



EUROPEAN COMMISSION
SANCO/10103/2006 rev. 3

DISCUSSION PAPER

**VACCINATION OF POULTRY AGAINST
HIGHLY PATHOGENIC AVIAN INFLUENZA H5N1
(DIVA STRATEGY)**

**This document does not necessarily represent
the views of the Commission services**

12 October 2006

Vaccination of poultry against Highly Pathogenic Avian Influenza H5N1 (DIVA¹ strategy)

1. Introduction

There are only limited experimental evidence and epidemiological data available on the use of vaccination of poultry and other captive birds against avian influenza, in particular against the “Asian strain” of Highly Pathogenic Avian Influenza H5N1 (hereby simply called HPAI H5N1) and this lack of theoretical and practical knowledge poses questions that may not have an answer.

However, the current epidemic of HPAI H5N1 and the transmission of this virus over long distances via migratory birds are unprecedented. Even if the magnitude of the risk that the migratory birds will pose to the EU in the near future is still unclear, there is growing evidence suggesting that the prevention and control of disease outbreaks in poultry and other captive birds will be a major challenge for the EU and for the whole world for many years to come. Annex I gives a picture of the current disease situation and includes some comments on the risk for the EU in the next months.

Despite the constraints that make it difficult to properly assess the risks and the benefits of using vaccination as an additional HPAI H5N1 prevention and control tool, it appears wise to further explore this option in the EU, taking also into account the valuable experience gained in recent years in Italy, where following the major outbreak of HPAI of 1999/2000², a DIVA vaccination strategy has been developed and implemented in certain areas at risk of introduction of avian influenza viruses, which are located in the Po valley, in Lombardy and Veneto. Further experience has also been recently gained in France and the NL, which have implemented vaccination of poultry in the framework of the new AI control Directive 2005/94/EC.

This document is aimed at providing guidance on the possible use of vaccination against HPAI H5N1 in domestic poultry or other captive birds in the current EU Member States in the second half of 2006³. The opinions on avian influenza delivered by the Scientific Committee on Animal Health and Welfare in 2000 and 2003 and by the European Food Safety Authority in 2005 and 2006 are also fundamental documents to be consulted before taking decision on vaccination.

Vaccination should not be applied as an alternative to on-farm biosecurity measures, which are of fundamental importance for the prevention and control of avian influenza. However, it is recognised that one of the most important bio-security measures, namely keeping poultry indoors, may not be easily applicable in certain categories of poultry or would compromise the status of “organic” or “free-ranging” poultry.

1 DIVA: Differentiating Infected from Vaccinated Animals, by means of “sentinel” non-vaccinated birds into a farm and by laboratory tests.
2 That epidemic was caused by an H7N1 virus type.
3 Vaccination of special categories of birds such as zoo birds is already possible in accordance with Commission Decision 2005/744/EC.

2. Legal framework for vaccination

2.1 Vaccination as a tool for the control of AI

The new Council Directive 2005/94/EC⁴ on the control of Avian Influenza allows the implementation not only of emergency (short term) vaccination following a disease outbreak (as the old Directive 92/40/EEC did) but also of preventive (long term) vaccination plans, which must be based on a risk assessment to be carried out by the Member States. Although Directive 2005/94/EC shall be only transposed and implemented by the Member States into national legislation by 1 July 2007, it entered into force on 3 February 2006. Hence from this date, Member States have the possibility to submit their preventive or emergency vaccination plans to the Commission for approval on the basis of this new Directive and subsequent implementation, and apply vaccination using the broader framework that is foreseen in the new legislation, see also Annex II.

Directive 2005/94/EC also foresees that if veterinary vaccines are used, they should be authorised in accordance with the provisions of the Community pharmaceutical legislation (Directive of the European Parliament and of the Council 2001/82/EC⁵; Regulation (EC) No 726/2004 of the European Parliament and of the Council⁶).

2.2 Availability and authorisation of veterinary vaccines

As regards marketing authorisation procedures, in accordance with article 8 of Directive 2001/82/EC, the Member States may provisionally allow the use of currently available inactivated vaccines⁷ without a marketing authorization for placing on the market, after informing the Commission of the detailed conditions of use. On these bases, France, Italy and the NL have allowed the use of avian influenza vaccines.

In accordance with article 26 (3) of Directive 2001/82/EC, the UK has granted a provisional marketing authorisations for inactivated avian influenza vaccine. That provisional authorisation is subjected to specific conditions and will be submitted to annual re-assessment. Consequently, in accordance with Article 7 of the said Directive, the other Member States may authorise the marketing or administration of vaccines for which provisional authorisation has been granted.

Marketing authorisation could also be granted provisionally at Community level in accordance with Article 39 (7) of Regulation N°726/2004. Two pharmaceutical companies have submitted an application for granting marketing authorization for their avian influenza vaccines to the European Medicines Agency (EMA). Following an assessment of the applications by the Committee for medicinal products for

4 OJ L 10, 14.1.2006, p. 16.

5 OJ L311, 28.11.2001, p. 1, as amended by Directive 2004/28/EC, OJ L136, 30.4.2004, p. 58.

6 OJ L136, 30.4.2004, p. 1.

7 Representatives of the pharmaceutical industry have had the possibility to inform the Member States on the products currently available at a meeting held in Brussels on 10 January 2006.

veterinary use (CVMP) at EMEA on the quality, safety and efficacy of these 2 vaccines, the Commission has already granted authorisation through an accelerated procedure.

