

## Update on the Avian Influenza situation (As of 28/01/2004) – Issue no. 27



Ducks in rice field, Cambodia.  
Photo: S.Desvaux

The information summarized below is gathered from official and non official sources, which are quoted in the text. AIDE news is prepared by the FAO Technical Task Force on Avian Influenza.

### 1. Latest information on Avian Influenza

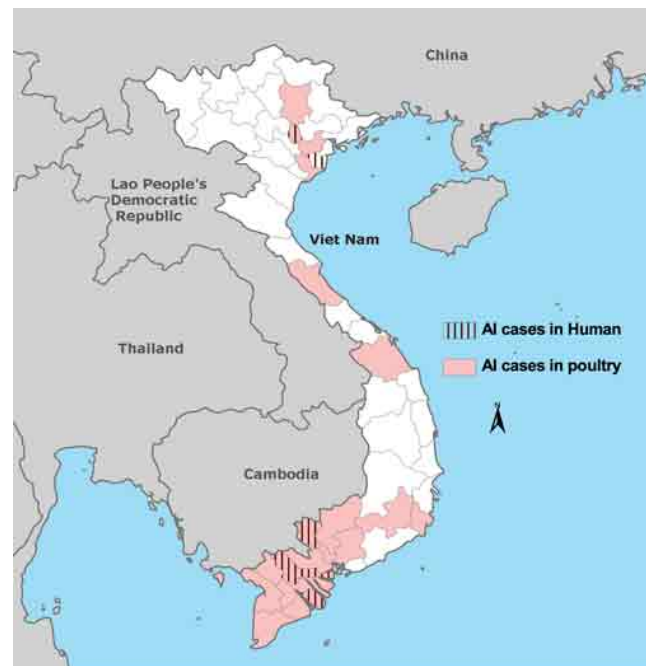
Outbreaks of H5N1 Highly Pathogenic Avian Influenza (HPAI) in poultry were reported in Thailand and Viet Nam, and human cases were reported in Viet Nam during the preceding month. Having lunar New Year day on 9 February, movement of poultry and poultry products will increase in the region. The need for biosecurity of domestic poultry to prevent infection and enhanced early warning in order to detect every additional case are highest during this season to avoid new cases of HPAI in poultry and to minimise the risk to humans.

#### Country situation

**Thailand:** Since 03/07/04, H5N1 HPAI infection has been confirmed in 57 provinces and more than one million birds have died or been culled in response. HPAI outbreaks were confirmed in 13 districts in the week of 9-16/12/04, resulted in culling of 23,243 birds. As at 27/01/05, 8 locations in 3 provinces, Pitsanuloke, Rayong and Nakorn Pathom were still the subject of the 21-day surveillance period imposed by the Department of Livestock Development (DLD), Ministry of Agriculture and Cooperatives. In January, HPAI outbreaks were reported in native chickens in PhitsanuLok Province and in fighting cocks and native chickens in Rayong Province. The Agriculture and Cooperatives and Public Health Ministry's disease control department ordered stepped-up inspections in poultry and the human population in border provinces. (27/01/05, Source: Government, FAO)

**Viet Nam:** In January, to 28 /01/05, avian influenza has been confirmed in 30 provinces and cities and 897,149 birds have died or been culled.

