordination Action



Improved eradication of classical swine fever (CSF) using emergency vaccination programmes: use and consequences of vaccination

FMD and CSF Coordination Action - Workpackage 8,
Disease Control
CIDC-Lelystad, Lelystad, The Netherlands; and
CRL for CSF, Institute for Virology, Hannover, Germany





Workshop on

“Improved eradication of classical swine fever (CSF) using emergency vaccination programmes: use and consequences of vaccination”

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FMD and CSF Coordination Action
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Conclusions and Recommendations

Scope

- Discuss the use of strategies involving the use of vaccine for the eradication of CSF.

Conclusions

- Vaccination is part of a strategy to control or eradicate CSF.
- Emergency vaccination might be a useful tool, especially in the framework of a non-vaccination policy.
- A number of modified live CSF vaccines are available, however, only a few have been shown to fulfil the requirements of the OIE.
- Currently available marker vaccines do not fulfil the criteria of the OIE manual, however, they are suitable to be used to reduce the number of susceptible animals and stop infection with field virus. The currently available subunit vaccines are the only CSF marker vaccines that have a European license.
- Current EU legislation allows emergency vaccination using conventional modified live vaccines and marker vaccines.
- Control strategies involving emergency vaccination have been or are being prepared by a few Member States
- In current EU legislation, restrictions apply to vaccinated animals and their products if vaccinated and infected animals can not be differentiated from each other. However, derogations can be made for the products of marker vaccinated animals.
- Despite the favourable legal situation, intra community trade with products from marker vaccinated animals seems to be difficult, due to considerable scepticism and reservations among stakeholders. The reaction of Third Countries is unpredictable
- A number of promising live marker vaccines are under development, however, commercial incentives to license these products and to make them commercially available are low or even completely lacking.

Recommendations

- EFSA should be asked to carry out a risk assessment concerning the safety of products of vaccinated animals. Different strategies with and without vaccination should be compared.
- Incentives have to be created for the licensing of novel live marker vaccines.
- The solving of trade conflicts taking into account intra community trade and trade with Third Countries should be continued in peace time. This includes the acceptance of products of vaccinated animals by all stakeholders.
- New disease control strategies elaborated by Member States must have a broad scientific basis. The Member State should be prepared to implement the new strategy on its own territory first.
- Efforts to improve marker vaccines and accompanying diagnostic tests should be continued.
- The use of new diagnostic tests and marker vaccines should be evaluated for their suitability in improved control strategies.
- Communication and exchange of opinions and concerns should be considered amongst all stakeholders.
- Compensations for losses due to trade of meat and meat products from vaccinated animals should be considered.

Introduction

In the last decade, several large outbreaks of exotic animal diseases have occurred in the EU. Classical swine fever, foot-and-mouth disease and avian influenza were responsible for the loss of life of millions of animals and billions of euro's in terms of economical damages.

Some of these outbreaks (CSF in the Netherlands in 1997/98, FMD in the UK in 2001 and AI in the Netherlands in 2003) turned out to be impossible to eradicate within a reasonable time and with limited damages for the agricultural society and society in general. The call for alternate eradication strategies became however louder and louder, especially in the countries that experienced those devastating outbreaks.

Even though the EU has a non-vaccination policy for certain diseases, emergency vaccinations in case of outbreaks are allowed. However, to protect trade partners, there are trade restrictions to be observed. Especially for exporting countries, these restrictions would have an economic impact of such a magnitude that in effect almost no one applies for the option of such an emergency vaccination, especially with the aim of letting the vaccinated animals live out their normal lifespan. Emergency vaccinations that were applied during the FMD outbreak in the Netherlands in 2001 for instance, were followed by the destruction of all vaccinated animals in order to be able to export animals and animal products again as soon as possible.

In case of CSF, exceptions can be applied to those rules within the EU in case of vaccination with a marker vaccine. This opens up the possibility to use emergency vaccination without the unacceptable economic impact such a decision would have. Although registered marker vaccines are available, doubts with respect to the efficacy and the acceptance of vaccinated animals by consumers, in the intra community trade market and in trade markets outside the EU results in a huge reluctance to use these vaccines.

The workshop, that was organized by the Community Reference Lab for CSF and CIDC-Lelystad, was targeting the crucial issue of acceptance. Based on the current status of vaccines and marker vaccines against CSF, and strategies that have been drafted, the main question that remains is what to do afterwards?

- How do governments and official agencies feel about the use of (marker) vaccines?
- What can we expect from farmers, slaughter houses, retailers and consumers?
- What kind of developments can we expect from scientists to make it easier for all stakeholders to accept the use of vaccines in the eradication of CSF?

For the workshop, all major stakeholders were invited to participate and present their point of view, however, not all of them showed interest to attend the meeting. EU, OIE and FAO presented their position on (emergency) vaccination. COPA-COGECA presented the position of the farmers and VION, as one of the major meat processing companies in the EU, presented their position. Unfortunately, several retail organisations, as well as international retailers in the EU and large national retailers (the Netherlands and Germany) declined to participate in the workshop and present their views on the issue of vaccination. The same was true for several international and national (the Netherlands and Germany) consumers' organisations.



Presentations

Abstracts of the presentations were in most cases provided by the speakers. In other cases, a short summary was put together from the presentation, using several key slides.