The two vaccines concerned, Nobilis Influenza H5N2⁸ and Poulvac FluFend H5N3 RG⁹, are inactivated, adjuvanted avian influenza vaccines for administration by injection. Nobilis Influenza H5N2 is for use in chickens and Poulvac FluFend H5N3 RG is for use in both chickens and Pekin ducks.

2.1 Financial aspects

Council Decision 90/424/EC on expenditure in the veterinary field, as recently amended by Council Decision 2006/53/EC, establishes that where emergency vaccination is decided upon in accordance with Article 54 of Directive 2005/94/EC, the Member States shall obtain financial support from the Community, which will cover 100 % of the cost of supply of the vaccine and 50 % of the costs incurred in carrying out that vaccination. Decision 2006/53/EC also provides for a legal base to financially support AI surveillance programmes in the Member States.

3. General advantages and disadvantages of vaccination

Based on the information available on the control of and use of vaccines against Avian Influenza, the main pros and cons that are expected in relation to the use of vaccination for the prevention and control of HPAI H5N1 can be summarised as follows:

3.1. Advantages

- a) Vaccination reduces mortality and associated losses (this may be of major importance for very valuable birds, such as zoo birds);
- b) It reduces the risk of virus infection to individual birds and therefore reduce the risk of disease introduction into a vaccinated farm (a higher virus amount is necessary to cause infection of individual vaccinated birds).
- c) It reduces the amount of virus that is shed in the environment by an infected bird. As a consequence, in case the virus enters a vaccinated farm, there is less risk that the virus is spread to other farms. In a similar manner, also humans are less exposed to the risk.
- d) As a consequences of b) and c) above, primary outbreaks of disease are less likely to occur in a properly vaccinated population than in a non-vaccinated population and if they occur the disease is likely to be more easily contained and eradicated than in a non vaccinated population. This would prevent massive culling of poultry. Given that vaccinated poultry are less likely to become infected

8 Intervet International BV
9 Fort Dodge Animal Health

and to shed large amount of virus than non-vaccinated ones, they might be “spared” from the killing and destruction in case preventive killing is necessary in an infected area.

3.2. Disadvantages

- a) Vaccination is difficult/expensive to administer and requires a heavy organisation. Currently, in order to induce and maintain a good immunity, only vaccines to be administered by injection 1-3 times during the life span of a poultry bird are available.
- b) In certain species (in particular ducks and geese, but also turkeys) the immune response induced by vaccination is in general not fully satisfactory, the benefits indicated above are therefore inferior than in other birds (broilers, hens).
- c) It may “mask” the occurrence of disease in a farm and delay its detection; for this reason adequate clinical and laboratory surveillance in accordance with the DIVA principle are necessary. Use of sentinel animals in vaccinated flocks can support the early detection of disease. However, these measures are expensive and to a certain extent constitute restrictions to trade, as vaccinated poultry (and their products) must be subjected to special controls before being traded to ensure that the poultry (and their products) are not infected.
- d) If vaccination is not properly applied (or applied with low quality vaccines) and surveillance is not properly ensured, it may eventually lead to the persistence of disease at an endemic status in the vaccinated poultry population, as the virus would continue to circulate between not fully immune birds.
- e) It may induce a false sense of security and thus favourite relaxation of bio-security and surveillance measures by the poultry owner and so leading also to a potential risk for human health.
- f) Given the tendency of influenza viruses to mutate, it is appropriate to ensure that the vaccine strain matches the field virus. For the same purpose, it may also be necessary to properly update vaccine strain composition; however, poultry vaccines may not need annual update of their composition as human influenza vaccines.
- g) It may induce third countries to apply restrictions to trade on poultry and poultry products (meat, etc.). However, the OIE Terrestrial Animal Health Code, in relation to trade in live poultry, day-old live poultry and hatching-eggs (not poultry meat or eggs for consumption), only recommends that vaccination is performed in accordance with the guidelines for the surveillance of Avian Influenza and the relevant information is attached to the international veterinary certificate.
- h) It may induce retailers not to accept products such as eggs from vaccinated flocks, even if this attitude is totally unjustified, as products from animals that have been vaccinated in accordance to EU requirements are safe for the consumers and should not be discriminated.

4. Cost/effectiveness of vaccination: some historical data

Because the current epidemic is unprecedented and there is very limited experience on vaccination of poultry against H5N1, it is extremely difficult to predict its cost/effectiveness. However, some data are available on the DIVA vaccination carried out in 4 Provinces of Northern Italy since December 2000, following the major epidemic of 1999/2000. The costs and losses of that epidemic have been estimated in 500 M€, including 110 M€ of compensation costs.

In the last 5 years, vaccination has been applied in meat producing turkeys and laying hens farms in Northern Italy as an additional tool to prevent introduction of Low Pathogenic Avian Influenza (LPAI) viruses from wild birds into poultry, to reduce circulation of these viruses in poultry and in this manner to prevent their possible mutation in HPAI viruses. Vaccination of 400-600 commercial poultry farms¹⁰ has had a cost of 2-4 M€ per year, including the cost of the vaccine doses, administration of vaccine and surveillance costs. The overall cost has been around 0.1 - 0.15 € per vaccinated bird.