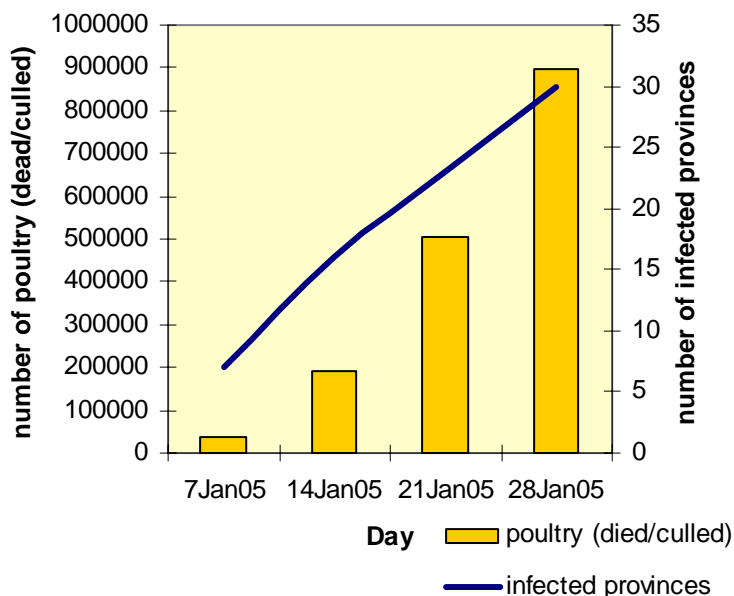
The Prime Minister sent an urgent message to concerned ministries, sectors and provinces calling for "drastic" measures on 17/01/05. In his message the Prime Minister says that bird flu is returning, particularly in Mekong Delta and southern provinces, and tends to spread quickly; ministries must consider the fight against the outbreak as their "key and immediate missions" to ensure the health and safety of the public and food supplies during Lunar New Year. Imports of poultry and poultry products from neighbouring countries are temporarily suspended, with any detected consignments to be seized at the border and destroyed. The owners



Provinces reporting avian influenza outbreaks in poultry and humans in Viet Nam since December 2004 (as of 27 January 2005)

will not receive any compensation but will be requested to pay for the cost of culling birds. The Ho Chi Minh City Police Department has deployed its forces to cooperate with the animal health bureau and market monitoring staff to check the trading at markets and especially the transport of fowl at gateways to the city. In Danang City, trade in live fowl at major markets is banned.

To 29/12/04, the WHO reported 27 HPAI human cases in Viet Nam, with 20 fatalities. This number increased dramatically in one month, as at 26/01/05 a further ten patients were confirmed as HPAI-infected, of which nine have died.



**Number of dead or culled poultry and infected provinces in Viet Nam since 1 Jan. 05 (accumulated)**

The provinces with suspected or confirmed human case since December 2004 are: Dong Thap, Tra Vinh, Tay Ninh, Hau Giang, Tien Giang, Bac Lieu, Thai Binh, Hung Yen, Phu Tho, Kien Giang, Binh Dinh Provinces and Hanoi. (28/01/05, Source: Government, FAO, media websites)

**Hong Kong SAR:** a "Chinese pond heron" (*Ardeola bacchus*) was found dead in the New Territories ecological mitigation area of Lok Ma Chau Spur Line Project 1 on 10/01/05. Avian influenza virus subtype H5N1 was confirmed in the heron. Genetic sequencing of the haemagglutinin cleavage site is to be conducted. All poultry farms within 5 km of where the heron was found have been checked and no unusual mortalities or illness were detected. Local poultry farms are routinely under constant monitoring and surveillance and individual farms have biosecurity plans that include bird-proofing of all sheds. All chicken farms are routinely vaccinated with inactivated H5N2 vaccine and 60 unvaccinated sentinels are kept in each batch of chickens. Extensive surveillance, including viral culture, is conducted in wholesale and retail poultry markets, in bird parks and in wild bird populations. (14/01/05, Source: Government, FAO)

--- Other strains -----

**Pakistan:** During November 2004, outbreaks of H7 avian influenza were reported in unvaccinated chickens in Haripur and Abbottabad, North Western Frontier Province; H7N3 and H9N2 were isolated from chickens in Karachi. (November 04, Source: Government, FAO)

## 2. Recommendations on the Prevention, Control and Eradication of HPAI in Asia

- **FAO Recommendations on the Prevention, Control and Eradication of Highly Pathogenic Avian Influenza (HPAI) in Asia.** This is an FAO position paper based on peer reviewed publications, meetings with government officials and expert consultations including OIE and WHO experts. The document is available at the FAO AGA website and the content list was provided in AIDENews 23. As previously advised, FAO will provide a summary of each topic in subsequent AIDENews issues. This issue provides an overview on the Use of Vaccination.