Role of vaccination in the control of CSF (including historical experiences)

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Historically vaccination has always been an important tool for the control of classical swine fever (CSF) and several generations of vaccine had been developed. First attempts to vaccinate date back to the beginning of the last century, when pigs were infected with live virus and simultaneously treated with serum from immune pigs. This high-risk practice was replaced in the 1930s and 1940s by the use of inactivated vaccines, e.g. formalin or crystal inactivated virus from blood and organs of infected pigs. However, these vaccines proved rather inefficient, and the subsequent development of modified live vaccines (MLVs) was a major step forward. Although reliable and published data are scarce, MLVs - over time - turned out to be highly efficacious and safe in pigs of any age. They induce a virtually complete protection against challenge with pathogenic virus. Today the GPE⁻, Thiverval, PAV-250 and the lapinised C-strains are in use worldwide. The latter is probably the most popular MLV against CSF. When properly used MLVs are powerful tools for prophylactic protection of domestic pigs against CSF. In many countries struggling with endemic CSF, MLVs are being used in order to limit economical damage. The systematic use of MLVs often was and is the first step in the eradication of CSF. In several Member States of the European Union (EU), the combination of prophylactic mass vaccination and culling of infected pigs in endemic regions has made it possible to almost eradicate the disease. However, it is not possible to discriminate between infected and vaccinated animals, thus hampering disease control measures that rely on serology. Therefore, vaccination was banned at the end of 1990 before the internal common market was established in the EU. Vaccination is allowed only in severe emergencies and they are followed by strict restrictions on the international trade in pig products from regions and/or countries using vaccination. To avoid these problems, marker vaccines which allow differentiation of infected from vaccinated animals (DIVA) have been developed. There are several approaches published, ranging from protective peptides, single expressed proteins, naked DNA and chimeric viruses. To date, at least one subunit vaccine based on the E2 glycoprotein is commercially available and has been tested extensively for its efficacy. The accompanying discriminatory tests are based on an ELISA detecting another viral glycoprotein that is not included in the vaccine, the Erns. CSF subunit vaccines were found to be less efficacious than live attenuated vaccines. In addition, the currently available discriminatory tests do not provide high enough specificity and sensitivity to be used on individual animals only. There is an urgent need for more advanced (live) marker vaccines and better discriminatory tests. However, one major limiting factor for further developments of DIVA vaccines against CSF is the small market potential for these products.

Due to severe problems with re-emerging CSF in several South Eastern European countries the role of vaccination with MLVs and marker vaccine is currently being discussed.

Current eradication strategies of Classical swine fever: Ethical implications and considerations

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The use of animals and their products is generally accepted as a routine aspect of daily life around the world. However, the increasing awareness and sensitivity for our moral responsibility towards animals and rapid changes in production systems over the last decades have made agriculture and especially farm-animal welfare a public issue. This is particularly true when we deal with responses to outbreaks of classical swine fever (CSF), foot and mouth disease (FMD), avian influenza (AI), etc. Therefore, the main two ethical questions of the presentation are whether the current measures taken in case of CSF outbreaks can be justified, and whether they can solve the ethical problems.

After an introductory outline (1) of the current eradication strategies' moral problems, the argument will be put forward that they are justifiable on the basis of a 'harm to others' principle (2). This principle is applicable in the case of governmental interventions during an outbreak of an animal disease. However, governmental policy is not limited to controlling outbreaks, but formulates strategies for prevention in order to limit the 'risk of harm' (3). Consequently, methods to evaluate strategies in case of outbreaks (4) and approaches to prevent them (5) will be discussed.

Following the first approach, a strategy of ethical evaluation, known as the Animal Disease Intervention Matrix (ADIM) will be introduced (4). It can serve as a means to compare morally relevant effects of different eradication strategies. Besides its advantages, this strategy has the disadvantage to only compare different strategies of intervention whereas strategies of prevention do not get into focus.

In the next section (5) the focus will be shifted on two approaches of animal disease prevention and its implications. Whereas the first deals with technical measures within the existing agricultural system (conservative approach), the second suggests to change the agricultural system in order to reduce the likelihood of CSF (progressive approach). Only the second approach promises to address and respect the public's view of CSF: As the result of a wrong agricultural policy.

With regard to (3)–(5) conclusions will be drawn in (6). In ethical terms, future strategies to control and prevent CFS will only be morally acceptable if they fulfil two criteria: On the one hand, measures taken have to meet certain societal values such as minimizing harm to affected parties in case of emergency, on the other hand they have to contribute to a morally justified agricultural policy.

Does a shift in the CSF diagnostic strategy from antibody detection towards genome detection allow the use of live vaccines for disease control?

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When “one conceptual world view is replaced by another” we are talking about a paradigm shift (Th. Kuhn, 1962). Based on new scientific data, Kuhn’s concept of paradigm shifting will be used in this presentation to propagate the necessity of changes in the policy to control and eradicate Classical Swine Fever (CSF).

The present CSF control strategy is more than 20 years old. Two fundamental changes have occurred which justify a new policy. In the first place there is no more understanding for the strict non-vaccination strategy. Culling of healthy pigs has become an ethical and animal welfare issue and is not tolerated any more. Secondly, significant advances in diagnosis and modern vaccines have been made (real-time RT-PCR, DIVA strategy). The foundations for new concepts to control CSF based on novel diagnostic tools and vaccines have been laid.

The current policy to control and eradicate CSF (old paradigm)

According to EU Directive 2001/89/EC the general measures to control CSF are:

- culling of all pigs within the infected premises,
- installation of protection and surveillance zones,
- restrictions for trade and transport,
- extensive epidemiological, clinical and laboratory examinations.

Additional special measures, such as culling of all pigs within a 1000 m radius and emergency vaccination can be used. However, vaccination has never been applied so far.

The logic behind the actual CSF policy is that only seronegative pig populations are free from risk while pigs with CSF antibodies are a risk factor. Vaccination becomes impossible since it would be a “proof” for the presence of CSF. Consequently, freedom from CSF is defined as freedom from CSF antibodies. Therefore, there is a general request for seronegative pig populations to permit the international trade of pigs and pig products. In this strategically based concept the serological diagnosis, which is an indirect diagnostic approach, is of paramount significance (the basis for the old paradigm).