Since vaccination has been applied, three LPAI outbreaks have occurred in poultry farms in Northern Italy, in both vaccinated and non vaccinated poultry farms. These outbreaks have been eradicated thanks to a stamping out policy combined with “controlled slaughter” of poultry. Outbreaks have occurred in both vaccinated and non-vaccinated farms, however, in at least two of these three outbreaks the positive effect of vaccination seems to be evident. None of these outbreaks has eventually led to an HPAI outbreak, however it is extremely difficult to establish to what extent this was due to vaccination, other disease control measures or other factors.

In accordance to Marangon et al¹¹., the Italian experience has shown that a DIVA vaccination strategy can be successfully used under certain circumstances both for emergency and prophylactic purposes, limiting financial losses generated by major epidemics.

5. The preventive vaccination plans of the NL, France, Italy and Germany

At the end of February 2006, France and the Netherlands submitted preventive vaccination plans against HPAI H5N1 to the Commission for approval. Italy has continued to apply vaccination in certain areas of Lombardy and Veneto. Germany has submitted to the Commission a vaccination plan in late August 2006.

5.1. The French vaccination plan

The French plan approved by Commission Decision 2006/148/EC entails the vaccination of ducks and geese kept outdoors in the departments of Landes, Loire-Atlantique and Vendée, which are considered to

10 the area of vaccination and number of vaccinated farms has changed during the vaccination campaign.

11 Marangon and Capua, OIE Conference on Avian Influenza April 2005.

be areas at high risk of HPAI H5N1. Vaccination has been deemed necessary for the ducks and geese in these regions as these birds cannot be easily put indoors.

The French plan outlines the monitoring and control measures that will be taken in relation to the vaccinated birds. These include a pre-vaccination examination of flocks, monthly clinical surveillance of the holdings, the use of sentinel birds (i.e. unvaccinated control birds) to monitor for an avian influenza outbreak in the vaccinated flock. Farmers will be provided with warning criteria to help them in detecting any possible outbreak of avian influenza in the vaccinated birds.

Decision 2006/148/EC lays down further conditions, particularly in relation to the movement of vaccinated poultry. Vaccinated live poultry, their hatching eggs and day-old chicks cannot be exported or moved to another Member State or third country. Within France, vaccinated birds can only be moved to other vaccinated holdings, to holdings where there is complete separation of vaccinated and non-vaccinated birds, or to a slaughterhouse for immediate slaughter. Fresh meat and meat products from the vaccinated poultry can be marketed in the EU and dispatched to third countries, provided that it comes from holdings which have complied with all the above conditions, the flock from which it originates is inspected by a vet 48 hours prior to slaughter, and it meets all appropriate animal health rules. The Commission decision also requires that any packaging or means of transport used for vaccinated birds and their products is properly washed and disinfected.

5.2. The Dutch vaccination plan

The Dutch vaccination plan, which has been approved by Commission Decision 2006/147/EC, applies to backyard (hobby) poultry and to free-range (organic) laying hens throughout the whole country. There are between 1-3 million hobby birds in the Netherlands, and around 5 million free-range laying hens. The vaccination will be provided on a voluntary basis, as an alternative to the requirement that these birds be kept indoors.

All bio-security measures, such as the feeding of poultry under cover, will still have to be applied, regardless of whether owners opt for vaccination or not. Detailed surveillance and control provisions are outlined in the Dutch plan. Monitoring for an outbreak of avian influenza in the vaccinated flock will be done using sentinel birds and serological tests, vaccinated poultry will be identified to distinguish them from non-vaccinated birds, records will be kept of all vaccinated holdings and bio-security measures will continue to be applied.

In accordance with Decision 2006/147/EC, vaccinated hobby poultry will only be allowed to be moved to other vaccinated backyard holdings in the Netherlands subject to permission from the authorities, while no movement of these birds to another Member State will be authorised. Meat and products from hobby poultry are not allowed to be commercially marketed anyway, so no additional provisions were needed for products from vaccinated hobby birds.

Vaccinated free-range laying hens may only be moved to other vaccinated holdings or directly to a slaughterhouse within the Netherlands, and may not be dispatched outside the country. Eggs from

vaccinated laying hens can be marketed in the EU and dispatched to third countries provided that they are shown to come from a disease-free holding and must be packed in disposable packaging in an officially designated centre, in line with required bio-security measures. Fresh meat and meat products from the vaccinated laying hens can be put on the market provided that it comes from holdings which have complied with all criteria, the flock from which it originates is inspected by a vet 48 hours prior to slaughter, and it meets general animal health rules.

5.3. “Pilot projects”

When supporting the Commission’s approval of the two vaccination plans, the Member States experts at the Standing Committee on the Food Chain and Animal Health highlighted that the French and the Dutch vaccination plans had to be considered as “pilot projects” that should allow the Community to gain more knowledge and experience on the use of vaccines.

5.4. Results of the vaccination plans

The results of the vaccination plans carried out in the first half of 2006 in France and NL have been discussed with the Member States and representatives of the poultry industry in a meeting held in Brussels on 26 June 2006. Italy has also provided updated information on its vaccination plan.