## Summary of the § 5. The Use of Vaccination

Despite the control measures that have been applied in East and Southeast Asia, continuing reports of outbreaks in Indonesia, Thailand and Vietnam and, most recently, in Malaysia, show that H5N1 HPAI has not been eradicated from the region. There is evidence that infection has been established in some parts of the region for some years and that the H5N1 HPAI viruses have become endemic in some countries. In response to this situation, some countries have commenced vaccination and others are considering the role that vaccines could play in their control programmes. Experience with use of vaccines in Hong Kong indicates that they can be used successfully to help eliminate H5N1 HPAI virus. Most examples from Europe and North America relate to using vaccination to help control LPAI viruses.

A number of efficacious vaccines are commercially available. These vaccines provide excellent protection against clinical disease in chickens, reducing mortalities and the effect of the disease on production. Properly used high quality vaccines confer good resistance to infection, so that the vast majority of vaccinated birds exposed to field virus do not become infected. For the few vaccinated birds that might become infected, shedding of virus is markedly reduced (both in the duration of excretion and the quantity of virus). Vaccination reduces the total amount of virus contaminating the environment and acting as a source of infection to poultry and humans. However, the vaccine must be of high quality and have sufficient antigenic mass for the birds to develop a protective immune response. In addition to these technical considerations, governments must also consider the export issue as well as other non-technical factors in arriving at a decision to include vaccination as part of their control strategy. These include the social effects of widespread destruction of poultry on smallholder livelihood and the economic consequences of failure to control the disease.

**Assessing whether to vaccinate:** To assess the risk of infection, veterinary authorities must consider whether the virus is present in neighbouring countries/compartments and whether there are reservoirs of infection within the country/compartment under consideration. Veterinary authorities are more likely to consider the use of vaccine as the likelihood of infection increases. In an uninfected country with no infected neighbours, the risk of infection would be negligible and veterinary authorities would not normally consider routine vaccination. However, in a country in which domestic waterfowl, live bird markets or wild birds are reservoirs of virus, the poultry industry is at higher risk of infection. In such cases the level of biosecurity on poultry farms is a major factor influencing veterinary authorities' consideration of the use of vaccination. In the situation where farm/village/backyard biosecurity cannot be improved and there is significant challenge from HPAI viruses, including infection in neighbouring villages, wild birds, domestic ducks or bordering countries, Veterinary Authorities should consider vaccination strategies to minimize propagation by this sector, to protect susceptible birds from infection and to manage human health risks. The density of poultry also influences the risk of spread of infection. If a virus enters an area of high poultry density there is greater probability of its spread. Veterinary authorities would be more likely to consider vaccination of chickens in these areas than in areas with a lower poultry density. Restocking of farms in previously infected areas is a higher risk situation in which veterinary authorities might consider the use of vaccination. Veterinary authorities must take into account the interaction between the level of challenge and the level of biosecurity in considering the use of vaccine.

**Vaccines in use today:** Most vaccines used to date for AI have been inactivated whole AI virus antigen in an oil-based emulsion adjuvant produced according to OIE recommendations. A live recombinant fowl pox with H5 AI gene insert has been used in a few countries but most other countries have not yet licensed this vaccine for unrestricted use and it is currently under review by the OIE. The use of heterologous N subtype vaccines provides an opportunity to use serological surveillance and a strategy to detect the circulation of field virus through the detection of antibodies to the N subtype of the field virus. This is referred to as the DIVA approach. The