The future policy to control and eradicate CSF (new paradigm)

For avoiding mass culling of healthy uninfected animals a diagnostic strategy must be used which guarantees that only pig herds with virus positive animals are removed and no CSF virus circulates any more within the pig population. The diagnostic approach has to focus on the presence of virus and no longer on the presence of antibodies. This means that the focus of disease control has to be shifted from the indirect approach (serological testing) to the direct approach (direct detection of virus). The logic behind the future CSF policy would be that only CSF virus free pig populations are free from risk. Pigs with CSF antibodies are no risk factor. Thus, vaccination becomes a useful tool for CSF control. However, this shift can only be done if appropriate diagnostic tools are available.

The real time RT-PCR has the potential to replace the conventional diagnostic methods used at present. With this tool we are for the first time in a position to change the strategy and to fulfil the above-mentioned requirement (control of virus freedom). The real time RT-PCR based strategy has a higher reliability, since it is a direct search for CSF virus. Antibodies or cross reactions with other pestiviruses do not disturb the diagnosis. Vaccination does not interfere with the diagnosis. In case of a CSF outbreak emergency vaccination can be used. Culling of healthy pigs within a 1000m radius will be avoided since freedom from CSF virus will be checked by rapid PCR testing. The risk will not be higher than with the present strategy based on antibody control.

During the presentation different models of the new CSF control strategy will be presented and discussed. The advantages of the PCR based system compared to the present diagnostic approach are shown.

References

Kuhn T: The strategy of Scientific Revolutions, The University of Chicago Press, Chicago. 1970 (1962)

CSF Vaccination strategy: Eradication by use of protective vaccination (E2-subunit vaccines) (summary from slides)

Dr. Eric van der Sommen

Ministry of Agriculture, Nature and Food Quality, The Hague, The Netherlands

Goal of vaccination

- Get R_h (transmission between herds) below 1 to stop the epidemic.
- Minimise the number of healthy herds/pigs to be killed and destroyed.
- Keep the risks for trading partners equally low as with the traditional strategies.

Dutch vaccination program in case of an outbreak of CSF

- Marker vaccine (Intervet Porcilis Pesti): 550.000 doses purchased.
- All farms within 2 kilometre of each infected farm will be vaccinated.
- All pigs with exception of sows
 - To prevent carrier sows and carrier piglets from remaining undetected.
 - Less false negatives due to BVD viruses.
- Piglets twice in case of re-emerging of disease.
- Boars in semen centres are also vaccinated.
- Intensive screening before lifting restrictions.

Model studies, based on real outbreak data (1997/98 Netherlands) and experimental data on vaccine efficacy, showed that this strategy is equally effective and safe as a strategy involving preventive culling in a radius of 1 km around each infected farm. Furthermore, this vaccination strategy is economically advantageous in comparison to the 1 km culling strategy.

During the presentation backgrounds and arguments were given for the choices that were made to put together the currently proposed vaccination strategy in the Netherlands.

EU point of view on vaccination against CSF: “Control and Eradication of CSF”

(summary from slides)

Dr. Alberto Laddomada, Dr. Jean-Pierre Vermeersch
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European legislation

- Directive 2001/89/EC on CSF control.
- Decision 2002/106/EC on the Diagnostic manual.
- Additional Commission Decisions:
 - Approval of eradication and emergency vaccination plans.
 - Approval and co-finance of plans.
 - Ad hoc safeguard clauses & regionalisation (wild boar, Romania, ...).

Vaccination

- Use of classical swine fever vaccines is prohibited.
- Emergency vaccination in pig holdings and wild boar is possible.
- Use of both vaccine types, live attenuated vaccines and marker vaccines, is possible.
- Main criteria and risk factors to be considered for the application of emergency vaccination (Directive 2001/89/EC).
- Emergency vaccination plans to be part of the national contingency plans.
- Specific plan to be submitted to the Commission before starting vaccination.
- EU vaccine bank with marker vaccine and live attenuated vaccine for use in case of emergency vaccination.
- Measures in emergency vaccination area.
 - During vaccination period:
 - No vaccinated pigs may leave the area.
 - All fresh meat produced from vaccinated pigs has to be either processed or marked and treated.
 - Duration of the measures: at least 6 months after completion of the vaccination.
 - Before the 6 months period:
 - Measures to ban seropositive pigs leaving the holding unless for slaughter.
 - Measures as regards piglets from seropositive sows.
- Marker vaccine.
 - Specific request by Member State necessary.
 - The Commission (Standing Committee) may grant derogations possible to the marking of meat of the vaccinated pigs and its subsequent use, and the destination of the treated products.
- Emergency vaccination cannot work unless:
 - Scenario studies are made and the pros and cons of different vaccination strategies are discussed & agreed with the stakeholders.
 - A “general plan” is then included in the national contingency plan.
 - All necessary practical arrangements are made in peace time to ensure that vaccination will be properly applied.

Conclusions

- CSF eradication is an EU priority.
- CSF in domestic pigs has been eradicated in the EU 25 and must be achieved in the EU 27.
- Presence of CSF in wild boar has been reduced but remains a concern.
- Efficient tools and legislation are available.
- Better tools would be very welcomed.
- Substantial efforts and resources are still necessary: prevention - awareness – preparedness, remain essential.
- Emergency vaccination is a useful tool.
- Improved diagnostic tools will also help.
- Changes to current rules can be introduced if there is enough scientific support and Member States are convinced about it.