The French plan has led to the vaccination of a total of almost 500 000 ducks and a few thousand geese, most of them in the department of Landes. Indeed, most farmers in Loire-Atlantique and Vendée have preferred to keep their ducks and geese indoors and not to vaccinate them because of the possible consequences on trade.

The cost of the vaccination plan, which have been estimated in 0.8 € per head, have been paid entirely by the French government. At present, the French authorities have not yet taken a decision on the possible continuation of the plan.

The NL plan has led to the vaccination of around 1 000 backyard poultry flocks (out of ~100 000 in the Netherlands) and a few ‘organic’ laying hens commercial farms. The costs of vaccination in the NL have been entirely covered by the poultry owners, except for the cost of monitoring and efficacy testing which were covered by the Ministry of Agriculture.

The so far limited use of vaccination has been due to the high cost of vaccination, in its limited advantages in terms of possible “sparing” of vaccinated poultry from possible preventive killing and because of the consequences on trade and/or movements of birds that vaccination could cause. Indeed one of the main problems encountered after vaccination of commercial farms has been the non-acceptance of eggs by some retailers in the EU, due to concerns that the origin of these products from vaccinated birds may cause fears in the consumers and marketing problems.

In late June 2006 NL has submitted an amended plan to the Commission for approval, taking into account some of the lessons learned in early 2006. One of the main changes in the plan would consist in

establishing that in case of an outbreak, vaccinated poultry would be spared by preventive killing, unless this is strictly necessary. The Plan has been approved by the Commission by means of Decision 2006/528 of 27 July 2006 and it is now being implemented in the NL.

In Italy, where vaccination is compulsory in all commercial farms of meat-type turkeys, laying hens and capons kept in certain high risk areas in Lombardy and Veneto, more than 19 million vaccine doses have been distributed during the period September 2005-June 2006 to apply vaccination in around 13 000 000 poultry kept in almost 400 commercial farms. The costs of vaccination are covered by the poultry owners, while those of surveillance are covered by the national and regional authorities. Italy intends to continue the vaccination plan that is reasonably well accepted by farmers and that is not causing them significant trade problems, until at least December 2006. Italy is also considering the vaccination of ducks and geese in some open air farms.

However, certain “structural” measures that Italy and in particular the two Regions in question had planned to gradually introduce in the poultry sector to reduce the AI risks in the high risk areas in question have not been implemented as planned or its implementation has been delayed.

5.5 The German vaccination plan.

At the end of August 2006 Germany has submitted to the Commission for approval a preventive vaccination plan to be carried out in three commercial holdings in the framework of a large scale field study aimed at assessing the protective efficacy of an avian influenza vaccine of H5 subtype by applying vaccination to poultry kept under normal field conditions. Given that the poultry will only be used for the study, no live poultry or their products will be allowed for any commercial purposes.

The plan has been approved by the Commission. The study will start very soon and is expected to finish in about two years.

6. Lessons learned from the recent EU experience on vaccination

As the HPAI H5N1 virus has not entered areas where vaccination was carried out, it has not been possible to assess its benefits in terms of prevention of HPAI H5N1. However, there is sufficient evidence that the vaccines used in the EU would provide a significant level of protection against this virus.

In order to be carried out on a large scale and thus significantly influence the outcome of a possible outbreak, vaccination requires convinced support by the poultry owners. Stronger support could be obtained if current trade / movements of birds problems linked to vaccination are solved. While the trade barriers posed by third countries appear to be a limited problem, retailers may still pose some resistance to accept products from vaccinated birds. A good communication strategy and full transparency may prevent or reduce undesired consequences on trade.

Vaccination (and related surveillance) is an expensive operation¹². This is another obstacle to its acceptance and implementation by poultry owners. The issue of vaccination costs should also be addressed to ensure that different approaches by the Member States do not lead to distortion of competition. While it appears that the feeling of at least many Member States is that long term vaccination costs should be covered by poultry owners, surveillance costs might be financed with public money, including Community financial support.

Due to the problems so far encountered in implementing vaccination, it appears likely that also in the next months the use of vaccines in the EU will be limited to some specific situations. However, to exclude *a priori* the use of this tool is neither appropriate nor desirable. The Member States should not be discouraged to make efforts to gain more experience on the use of this tool, not only to prevent HPAI H5N1 but also incursions of other H5 or H7 AI viruses in poultry. The Member States should develop and draw up scenarios in which vaccination could be used, so that this tool may be used as appropriate, taking into account that the evolution of the HPAI H5N1 situation is still very difficult to predict. At the same time, they should continue to keep in place and enhance adequate biosecurity measures in poultry farms.