circulation of LPAI viruses, such as H9N2 and H6N1, both of which are known to occur in parts of Asia, may interfere with the use of DIVA strategies. The response to vaccination using fowl pox virus-vectorized vaccine may be impeded in older poultry that have had prior exposure to infection with fowl pox virus or vaccines against fowl pox. The fowl pox virus-vectorized vaccine is of unknown efficacy in ducks and other avian species as the vector is not known to replicate in species other than chickens. A DIVA strategy can also be used with recombinant live vectorized vaccines because these vaccines do not induce the production of antibodies against the nucleoprotein antigen that is common to all AI viruses. Therefore only field-infected birds will exhibit antibodies in the agar gel precipitation test or enzyme linked immunosorbent assay (ELISA) to detect group A (nucleoprotein) antibodies. Both vaccinated and infected birds will have HI antibodies against the specific H subtype. Use of the DIVA strategy may mitigate the impact of export market closures. If the infected country can demonstrate the absence of field virus in vaccinated flocks, importing countries may be prepared to re-establish conditions for import.

FAO recommends that the Veterinary Authorities implement arrangements for monitoring the immune status of vaccinated flocks. For this purpose, it is important to use the specific antigen that is the source of the HA antigen in the vaccine. Properly vaccinated birds will exhibit relatively high titres in the appropriate HI test. Both conventional inactivated and recombinant vaccines must be administered by injection, which gives rise to practical and cost-related limitations to their use. Further scientific research and the development of vaccines that can be administered via feed or water as well as vaccines for use in avian species other than chickens is urgently required. Veterinary authorities should satisfy themselves that any vaccine used has been produced in accordance with the OIE Manual of Standards for Diagnostic Tests and Vaccines. The OIE Manual defines the 'Principles of Veterinary Vaccine Production', including vaccine types or forms, quality assurance, master seed management, documentation of the manufacturing process and record-keeping. FAO recommends that purchasers of vaccines assure themselves of the quality assurance procedures applied by manufacturers and of the performance characteristics in the field of all vaccines under consideration.

**Vaccine administration:** Vaccination teams should comprise veterinarians, technicians and assistants ('vaccinators') trained in both the vaccination procedure and appropriate public health measures including the correct use of personal protective equipment (PPE). Team members should follow manufacturers' recommendations on the storage and delivery of vaccine. They should also ensure that detailed records of vaccination (number and species vaccinated, location, date, identification numbers of sentinel birds etc.) are recorded and entered in relevant databases so these data are captured by official information systems and available for subsequent analysis. Vaccination team members should also be well trained in biosecurity measures to ensure they follow appropriate cleaning and disinfection procedures that minimise any risk of their spreading AI viruses or other poultry pathogens between flocks. Unvaccinated identified sentinel birds must be placed in the flock and there must be a monitoring system in place to assess the effectiveness of vaccination and to check sentinel birds.

**Birds to be vaccinated:** Veterinary authorities are more likely to consider the use of vaccine for valuable birds even when the risk of infection is relatively low. Such birds might include broiler breeders and layer breeders, fighting cocks and zoological collections. In situations of high HPAI challenge FAO recommends that all measures be taken to protect high value birds, including increased biosecurity and, as appropriate to the circumstances, vaccination. Veterinary authorities would not normally consider the vaccination of chickens that are processed at an early age (e.g. broiler chickens processed before 45 days of age). However, in the situation where there is a high challenge and biosecurity is insufficient to prevent infection, it may be appropriate to consider vaccination of broiler chickens. In backyard production systems where the chickens are fully susceptible to infection with HPAI and there is a high risk of infection, it may be appropriate to vaccinate all chickens. There is little

information available on the efficacy of AI vaccines in avian species other than chickens. Nonetheless, ducks are being vaccinated in some parts of Asia using conventional inactivated vaccines. Further research is urgently needed to determine the effectiveness of existing vaccines in ducks. Until such research is completed, FAO cannot make firm recommendations on the use of AI vaccines in ducks.