OIE position on emergency vaccination – International aspects

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The World Organisation for Animal Health (OIE), founded in 1924, is the international standard setting body for animal health and plays an active role in the encouragement of the international solidarity in the control of animal diseases. The mandate of the OIE is to improve animal health world wide and two important objectives are encouraging transparency of the world zoonosanitary information and safeguarding world trade by publishing animal health standards for international trade. In addition animal welfare was identified as a priority in the 2001-2005 OIE strategic plan.

The OIE member countries are obliged to notify outbreaks of the about 100 listed diseases including Classical Swine Fever (CSF). The notification reports should include the control and eradication measures taken in case of an outbreak and indicate whether vaccination is used as control tool. The OIE Terrestrial Animal Health Code defines the standards for international trade for CSF and includes surveillance guidelines. According to the Code countries can use vaccination in the course of eradication of CSF or as emergency measure. In this case a country can recover the CSF free status provided they have either killed all vaccinated pigs, or stopped vaccination 12 months ago or are able to distinguish between vaccinated and infected pigs. A good surveillance program should always be implemented and the wild pig population should be free from disease or if endemically infected, evidence of effective separation between domestic and wild pigs should be provided. The existing Code chapter and surveillance guidelines are currently under review to incorporate the most recent available scientific information on the disease.

The OIE has general guidelines on principles of vaccine production (quality assurance, manufacturing process etc) and specific guidelines on the production of avian influenza vaccines to be found in the OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals. Specific requirements for CSF marker vaccines include a fast response, protection against transplacental infection, duration of immunity of at least 6 months and the availability of a sensitive accompanying test. The currently available licensed marker vaccines do not fulfil all these requirements.

The first line of defence against CSF should always be early detection and fast response with the classical methods. The use of vaccination should be combined with other control measures like increase of biosecurity and movement controls. The vaccination program should be part of an overall contingency plan and the trade consequences, availability of good vaccines, animal welfare and logistical factors should be taken into account.

FAO position – International aspects: Strategic use of CSF vaccines in an endemic setting (summary from slides)

Dr. Klaus Depner
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Mission of the FAO:

- To safeguard livelihoods of millions of livestock owners from the ravages of transboundary animal disease through improved prevention measures, including hygiene and care, appropriate vaccination and treatment regimes,
- ... and promote responsible mechanisms of the veterinary profession for preventing, detecting and responding to animal disease emergencies.

Pig husbandry is quite different all over the world: size of farms, available veterinary care and other infrastructure, role of pigs in directly providing food vs generating income, etc. As an example in the EU, the situation in Romania is presented. The presence of millions of backyard holdings constitutes a completely different system of pig husbandry than the 'standard' of the 'old' EU-countries with mostly relatively few and large pig farms (commercial holdings). When it comes to eradication of CSF, pig husbandry in Romania relates more to feral pigs than to commercial holdings. Vaccination against CSF is considered an essential tool in endemic settings to increase the livelihoods and food security.

Trade issues with respect to vaccinated animals and meat of vaccinated animals (summary from slides)

Klaas Johan Osinga

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Vaccination

- In some cases (like with CSF) the OIE code and legislation include emergency vaccination options. This leads to the questions of whether the market (food chain partners) will accept products (meat, milk) from vaccinated animals.
- In other cases the vaccines are not (yet) recognized by the OIE code. This leads to the question whether the international market (trading partners) will accept trading of animals and /or of products from vaccinated animals

Control of FMD and CSF in the EU (start: 2002)

- Title: “Food chain partners explain their understanding of EU infectious animal disease control policy, including possible emergency vaccination and the safety for consumption of products from emergency vaccinated animals “
- COPA-COGECA, UECBV, CLITRAVI, EDA, EUROCOMMERCE, FESASS, BEUC, EUROGROUP for Animals, IFAH EUROPE and FVE are considering, on an individual, bilateral or multilateral basis (to be defined on a case by case basis):
 - To avoid trade restrictions in case of outbreaks, through communication and by ensuring agreement between authorities inside and outside EU concerning marketing of products from vaccinated animals, and that the systems in use are safe in regard to separation and traceability of products from vaccinated and unvaccinated animals. Such agreements should ensure full recognition of OIE recommendations.
 - To create awareness to EU Decision 90/424/EEC that gives an option to buy up products from emergency vaccinated animals in case they find no market. This might be the case for cooked pig meat and deboned veal.
 - To request from the OIE that approved test methods be described to be used to ensure that vaccinated herds/animals are free from virus infection.
 - To tackle with competent authorities the problem of the acceptance of products from animals vaccinated where a vaccine without registration in most Member States has been used.

What is expected of public authorities?

- Legislation approving (emergency) vaccination is in place, meeting OIE guidelines and “trade compatible” :
 - Vaccines are registered; diagnostic tests validated
 - Vaccination programs are approved by Member States and third countries
- Prepared to clearly communicate about the safety of vaccination, if need be (consumers, food chain, third countries)
- Emergency plans in place and rehearsed

What is expected of food chain partners?

- Consider emergency vaccination as one of the tools to control infectious diseases like CSF, while minimising the number of culls of healthy animals
- Work together to solve any trade problems that may arise from vaccination. This should be done in ‘peace time’

- Communication is important

What is expected of science?

- To provide tools for animal disease control that are 'trade compatible'
- To accept that there may be more than one sound solution to the same animal disease situation, based on:
 - Economics
 - Ethics
 - Science

Meat industry perspective of CSF control with vaccination

Dr. Lourens Heres and Prof. Dr. Bert Urlings

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Export of meat is of crucial importance for a sustainable pork production, in that respect food safety and absence of notifiable diseases is of utmost importance. Therefore Classical Swine Fever (CSF) has a dramatic effect on the economic performance of the pork supply chain. CSF causes markets to close when it is detected and resumption of export can only be considered after sufficient evidence of effective eradication and political will in third countries.