7. Setting the possible vaccination scenario

The vaccination scenarios that are described below are based on the following assumptions:

- a) Following the epidemic of HPAI H5N1 in wild birds in several Member States in early 2006, there is a significant risk that the disease will re-appear in wild birds in the second half of 2006 either because it has persisted in the EU during summer or because it will be reintroduced from neighbouring countries. From the migratory and non-migratory birds above the disease might spread into domestic poultry and other captive birds. Experience suggests that farms in which no clear separation of domestic birds with wild birds can be ensured and domestic turkeys and ducks are at higher risk. Irrespective of the risk posed by wild birds, the disease might also enter the EU via other routes (legal or illegal trade, contiguity with a third country, etc).
- b) Prevention, surveillance and early-warning measures are already in place in the Member States in accordance with relevant legislation that would reduce the risk that the disease is introduced and spread in domestic poultry and other captive birds. However, intense surveillance in certain populations such as backyard poultry may be problematic and very cumbersome.
- c) In case of introduction of disease into the populations indicated in b) above, the Member States will rapidly put in place a number of rigorous control and eradication measures, irrespective from vaccination, as provided in Council Directives 92/40/EEC and 2005/94/EC and national contingency plans to prevent the disease becoming established in domestic poultry populations and to ensure that a permanent wild birds / domestic birds cycle of infection is not established. Nevertheless, outbreaks

¹² Costs of vaccination would be strongly reduced if other application mechanisms such as spray vaccines were available. See also chapter 12

of disease may lead to health risks for people directly exposed to infected poultry, major economic losses and require the adoption of draconian measures for their effective containment and eradication, including massive stamping-out of poultry and other captive birds. These measures may be difficult to implement as rapidly as desirable and may have a significant negative impact on poultry farmers and rural populations.

Given a), b) and c) above and the experience gained in early 2006, it is unlikely that the disease will become established in an endemic form in domestic bird populations in the EU in the next months, irrespective of vaccination. However, if properly applied and accompanied by a specific surveillance system, vaccination may contribute to reduce the risks and the overall negative impact of an outbreak.

8. Poultry populations at particular risk in the EU in which vaccination (DIVA strategy) against HPAI H5N1 could be envisaged

8.1. Preventive vaccination

Based on the pros and cons and the assumptions above, preventive vaccination could be envisaged in the following populations of domestic poultry:

- a) turkey, ducks, geese and laying hens farms located along major migratory flyways, in particular if in these farms an effective separation between the domestic poultry and wild birds cannot be ensured and if these farms are located in areas with a high density of poultry;
- b) backyard poultry farms located along major flyways or in the vicinity of areas with a high density of wild birds. Proper vaccination in these farms might have a significant impact to decrease the risk posed by the disease, taking into account that in many countries so far affected by HPAI H5N1, backyard flocks play a major role in the persistence of infection in an endemic form and that poultry-to-human transmission of virus has mainly occurred in people living in contact with backyard poultry. However, it would be at the same time a very challenging and demanding task, see also Annex III. One of the possible advantages of vaccinating poultry and in particular backyard poultry from the owner point of view is that these poultry could be spared by in case of preventive killing following an outbreak.

8.2. Emergency vaccination

Based on the pros and cons and the assumptions above, emergency vaccination following a disease outbreak could represent an alternative to pre-emptive culling in reducing the susceptibility of healthy flocks at risk by reducing the transmission rate. It could therefore be applied around or in the vicinity of an outbreak, giving priority to the poultry farms at higher risk described in 4.a) above. However, the size of the vaccination zone and the farms to be vaccinated cannot be identified *a priori*. The practicability of vaccination, the time interval necessary to obtain protective immunity and the resources available for

such emergency vaccination must also be fully considered. The experience gained in the last months in France and NL suggests that vaccination requires remarkable logistic efforts. Emergency vaccination plans must therefore be properly designed to ensure successful implementation.

Both in case of preventive vaccination and emergency vaccination it will be of major importance:

- to establish an effective surveillance system in line with the DIVA strategy, which should take into account the experience gained in Italy, France and NL;
- that poultry owners are properly informed on the pros and cons of vaccination, and on the measures and actions to be taken to prevent any spread of virus from their birds. Owners must be made aware that clinical signs of disease that would normally indicate the presence of infection may not be evident in vaccinated populations and that *inter alia* appropriate personal hygiene measures must be taken, in line with the guidelines issued by the ECDC to minimise the risk of humans acquiring HPAI H5N1 from exposure to infected birds.

In order to prevent any possible spread of disease which may occur in vaccinated flocks and may not be detected in a timely manner, the surveillance and control measures laid down in articles 3 to 9 of Commission Decision 2005/926/EC¹³ in relation to trade in vaccinated poultry and their products would be considered as an important reference by the Commission when assessing and eventually approving the vaccination plans submitted by the Member States. Before submission, the vaccination plan should be agreed between the animal health and public health authorities in the Member State.

9. Requirements for vaccination

The Member State wishing to implement vaccination against avian influenza must submit a plan that should give the following information and comply with the requirements below:

9.1. Disease Information

The Member State must give a clear description of its disease situation (or the neighbouring country or Member State, if this situation poses a threat). Results of previous surveillance in poultry and wild birds according to Commission Decisions 2005/732/EC and its amendments (Commission Decisions 2005/464/EC and 2005/756/EC) on intensified surveillance in wild birds specifically for H5N1 HPAI have to be taken into account in this description. Depending on this situation and the risk assessment of 6.2.below, it must be stated if emergency vaccination or preventive vaccination is envisaged.