**The implication of vaccination for exporting countries:** In the case of countries that export poultry products, the most favourable status is country freedom from notifiable avian influenza (NAI). Countries that become infected usually lose their export markets and need to take steps to regain their former trading status as quickly as possible. The OIE Terrestrial Code chapter on Avian Influenza provides more specific guidance on the requirements to be satisfied by countries experiencing an outbreak of NAI. In the event of new outbreaks, the first approach will be to stamp out infection. In the situation where stamping out cannot be quickly achieved at the country level and other strategies must be considered, the use of vaccine does not imply automatic loss of export markets. However, this is subject to full compliance with OIE recommendations, particularly those concerning the strict application of active surveillance. When vaccinating, active surveillance using the DIVA strategy is a key condition in order to provide the necessary assurances that notifiable AI viruses are not circulating in any compartment from which export is proposed or occurring. In addition to that, the placement of identified, unvaccinated sentinel chickens within vaccinated flocks and strict record-keeping on vaccine use will be important elements in ensuring and demonstrating the absence of virus circulation. The application of the compartmentalisation concept can accelerate the resumption of export, provided that establishments apply the required surveillance, control and biosecurity measures for the purpose of international trade. In order to satisfy importing countries as to the status of an HPAI-free compartment within an infected country it is recommended that countries use only vaccines produced in compliance with OIE recommendations and in accordance with strict quality assurance procedures.

**Public health factors relating to use of vaccines:** Human health authorities have expressed two main concerns about the potential public health effects of vaccination of poultry: persistent excretion of AI virus in vaccinated poultry; generation of new strains of AI virus as a result of vaccination. Although vaccination does not eliminate the possibility of infection, field surveillance and experimental trials have shown that in properly vaccinated poultry exposed to the current strain H5N1 HPAI virus, infection is highly unlikely to undergo sustained transmission within, or to result in persistent infection of, the flock. Experimental results have shown that properly vaccinated birds subsequently inoculated with HPAI H5N1 virus are less likely to become infected, are less likely to excrete virus and, if they do excrete, will excrete lower quantities of virus than their non-vaccinated counterparts. Concerns have been expressed that the use of vaccination against HPAI virus in birds might lead to the emergence of mutant strains that are more likely to transmit from person to person. Influenza viruses undergo spontaneous mutation when they multiply. Selection pressures do occur when vaccines are used against viruses, but these pressures also occur during natural infection. However, it is unlikely that vaccination of poultry will exert a selection pressure on the cell receptor of the HA protein that might lead to an increase in the transmissibility of the virus to mammals. Thus vaccination can actually reduce the opportunity for natural mutation or reassortment by reducing the quantity of circulating virus. To overcome these concerns, FAO recommends implementation of surveillance systems that measure the response to vaccination and detect the presence of field virus in clinically normal vaccinated poultry. FAO further recommends that viruses isolated be fully characterized at an appropriate OIE/FAO or WHO reference laboratory to provide early warning of any significant antigenic or genetic changes that might be occurring.

The full text of the Guiding Principles is available on:

[http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e\\_tadAVI.htm](http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e_tadAVI.htm) at relevant articles/publications:  
or <http://www.fao.org/docs/eims/upload/165186/FAOrecommendationsonHPAI.pdf> (233KB)

Further reading: Vaccination for avian influenza in Asia. I. Capua, S. Marangon

[http://www.oie.int/eng/AVIAN\\_INFLUENZA/vaccination%20in%20Asia.pdf](http://www.oie.int/eng/AVIAN_INFLUENZA/vaccination%20in%20Asia.pdf)