The strategy to control CSF should be built on three pillars. The first is prevention of introduction of the virus, by hygiene at farm and transport, reduction of transport movements, control in wildlife etc. However most of these measures are out of our control span. The second pillar is rapid detection of the disease. The longer it takes to detect the introduction of the virus, the more farms are infected before first detection. For this purpose VION supports research into rapid early warning systems together with research groups in Germany and the Netherlands. Finally, in case of an outbreak, the virus must be contained as soon as possible. Besides culling of infected herds and contact herds, emergency vaccination should immediately after detection be evaluated if it is a useful tool to contain the spread of the virus.

EU legislation (EU 80/215) provides the possibility process the meat of vaccinated pigs and to trade this processed meat on the EU market. To make this strategy work the farmers in emergency vaccination schemes should be compensated for the reduced prices of meat that has to be processed. Then for all parties in the containment of the disease (authorities, industry and farmers) vaccination is an attractive method to rapidly contain the disease at the lowest total costs.

Overview development of new vaccines: possibilities and first experiences

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Many of the vaccines in veterinary medicine were selected by serial cell culture or animal (e.g. rabbits) passages. However, for a large number of infectious diseases in veterinary medicine, vaccines are not available or the classical types of vaccines are not sufficiently efficacious or safe. In addition, vaccination against epizootic diseases is often not possible in regions where the disease has been eradicated, because vaccinated animals cannot be differentiated from infected animals. For classical swine fever (CSF), efficacious modified live vaccines are available; however, these vaccines (e.g. C-strain) do not allow the DIVA principle (Differentiating Infected from Vaccinated Animals). Therefore the development of novel attenuated CSF marker vaccines is one of the major goals in CSF vaccine research. Since several years now, genetic engineering gives the possibility to specifically manipulate viral genomes and to combine genetic information of different viruses. The development of reverse genetic systems and infectious clones of RNA viruses is a necessary precondition for the modern CSF vaccine prototypes. As a result, genetically modified organisms are the basis of this kind of novel CSF-vaccines. In general, the novel components of modern CSF-vaccines can be roughly summarized with the following headwords:

- Infectious RNA clones
- Packaged replicons (pseudovirions) and defective in second cycle vaccines (DISC)
- Chimeric pestiviruses (CSFV/BVDV, CSFV/BDV, BVDV/CSFV)

Selected types of novel CSF-vaccine prototypes will be presented, concentrating on recent developments using chimeric pestiviruses for the detection against CSF. In most cases, the new vaccine prototypes also enable the DIVA principle, and are now optimised concerning efficacy, safety and traceability with accompanying assays.

The recent advantages in veterinary vaccinology often resulted in prototype vaccines with an improved efficacy and safety. However, all new vaccine types should perform much better than the 'old' standard vaccines to be accepted as a reasonable alternative.

Unfortunately, up to now the novel CSF-vaccines were neither commercialised nor licensed. Therefore, possible reasons will be specified and further discussed.

Working groups

Session 1: Use of currently available tools in emergency vaccination strategies

From a scientific perspective: Is there reason to think that the actual (intensive) agricultural systems increase the likelihood of CSF?

Answer:

In principle no, the contrary is true. Traditional small holdings pose a greater risk for the introduction of CSF into a CSF free region than large professional holdings with state-of-the-art biosecurity. Another factor with respect to introduction, that is more important than intensive agricultural systems, may be globalization. Transport and contacts over large distances increases risk of spreading.

However, once CSF is introduced, intensive agricultural systems may contribute to the spread of the infection. Furthermore, due to intensive agricultural systems, depending on export and trade, the impact of a CSF outbreak has increased, both in terms of economics and in severity of measures as seen by the public.

The group agreed, that a number of parameters greatly affects the outcome of CSF outbreaks, e.g. veterinary infrastructure, biosecurity, education of stakeholders, and financial resources, more than just the agricultural system.

In moral terms: Where do we (as a workgroup) see the main advantages of vaccination strategies?

Answer:

- Allows for more flexible approach, taking into consideration also social and ethical aspects → different approaches for different systems.
- No destruction of valuable food (in case of backyard holdings there is also a social issue involved).
- No destruction of valuable genetic stock.
- The number of susceptible animals will be reduced.
- Reduction of diseased animals in general is advantageous for animal welfare.
- Reduction of stress in farmers veterinary personal and other personal involved in culling operations.
- There is the moral obligation to use the best available techniques for disease control.
- There is a general responsibility to use public money for the best of society.
- Vaccination also adds complexity.
- The future goal is always freedom of the disease.
- Strategy is good if trade is possible; need for transparency of strategies and help.

What would be the main criteria to vaccinate?

Answer:

- See legislation for emergency vaccination as a basis.
- Is a tool for eradication, not an eradication program by itself (additional measures should also be taken).
- Different strategies will be desirable for different scenarios, and therefore tailor made strategies are needed → no single strategy is the best!
- Background is important:
 - Region (holdings, presence of wild boar).
 - Infrastructure (vet system, registration of holdings).
 - Quality of veterinary service.
 - Capacity in terms of people and material (logistics).
 - Contact structure between holdings.
 - Danger of virus spread.
 - Density of pig farms.
 - Economics, restrictions on trade (within Europe, third countries).
 - Preparedness (contingency plan, available vaccines, tests, etc.).
 - Ethics, welfare, public opinion, social aspects.
 - Outbreak situation (how long has virus been present, how many herds are infected, where are they located).
 - Compensation policy.
- Some concerns that were raised:
 - Does the option of vaccination discourage the effort to increase biosecurity?
 - Where vaccination is most needed, implementation is most difficult.