9.2. Risk assessment

¹³ Commission Decision of 21 December 2005 on introducing supplementary measures to control infections with low pathogenic avian influenza in Italy and repealing Decision 2004/666/EC

The Member State concerned must give a clear justification prior to introduce vaccination based on an assessment of risks for disease introduction in its poultry flocks. This shall take into account the risks factors and local conditions prevailing (such as structure of poultry keeping, husbandry practices such as percentage of free range holdings, susceptibility of different species, poultry density, proximity to wild bird wintering and resting sites and wetlands, possible contacts to wild birds etc.) It shall also explain why other biosecurity measures adopted at national and Community level are not deemed sufficient to protect poultry flocks.

9.3. Extension of vaccination area

The Member State must notify in which geographical area and type of holdings it intends to carry out vaccination. For this purpose clear maps with identification of administrative boundaries such as communes need to be provided. The number of holdings and approximate number of birds to be vaccinated must be indicated as well as the species of poultry (e.g. chicken, turkey, ducks, geese etc.) and the production categories (e.g. fattening birds, breeders, layers). All these holdings must be registered. If this is not yet the case for backyard flocks this must be done in case these shall be included in the vaccination programme. Identification of vaccinated animals should also be described.

9.4. Vaccination strategy

Vaccination shall be carried out in accordance with a DIVA strategy which shall allow a differentiation between vaccinated/infected and vaccinated/non-infected birds. It must be clearly described how this system can be implemented in the concerned species and production systems the Member State wishes to subject to vaccination. Details shall be provided in the section on surveillance. The duration of the vaccination campaign must be indicated.

9.5. Vaccine characteristics

Information on the vaccine(s) to be used must be submitted including the characteristics of the Master seed strain (subtype, LPAI, HPAI), the vaccine manufacturer, type of vaccine (inactivated, GMO, etc). It must be stated which provisions of pharmaceutical legislation market authorisation according to pharmaceutical legislation has been granted exists. Minimum data requirements for an authorisation under exceptional circumstances for vaccines for emergency use in birds against H5 and/or H7 highly pathogenic avian influenza virus are set out in a document of the European Medicines Agency (EMA) of 16 February 2006 Doc.Ref.EMA/CVMP/IWP/46853/2006 of the Committee for Medicinal products for veterinary use (CVMP).

9.6. Vaccination scheme

The Member State must indicate the vaccination scheme to be applied to each species and production type to be vaccinated, the dose per bird, the age of the bird at vaccination, the frequency of vaccination and the intervals between (re)-vaccinations. Specific arrangements will be required if no all-in all out practise can be performed (e.g. birds to be added should have acquired sufficient immunity before moving into common sheds with birds already vaccinated).

9.7. Logistics of vaccination campaign

The Member State concerned must indicate the organisation of vaccine acquisition, vaccine storage, the distribution channels, maintenance of the cold chain, the application of vaccination by veterinarians, vaccinators etc and the destiny of unused vaccine doses. It must be guaranteed that all these steps are carried out under official supervision.

9.8. Biosecurity and early detection systems:

Member States must ensure that heightened biosecurity measures and systems for early detection according to Commission Decision 2005/734/EC¹⁴ are in place in all holdings of the territory.

9.10. Accompanying surveillance

The Member State must clearly describe the surveillance measures to be implemented in case of preventive or emergency vaccination that should allow for an early detection of possible field virus circulation.

In the case of emergency and preventive vaccination all vaccinated flocks must be subjected to surveillance by laboratory tests. To this end sentinel birds (unvaccinated susceptible birds, that must be clearly identified to avoid substitution or mix-up) shall be placed in the holdings. It is recommended to use not less than 1% of the population and in any case a minimum of 100 birds. The laboratory tests to be carried out on these sentinel birds must be indicated in terms of sample size (to allow for detection of infection with satisfactory confidence levels) as well as the frequency of testing and the type of laboratory tests used. Severely diseased sentinel birds shall be humanely killed and dead birds shall be immediately submitted to laboratory investigation. In case of species that might not show clear clinical signs even in case of HPAI infections, the use of sentinels of a poultry species that show a higher susceptibility than the vaccinated one shall be considered instead. If suitable tests are available (discriminatory tests) laboratory testing shall be carried out on vaccinated birds. In the case of emergency vaccination the regular surveillance of poultry flocks shall also be intensified for non-vaccinated poultry flocks in the vaccination area. The frequency of testing and the laboratory tests used shall be adapted to the type of production,

14 Commission Decision 2005/734/EC

the species concerned and possible risk factors for introduction of infection (long living birds, very dense poultry area, multiple contacts within an integration...).

9.11. Efficacy monitoring

Vaccinated birds shall be submitted to serological testing in order to evaluate the antibodies dynamics and assess the efficacy of vaccination in order to allow for adaptations of the ongoing vaccination scheme, if necessary, to achieve optimal protection.

9.12. Movement restrictions

Movement restrictions will differ for emergency vaccination programmes and preventive vaccination programmes depending on the actual risk of possible undetected field virus circulation. In case of movement of live poultry, day old poultry and hatching eggs this situation might often require laboratory testing before movement. In case of products derived from vaccinated poultry, such as meat and eggs compliance with the requirements of the surveillance accompanying the DIVA vaccination programme shall suffice.