### 3. Surveillance and Post-epidemic rehabilitation activities – What next?

**Lao PDR up-date:** There has been no outbreak reported since February 2004. At the time of the outbreak, the river between Thailand and Lao PDR was extremely low. Migratory birds may have been attracted to remaining water reservoirs and ponds in villages and farms adjacent to the river. Almost all reports of infection came from locations close to the river. The Lao Ministry of Agriculture and Fisheries imposed a ban on the introduction of poultry from Thailand and this decree is still in place. Check points have been established at major traffic points to monitor movements. Public awareness programmes emphasize the need for improved “local” quarantine and prevention of exposure, as far as practicable, in both villages and commercial premises. Interviews with farmers revealed that, within infected farms, the disease spread more quickly where birds were kept on litter than in layer cages, suggesting that the faecal-oral route of transmission was more important than aerosol transmission. Some 20% of the national poultry flock is held in commercial enterprises servicing the larger urban human populations around the cities of Vientiane, Luang Prabang, Champasack and Savannakhet. Of these, egg producers obtain most of their replacements as “point-of-lay” 16 week-old pullets from Thailand. Similarly, day-old commercial broiler chicks are imported into farms and available in small numbers at the larger district markets. There is no commercial production of ducks or turkeys. Village poultry in Lao PDR have close contact with each other, with pigs and with children, creating a risk of inter-species transmission. There are no large “wet” markets in Lao. Poultry are sold in the village or the local district market. The system of selling poultry in the market in Lao is unique: Consumers are offered live birds by traders in the market; birds that are not sold that day are processed and offered as fresh or cooked carcasses the following day. At the market level, this system effectively works on an “all-In, all-Out” basis. There are no large commercial poultry slaughtering establishments in Lao. Rather, processing is done by owners or traders with small basic facilities. Village poultry populations are self-replacing with few introductions from outside the village. Thus, in the event of HPAI outbreaks in the village, disease may be limited to the locality, with little risk of further spread. Active surveillance must be continued, encouraged and results recorded. (source: extract from FAO consultant report, edited)

- **Cambodia update:** There has been no outbreak reported since October 2004.
- Surveillance:** The passive surveillance system found 3 suspected cases that were investigated in May-July, due to a possible link with suspected human cases. An active surveillance program for markets was launched in early August in the major live bird markets in the town. Monitoring of repopulated farms has been proposed for previously infected farms and farms located a 3 km radius of outbreaks to declare those places free of disease and some farms are being used as sentinel farms in the country. The central epidemiology team has visited every province involved in this monitoring. Monitoring has already started in Phnom Penh and Kandal provinces. The identification and geo-referencing of commercial and semi-commercial farms in the outbreak areas (3-4 km around the outbreak) has been initiated and will be extended to the whole country. The data collected will be shared with the statistics department of the Ministry of Agriculture.
- Diagnosis activities:** The Pasteur Institute in Cambodia and the Australian Animal Health Laboratory (AAHL) has helped NAHPIC to train staff and to organise a proficiency test for HI test, with good results. AAHL helped to prepare reference antigens from the Vietnamese H5N1 strain for use in the HI test and control slides made from organs smears for use in IFAT.
- Qualitative study:** A study based on interviews of citizens suggests that many villages around the outbreak sites faced an HPAI outbreak. Preliminary results also suggest that the spread of the virus was higher among “village poultry” than between independent farms. Possible explanations for the absence of new outbreaks since last April are: very high temperatures from mid-April to mid-May; the very high case fatality rate in chickens (often reaching 100%) prevented birds acting as virus

carriers; drastic reductions in animal movements in the country and the number of live birds in markets; and the low human and animal population density in the country. Many ducks are reared for egg production in rice fields and are quite separate from the local chickens. (source: FAO consultant report)