Can we control and eradicate CSF only by using one strategic approach? - Do we need different strategies (with and without vaccination) for the different production systems (commercial versus back yard) and the different geographic areas (high density versus low density)?

Answer:

Different strategies will be needed for different situations. No single strategy, whether or not it includes vaccination, will be able to control and eradicate CSF in every circumstance. Flexibility and tailor made eradication strategies are therefore necessary, but can be based on general principles as foreseen in for instance EU-regulation and OIE manuals.

Can we afford on a long term basis a control and eradication programme tailored exclusively for commercial farms? - Is compartmentalization the solution for the future?

Answer:

In principle compartmentalization is possible. However, OIE will not grant official status of freedom, as they do so only on country basis. Trade can only be resumed based on bilateral agreements.

Which is the most effective way to control CSF in back yards? - Can CSF be ignored in back yards when commercial farms are under good biosecurity protection?

Answer:

CSF cannot be ignored as it will be a constant threat to the commercial holdings and therefore also to trade partners. Tailor made strategies, taking into consideration the specifics on husbandry, infrastructure, etc, but also social and economic issues, are therefore needed

Session 2: Political issues with regard to vaccination against CSF

From a scientific perspective: Is it important to address and integrate the public's perspective of eradication/vaccination strategies?

Is it sufficient to have a CSF control strategy which guarantees only open trade on a common market, or do we need strategies which are taking into account also ethical and socio-economic aspects?

Answer:

A scientifically based control strategy should not be changed due to public views. Instead the necessary measures should be professionally communicated and explained to the public. One of the underlying problems is that the general public is not sufficiently aware of modern agricultural practices.

On the other hand, views on ethics, welfare and social aspects from the public need to be taken into consideration. Within the boundaries of what is acceptable to a society, the best possible eradication strategy should be found. Flexibility is essential, as every situation is different and tailor-made strategies, on a scientific basis, will be needed to achieve an optimum between efficacy and acceptability in any given situation.

Why do we still make a difference between (products of) animals vaccinated against diseases notifiable to the OIE, and (products of) animals vaccinated against other diseases (e.g. CSF/FMD vs. Aujeszky's disease and Swine erysipelas). Is a paradigm-shift needed?

Answer:

CSF and FMD positive animals are not acceptable from a trade perspective, because both infections are highly contagious and dangerous. Priorities have to be defined (e.g. concerning Aujeszky and erysipelas) and they have to be communicated in a transparent way.

How do we build and maintain trust in disease eradication methods among consumers and farmers if neighbouring Member States choose different methods from the options offered by EU legislation in more or less equal circumstances?

Answer:

Depends on the line of arguments pro and con a certain measure. Different strategies can be equally efficacious, but can be more practical or acceptable given the circumstances in

different Member States (like infrastructure, pig husbandry, but also public perception). Here again proactive communication and information is needed, stakeholder should be addressed separately from media and public.

Session 3: Trade and marketing issues with regard to vaccination against CSF

If a vaccination plan has been accepted, is there still room for individual Member States to recline products (or animals) from other Member States?

Answer:

According to European law, no. When a decision for emergency vaccination has been taken with a qualified majority, all Member States will bear the consequences. However, in such a crucial question a unanimous decision would be preferable.

What is in your view the definition of a trade compatible vaccination method?

Answer:

It should be acceptable for:

- the importing country
- the domestic meat processing industry
- for foreign trade partners
- the consumer

How could scientific confidence that a vaccination method is safe be used to allay fears of pig meat from CSF vaccinated pigs importing countries?

Answer:

The vaccination method should provide assurance of the minimal risk of the meat posing a hazard to the pigs of the importing countries. A risk analysis should be performed: The risk after vaccination should be smaller or equal to the risk using conventional strategies.

Example: A potent, innocuous live marker vaccine with a sensitive and specific accompanying assay and internationally approved protocols to use them should provide assurance.

Is there any need to differentiate meat from vaccinated and non-vaccinated animals (slaughterhouse, wholesale, retail)? Do they need to be slaughtered separately?

Answer:

The need for differentiation depends on risks for either consumers or pigs (swill feeding). As there is no risk for consumers, from that perspective there is absolutely no need to differentiate meat. From the point of view of risk for pigs, this depends on the efficacy of the strategy (which should be equal to that of a strategy without vaccination), but also on trust and faith in a strategy involving vaccination. Differentiation in slaughterhouse and wholesale may under circumstances be necessary, as may separate slaughtering, in case meat from vaccinated animals is only destined for the local market.

Session 4: Future tools in emergency vaccination strategies

What will be the future role of modified live vaccines in the control of CSF in the framework of a non-vaccination policy? What are the specifications of future vaccines that could be used with a high confidence in emergency eradication strategies?

Answer:

There will be a future role for modified live vaccines. Specifications will depend on the strategy, including additional measures, but for emergency vaccines ideally include:

- One shot application
- Must be safe and innocuous
- High efficacy (e.g., rapid onset of protective immunity, including foetal protection)
- Good accompanying test

Is there a future for a new generation of marker vaccines?

Answer:

Yes. Currently available marker vaccines do not yet have the efficacy of modified live vaccines like the C-strain. Improved marker vaccines will certainly help to improve control and eradication strategies and increase trust of trading partners.

What scientific requirements and protocols are needed for the validation of the PCR tests as part of the new strategy? What are the current gaps on this to guarantee with sufficient confidence that meat from vaccinated pigs is 'safe' to be put on the market.

Answer:

The circumstances of PCR-use are crucial and interpretation of results is important. Experience with PCR, especially if used as a high-throughput test is essential to avoid (cross-)contamination and be able to produce correct results. If used for testing live animals, it needs to be established that negative results on blood is equivalent to being safe (no virus in certain tissues, for instance). Also pooling of samples should be further investigated with respect to sensitivity of the PCR on pooled samples in relation to infectivity of single samples.