9.13. Record keeping

Member States shall keep records for all poultry holdings (vaccinated and non-vaccinated), the holdings that are subjected to vaccination, the number of animal vaccinated, the number of holdings subjected to the surveillance programme and vaccine efficacy testing. All data in relation to vaccination logistics (vaccine storage, distribution as under 5.3.) have to be kept.

Poultry flock owners shall follow their legal obligation for record keeping. In addition owners of poultry hobby flocks shall keep a register of all movements of birds (acquisition, hatchings, deaths, movement to other keepers, slaughter for own consumption, etc.).

9.14. Declaration by owner

Owner (keeper) must declare to adhere to reporting obligations as set out in Decision 2005/734/EC and to obey the movement restrictions laid down in the emergency or preventive vaccination plan. He must state that he has been informed about the eventual risks of vaccination as concerns masked infection, the clinical symptoms of AI infection in poultry and humans, the necessary bio-security measures to avoid introduction of field virus infection and the hygienic precautions for personnel.

10. EU supported research

The EU is supporting research into the improvement and development of control tools in particular diagnosis, vaccines and increase knowledge of the disease. With regard to vaccines, the project AVIFLU¹⁵ was modified to include several experiments to study the efficacy of one commercial vaccine in ducks, quantifying the virus transmission in naïve and vaccinated ducks, evaluate the resistance to clinical disease and to evaluate the degree of virus shedding in vaccinated and unvaccinated waterfowl. The project FLUAID¹⁶ is focused on diagnostic tools and vaccines to be used in outbreak management and in the application on control measures based on vaccination. It foresees pilot studies with the view of developing a future EU vaccine bank, the identification of prototype strains for vaccine production, the development and validation of companion diagnostic tests to be used in combination with the DIVA strategy. Other on-going projects such as LAB-ON-SITE¹⁷, EPIZONE¹⁸ and HEALTHY POULTRY¹⁹ address diagnosis, epidemiology and surveillance and control strategies which are all valuable in a situation where vaccination is used. At present and following the dedicated call for research proposals for human and pandemic influenza²⁰ two projects aiming at the development of new vaccines for avian species are under negotiation. These two projects are focused on vector based marker vaccines in view of large scale easy and low cost application.

15 QLK2-CT-2002-01454 "Pathogenesis and improved diagnosis and control of avian influenza infections"

16 SSPE-CT-2005-022417 "Generation of information and tools to support the management of the avian influenza crisis in poultry" FLUAID

17 SSP-3- 513645 "New and emerging technologies: improved laboratory and on-site detection of OIE List A viruses in animals and animal products" LAB-ON-SITE

18 FOOD-CT-2006-016236- "Network on epizootic disease diagnosis and control"- EPIZONE.

19 SSPE-CT-2004-513737 "Development of new integrated strategies for prevention, control and monitoring of epizootic poultry diseases"- HEALTHY POULTRY

20 http://cordis.europa.eu/fp6/dc/index.cfm?fuseaction=UserSite.FP6DetailsCallPage&call_id=269

ANNEX I

The Avian Influenza H5N1 situation in Europe.

Which will be the risk in late 2006 - early 2007?

The spread of Avian Influenza virus H5N1 in many countries in Europe, Middle East and Africa in late 2005 and early 2006 is unprecedented. Data on surveillance carried out in the EU shows that there has been an epidemic of HPAI H5N1 in wild birds in Europe in the period February-May 2006, that has concerned 13 Member States and that has recently declined²¹.

There is evidence that in all affected Member States the disease has been introduced via wild/migratory birds, most likely proceeding from the wetlands surrounding the Black Sea and Caspian sea areas.

In the two areas above, there is a very high density of wild and migratory birds and it appears that the conditions exist for the virus to become entrenched in those environments. The possibility that HPAI H5N1 also persists in the ducks and geese breeding areas in Northern Europe is also to be considered. The finding of an infected wild bird (*Podiceps cristatus*) in Northern Spain (14th Member State concerned) at the end of June 2006 also suggests that the virus might persist in Europe during summer.

However, considering the seasonality of influenza viruses, there is the risk that the declining trend observed in summer 2006 will be reverted in the coming months.

Despite the very challenging disease situation in wildlife, the impact on poultry of the occurrence of HPAI H5N1 in wild birds in the EU in the first semester 2006 has been rather limited. The outbreaks which have occurred in poultry in France, Sweden, Germany and Denmark – all of them in non-vaccinated flocks - have been rapidly controlled by means of an effective stamping-out policy. The only major outbreak in poultry has occurred in June 2006 in Hungary, which has led to the stamping out (killing and destruction) of around 750 000 poultry. This outbreak has highlighted the difficulties in controlling the disease in areas with a high density of farmed ducks and geese, despite the efforts made by the authorities.

However, the overall disease situation suggests that the EU will continue to be exposed to a significant risk of virus introduction into currently non-affected areas and further spread to wild birds and poultry, both in backyard and commercial farms. This risk will most likely be primarily due to wild birds, but other possible ways of disease introduction should not be ignored.

21 for further information please look at: http://ec.europa.eu/food/animal/diseases/controlmeasures/avian/ai_addmeasures_en.htm

ANNEX II
EMERGENCY AND PREVENTIVE VACCINATION AGAINST AVIAN INFLUENZA
IN DIRECTIVE 2005/94/EC

1. Emergency vaccination

A Member State may introduce emergency vaccination in poultry or other captive birds as a short term measure to contain an outbreak in poultry or other captive birds when a risk assessment indicates that there is a significant and immediate threat of avian influenza spreading within or into the Member State concerned and where an outbreak of the disease has been confirmed within that Member State, in a nearby Member State or in a nearby third country.