- **China up-date:** There has been no outbreak since July 2004. The Ministry of Public Health has recently discussed an emergency program to guard against HPAI. Large cities have stepped up surveillance. Yunnan Province, which shares a 1,200-kilometer border with Viet Nam, has taken emergency measures to prevent HPAI spreading from Viet Nam into China. Poultry farms, regions on the China-Viet Nam border and places that experienced HPAI early last year have been urged to vaccinate poultry. The provincial government is encouraging local agriculture, health, import and export quarantine, public security, quality inspection and customs officers to work together to monitor spread of HPAI and to become better informed on the distribution of poultry and egg products. The local animal husbandry department has set up a 30-km-wide "immune protection zone" in the area bordering Vietnam and has established disinfection stations at the frontiers crossings and border ports to check and disinfect all vehicles and personnel crossing. Any outbreak of bird flu must be reported to authorities within 24 hours. (08/01/05, source: media website)
- **Malaysia up-date:** There has been no outbreak reported since November 2004. During the last few outbreaks, there was an unusual disease pattern with low or no detected mortality (mortality <2% to >40% in infected village poultry). The most recent isolates of virus (in November 2004) were from clinically normal birds in villages with no apparent increase in chicken mortality. (source: FAO consultant report)
- **FAO Workshop on Social and Economic Impacts of Avian Influenza Control**, 8-9 December 2004, Bangkok was held to identify potential social and economic impacts of alternative Avian Influenza control programmes and suggest a role for FAO in contributing to social and economic evaluation; and to identify topics for studies and strategic planning that require attention and funding by national governments and donors. A synthesis of findings is at:  
<http://www.fao.org/ag/againfo/home/en/home.html>
- **FAO/OIE Second Regional Meeting on Avian Influenza Control in Animals in Asia, 23-25 February, Ho Chi Minh City** – FAO and OIE in collaboration with WHO and Government of Viet Nam, will hold a joint meeting in Ho Chi Minh City, 23-25 February, 2005, to discuss the current AI situation in the region. The meeting will be attended by Chief Veterinary Officers from the region, representatives of international and regional organizations, international experts working in close collaboration with infected countries in the region and representatives of donor organizations and countries.
- **OIE/FAO Scientific International Conference on Avian Influenza (in collaboration with WHO) 7-8 April 2005, Paris** – this conference will review latest scientific knowledge and will address different aspects of disease control. Topics to be discussed are: Ecology and Epidemiology; Pathogenesis; Human Health implications; Control; Diagnostic; and Improvement of management tools. The Conference is an opportunity for the exchange of the latest scientific information at the global level which will assist in the evaluation and improvement of the current standards and guidelines. Further information can be found at:  
[http://www.oie.int/eng/Avian\\_Inf\\_2005/home.htm](http://www.oie.int/eng/Avian_Inf_2005/home.htm)

## 4. Related issues

### ➤ How can HPAI virus convert into a pandemic strain?

**H5N1 viruses:** The likelihood of HPAI virus in Asia giving rise to a pandemic strain cannot be calculated and this risk continues to alarm international organizations and the community at large. The current H5N1 genotype has been circulating for about 3 years, having apparently emerged in Asian poultry late in 2001 or early in 2002<sup>1</sup>. Infection with related H5N1 strains has also been reported in pigs. It seems that the evolution of a pandemic strain does not occur easily, even when conditions are favourable. A review published last year by Reid et al.<sup>2</sup> on the current state of knowledge regarding development of pandemic strains of influenza virus explains that it is still not clear how pandemic strains emerged, despite the studies completed. The viruses of the 1957 and 1968 pandemics appear to have obtained HA and some other genes from avian viruses and become adapted to reproduce in humans<sup>3</sup>. Another recently published review in Nature Medicine<sup>4</sup> provides a balanced appraisal of the current situation. Webby et al<sup>5</sup>, in another recent review, examine the requirements for emergence of pathogens. For influenza viruses this includes the ability to bind to receptors on cells of the respiratory epithelium. Previous pandemic strains that contain apparent haemagglutinins of apparent avian origin preferentially recognize human receptors (suggesting previous mutation), facilitating human-to-human transmission. A paper published earlier this year by Matrosovich et al.<sup>6</sup> reported that avian and human influenza viruses attach preferentially to different cell types in cultured human respiratory epithelium i.e. ciliated cells (avian strains) and non-ciliated cells (human strains), based on the different receptor types that these cells express. Matrosovich et al. (2004) also advise that mucus contains receptors for avian viruses. It may be that binding of avian influenza virus to mucus reduces the amount of virus reaching a cellular receptor, hence reducing the likelihood of disease in people exposed to these viruses.