Use of GMOs as CSF-vaccines

Answer:

There are no possibilities to develop efficacious live marker vaccines without the use of DNA recombinant techniques. It might be argued that chimera are not that artificial since closely related viruses like CSF and BVD viruses may recombine in nature with similar results.

Discussion

The goal of this workshop was to bring together 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. The main issue here is the marketing of meat from vaccinated animals. Unfortunately, several retail organisations, retailers and consumers' organisations declined to participate. However, those stakeholders present during the workshop had very fruitful discussions and exchanged views, opinions and possible problems.

In general it was concluded that vaccines may be valuable tools in eradication strategies, and under certain circumstances even be essential for success of an eradication strategy. The crucial issues that were identified during the presentations and discussions were the following:

1. There is some doubt with respect to the performance of currently available tools (licensed marker vaccines and marker tests) when being used as emergency tools in the eradication of large CSF outbreaks. Furthermore, there is no consensus on how to evaluate the efficacy of a vaccine in outbreak emergencies. Requirements for vaccines are mainly laid down for preventive vaccination, focussing on the protection of individual animals against clinical symptoms and safety for animals and consumers (i.e. European Pharmacopeia). However, the use of vaccines in the control and eradication of diseases requires that transmission of the virus within a population is reduced, which not necessarily correlates with clinical protection. Thus, the efficacy of vaccines needs to be evaluated on a population level, not on an individual level. Furthermore, contrary to requirements with respect to safety and individual protection, the use of vaccines in an eradication strategy is only one tool in a whole spectrum of measures to eradicate the disease. Eradication strategies should therefore be evaluated as a whole, not each component (like vaccination) by itself. This kind of evaluation can only be done in model studies, taking into consideration the whole spectrum of measures. Only then can the efficacy of the vaccine, and its value in the whole strategy, be determined. Model studies like this have been carried out for strategies with the E2-subunit vaccine and were used as a basis for the Dutch contingency plan involving possible emergency vaccination in case of a future CSF outbreak (http://www.lei.dlo.nl/publicaties/PDF/2007/5_xxx/5_07_06.pdf, Dutch report, epidemiological studies and overall summary in English)
2. There is considerable scepticism in the meat production chain when it comes to marketability of meat from vaccinated animals. Additional logistics necessary for the slaughter and processing of meat from vaccinated animals increase the cost of the meat, which is not compensated. Compared to the situation with preventive culling, where most stakeholders were fully compensated for their losses, this seems to be a problem.

In essence, while vaccination may lower the overall damages due to an outbreak, the damages are distributed in a different way over the stakeholders. While some benefit from the change in strategy, others suffer. This affects the support for a change in strategy in a clearly negative way!

3. There is considerable fear in the meat production chain for the response of retailers and consumers, especially when meat from vaccinated animals will be recognisable as such in retail stores. Unfortunately, none of the approached retail organisations, retailers' or consumers' organisations were prepared to participate in the workshop. According to the Dutch consumers organisation this was because meat from vaccinated animals was currently no issue at all for Dutch consumers. The response of consumers may however be unpredictable and could be completely different when there is an outbreak and vaccines are being used, especially in a situation where they are normally not used! The role of the media in issues like this is also unpredictable, but may potentially have a big impact.

Annex 1: Programme



Workshop on

“Improved eradication of classical swine fever (CSF) using emergency vaccination programmes: use and consequences of vaccination”

25-26 September 2007

Hannover, Germany

Organizers:

**Community Reference Laboratory
for CSF (CRL)**

University of Veterinary Medicine
Institute for Virology
Buenteweg 17
D-30559 Hannover
Germany

CIDC Lelystad

P.O. Box 2004
8203AA Lelystad
The Netherlands

within the framework of the Coordination Action on FMD and CSF

Location:

University of Veterinary Medicine
Auditorium
Institute of Pathology
Buenteweg 17
D-30559 Hannover
Germany

Tuesday, September 25th 2007

9.00 – 9.45 Reception

09.45 - 10:00 Introduction

Prof. Dr. Volker Moennig, Community Reference Laboratory for CSF,
Hannover, Germany

Session 1: Use of currently available tools in emergency vaccination strategies

Chair: PD Dr. Martin Beer

Friedrich-Loeffler-Institute, Island of Riems, Germany

10:00 - 10:25 Role of vaccination in the control of CSF (including historical experiences)

Prof. Dr. Volker Moennig, Community Reference Laboratory for CSF,
Hannover, Germany

**10:25 - 10.50 Current eradication strategies of Classical swine fever: Ethical implications
and considerations**

Mag. Herwig Grimm, University Munich, TTN Institute, Munich, Germany

**10.50 – 11.15 Does a shift in the CSF diagnostic strategy from antibody detection towards
genome detection allows the use of live vaccines for disease control?**

Dr. Klaus Depner, Friedrich-Loeffler-Institute, Island of Riems, Germany
(at present: FAO, Rome, Italy)

11.15 – 11.40 CSF Vaccination strategy: Eradication by use of protective vaccination (E2-subunit vaccines)

Dr. Eric van der Sommen, Ministry of Agriculture, Nature and Food Quality,
The Hague, The Netherlands

11:40 - 12:30 Discussion

Four working groups consisting of 10-15 participants each.