Where a Member State intends to introduce emergency vaccination it shall submit an emergency vaccination plan to the Commission for its approval.

The Commission shall immediately examine the emergency vaccination plan together with the Member State concerned and shall review the situation in the Committee as soon as possible. The emergency vaccination plan shall be approved in accordance with Regulatory Committee procedures (SCOFCAH).

The approval of the emergency vaccination plan may include measures restricting the movements of poultry or other captive birds and their products. Those measures may include restrictions concerning specific poultry compartments and other captive birds compartments and the establishment of restricted zones.

By way of derogation from the above rules, Member States may apply emergency vaccination before approval of the emergency vaccination plan, subject to the following conditions:

- (a) the Commission is notified of the emergency vaccination plan and the decision to apply emergency vaccination before the commencement of the emergency vaccination;
- (b) the Member State concerned prohibits the movement of poultry or other captive birds and their products except under certain "basic" conditions on trade in vaccinated poultry and products from the vaccinated poultry that laid down in an Annex of the Directive (these conditions may be revised afterwards when the plan is approved by SCOFCAH procedure);
- (c) the decision to apply emergency vaccination does not endanger disease control.

When a Member State applies the derogation above, the disease situation and the emergency vaccination plan shall be reviewed in the Committee as soon as possible. The vaccination plan submitted could then be approved and further Community measures established.

2. Preventive vaccination

Member States may introduce preventive vaccination in poultry or other captive birds as a long term measure where they deem that on the basis of a risk assessment certain areas of their territory, type of poultry husbandry or certain categories of poultry or other captive birds or the poultry or other captive birds compartments are exposed to the risk of avian influenza.

Where a Member State intends to introduce preventive vaccination, it shall submit a preventive vaccination plan to the Commission for its approval.

The Commission shall immediately examine the preventive vaccination plan together with the Member State concerned and shall review the situation in the Committee as soon as possible. The preventive vaccination plan shall be approved in accordance with Regulatory Committee procedures (SCOFCAH). The approval of the preventive vaccination plan may include measures restricting the movements of poultry or other captive birds and their products. Those measures may include restrictions concerning specific poultry compartments and other captive birds compartments and the establishment of restricted zones.

ANNEX III

SURVEILLANCE AND CONTROL OF AVIAN INFLUENZA H5N1 IN BACKYARD POULTRY FARMS - A VERY DIFFICULT AND DEMANDING TASK

Experience in Asia and Eastern Europe suggests that HPAI H5N1 virus may be particularly difficult to control in areas with a high density of “backyard poultry”. Furthermore, most human cases of disease have actually occurred in people living in close contact with backyard poultry.

In its opinion of September 2005, the EFSA has recognised that backyard poultry farms are often the link between wild birds and commercial poultry farms for the spread of Low Pathogenic Avian Influenza viruses. Once in commercial poultry farms, the disease may have devastating effects from an animal health point of view, in particular in those areas of the Community with a high density of farms. Once in these areas massive culling of both backyard and commercial poultry could be necessary. The experience suggests that this operation can be very demanding in terms of resources and having a major negative social impact, in particular when many backyard poultry owners are concerned.

The information accumulated in recent months suggests that wild birds and migratory birds play a significant role in the dissemination of HPAI H5N1 virus. To ensure a proper separation between backyard poultry and wild birds may be particularly problematic. Therefore, a proper strategy for the prevention, surveillance and control of disease in backyard poultry in the EU becomes essential to protect both animal and public health. This should be based on the following pillars:

1. Disease Information

It is crucial that backyard poultry farmers are informed on the bio-security measures to be taken in their farms to prevent contacts with other domestic or wild birds, the clinical signs of disease in their poultry and the hygienic measures and precautions to be taken in case of suspicion of disease to prevent a possible poultry-to-human spread of virus. Effective measures by the MSs are needed in passing this information to the local level.

2. Surveillance and early reporting

As poultry farmers and the owners of backyard poultry must be in position to rapidly report occurrence of clinical signs of disease to the competent authorities, they need to be informed of the local contact points for this. A system must also be in place for collection of carcasses of suspected poultry and for their rapid testing. As many of the owners may not currently have the knowledge to be able to act properly, they may need assistance in the local authorities eg information on killing birds correctly, disinfection etc.

3. Possible vaccination

This is particularly demanding in case of backyard poultry. Ideally, registration of all backyard farms should take place in the whole vaccination area. Vaccinated poultry should be individually identified, so that they can be differentiated from non-vaccinated ones. In addition farmers will have to keep dependable records and a post vaccination surveillance system will have to be put in place. Many owners may opt to slaughter the backyard birds rather than vaccinate them and this option should also be discussed with the owners.

Correct implementation of such measures will require that the owners are very well informed of what they must do and the implications for them of having the birds vaccinated. This should be done by the media at national, regional and local levels.

Before a decision to implement vaccination is taken, the Competent Authority should verify that all these elements are in place.