Moderators: Martin Beer, Alberto Laddomada, Willie Loeffen, Volker Moennig

12:30 - 13:30 Lunch

13:30 - 14:30 Presentation of results of working groups

Session 2: Political issues with regard to vaccination against CSF

- Chair:** **Prof. Dr. Volker Moennig**
Community Reference Laboratory for CSF, Hannover, Germany
- 14:30 - 14:55** **EU point of view on vaccination against CSF: “Control and Eradication of CSF”**
Dr. Alberto Laddomada, Dr. Jean-Pierre Vermeersch, European Commission, DG SANCO, Brussels, Belgium
- 14:55 - 15:20** **OIE position on emergency vaccination – International aspects**
Dr. Christianne Brusckhe, OIE Scientific and Technical Department, Paris, France
- 15:20 - 15:45** **FAO position – International aspects**
Strategic use of CSF vaccines in an endemic setting
Dr. Klaus Depner, FAO, Rome, Italy
- 15:45 - 16:15** **Coffee Break**
- 16:15 - 17:00** **Discussion in working groups**
Moderators: Martin Beer, Alberto Laddomada, Willie Loeffen, Volker Moennig
- 17.00 – 18.00** **Presentation of results of working groups**
- 18.00** **End of Day 1**
- 20.00** **Dinner**

Wednesday, September 26th 2007

Session 3: Trade and marketing issues with regard to vaccination against CSF

- Chair:** **Dr. Willie Loeffen**
Central Institute for Animal Disease Control, Lelystad, The Netherlands
- 09:00 - 09:20** **Trade issues with respect to vaccinated animals and meat of vaccinated animals**
Klaas Johan Osinga, COPA-COGECA, Brussels, Belgium
- 09:20 - 09:40** **Meat industry perspective of CSF control with vaccination**
Dr. Lourens Heres and Prof. Dr. Bert Urlings, Vion, Boxtel, The Netherlands
- 09:40 - 10:15** **Coffee Break**
- 10:15 - 11:15** **Discussion in working groups**
Moderators: Martin Beer, Klaus Depner, Willie Loeffen, Volker Moennig

11:15 - 12:15 **Presentation of results working groups**

12:15 - 13:30 **Lunch**

Session 4: Future tools in emergency vaccination strategies

Chair: **Prof. Dr. Thomas Mettenleiter**
Friedrich-Loeffler-Institute, Island of Riems, Germany

13:30 - 14:00 **Overview development of new vaccines: possibilities and first experiences**
PD Dr. Martin Beer, Friedrich-Loeffler-Institute, Island of Riems, Germany

14:00 - 15:00 **Discussion in working groups**
Moderators: Martin Beer, Klaus Depner, Willie Loeffen, Volker Moennig

15:00 - 15:30 **Presentation of results working groups**

15:30 - 16:30 **Final discussion and conclusions, End of meeting**

Annex 2: press release

Vaccinating instead of Killing?

Pressemitteilung von: University of Veterinary Medicine Hannover (openPR) -
International experts present recommendations on the eradication of classical swine fever

Scientists, experts from veterinary administration, representatives from agrarian associations and the meat industry as well as experts on politics in the EU Member States discussed the eradication of classical swine fever by emergency vaccinations at the University of Veterinary Medicine Hannover on 25 and 26 September 2007. The conference took place as part of a coordination action for classical swine fever and foot and mouth disease within the 7th Framework Programme of the European Community.

Background to this event are the high losses of the previous years through classical swine fever and other dangerous diseases of animals such as fowl pest and foot and mouth disease (FMD). These diseases are controlled in the European Union by eradication measures, which may include preventive culling of live-stock populations. During the epidemic of foot and mouth disease in Great Britain in 2001 alone, approximately six million animals had to be killed and destroyed in order to eradicate the disease. The total economic damage then amounted to 13 billion Euros. The outcome from epidemics of classical swine fever in the last 15 years looks similar: nearly 20 million pigs were killed and destroyed with an estimated total damage of five to six billion Euros.

Among the experts at the conference there was agreement that the latest developments in disease control, such as the availability of marker vaccines and new and highly sensitive diagnostic tests, should be considered for their suitability in eradication strategies for classical swine fever. Furthermore, incentives should be created for the industry to bring new and improved marker vaccines (live vaccines) to the market. To estimate the dangers that a changed eradication strategy could conceal, they would have to be compared to the present eradication strategies in a scientific risk analysis. The experts expect that such a science-based integration of new technologies would generate the confidence of all involved parties in fighting diseases. And it was agreed upon that mutual trust and transparency have a key function in the eradication of diseases. Thus, they also advise to use disease-free times to get rid of the uncertainties concerning the trade of products from vaccinated animals so that eradication strategies that include the use of emergency vaccines would be possible without delays in a crisis situation.

With the experience of high damages, but also under the enormous public pressure, the majority of which rejects the preventive culling of live-stock populations, experts increasingly favor a change of the present eradication strategies. Although the European Animal Diseases Legislation allows the use of emergency vaccines in case of a disease, this option has never been used up to now for two main reasons:

- A vaccination with traditional vaccine allows no laboratory diagnostic differentiation between vaccinated and infected animals. Hence, vaccinated animals and their products are excluded from markets in the whole of Europe. This would result in a ruinous price collapse.

- Although according to European law new marker vaccines could be used, thus differentiating vaccinated animals from infected ones, and although the products of these animals would be marketable Europe-wide under certain conditions, enormous scepticism exists in view of acceptance of these products by European and especially non-European trading partners.

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The University of Veterinary Medicine Hannover, Foundation stands for long standing competence in the field of veterinary medicine. It was founded in 1778 as the Royal School of Equine Medicine. It is the only veterinary medicine educational establishment in Germany which has kept its independent status. Since the beginning of 2003 the TiHo has been a public foundation. With its transformation into a public foundation the TiHo has gained autonomy and increased its flexibility.

<http://www.openPR.com/news/29654/Vaccinating-instead-of-Killing.html>