Another intriguing puzzle is why H9N2 influenza viruses have not developed into pandemic strains. These viruses are widespread in poultry in the region. They have been present in poultry throughout Asia for considerably longer than H5N1 viruses. These viruses are far more likely to be encountered in poultry in markets than H5N1 viruses<sup>7</sup>. Serological studies have also demonstrated antibodies to these viruses in humans<sup>8</sup>, and they have been isolated from pigs<sup>9</sup>. These findings demonstrate that even when avian influenza viruses develop some of the capabilities to infect man this does not automatically generate a pandemic. Countries and regional/international organizations must continue monitoring avian, porcine and human populations for the emergence of influenza viruses to ensure the detection and characterization of new viruses, to provide for early detection of recombination or other threatening changes in the nature of the viruses. No one can predict when the next pandemic strain of influenza virus, or even which strain, will emerge. It is therefore important that countries develop pandemic preparedness plans as recommended by WHO.

## 5. Actions taken – follow-up

### ➤ Recent Missions (December - February):

*We would be grateful if other organizations/countries could send us information on their assistance missions to the countries concerned.  
(e-mail to: Avian-Influenza-Registration@fao.org)*

#### **[Region]**

- Dr. F. Dolberg (Denmark) FAO consultant (Poultry Production Expert), 7-17/12/04

#### **[Cambodia]**

- Dr. Y. Froehlich (France) FAO consultant (Project Technical Adviser), 22/03-28/12/04

- Dr. A. Chaisingh (Thailand) FAO TCDC expert (Laboratory Diagnostics), 6-17/12/04

#### **[China]**

- Dr. J. Guitan (Spain) International GIS Specialist. 14/12/04-06/01/05

- Dr. Quang Minh Phan (China) FAO TCDC expert (GIS Information Technology). 4-18/01/05

**[Lao PDR]**

- Dr. R. Webb (Australia), Epidemiology and programme management. 14/11-11/12/04
- Dr. W. Kalpravidh, FAO RAP (Bangkok), Project Co-ordinator, 15-17/12/05
- Ms. E. Bautista (Philippines) FAO TCDC expert (Project finance & administration officer), 21/10-18/12/04

**[Malaysia]**

- Dr. C. Benigno, FAO RAP (Bangkok) Animal Health Officer, 12-14/12/04 Regional Seminar and Training on HPAI Diagnosis
- Dr. W. Kalpravidh, FAO RAP (Bangkok), Project Co-ordinator, 12-14/12/04 Regional Seminar and Training on HPAI Diagnosis
- Dr. L. Sims (Australia) FAO consultant (Avian Influenza Disease Management). 12-14/12/04 Regional Seminar and Training on HPAI Diagnosis

**[Singapore]**

- Dr. H. Wagner, FAO RAP (Bangkok) Senior Officer, First Meeting of ASEAN HPAI Task Force 1. 19-21/12/04
- Dr. W. Kalpravidh, FAO RAP (Bangkok), Project Co-ordinator, First Meeting of ASEAN HPAI Task Force 1. 19-21/12/04

**[Viet Nam]**

- Dr. J. Pearson (USA), FAO consultant (Laboratory Expert), 16-21/12/04
- Dr. A. Riviere-Cinnamond (Spain), Agro-Economist, 1-22/12/04
- Dr. A. Tripodi (Germany/Italy), Project Coordinator, Ongoing.
- Dr. V. Martin, FAO AGAH (Rome) Animal Health Officer (Infectious Diseases Emergencies). To commence in the week of 30/01/05
- Dr. D. Pfeiffer (UK), FAO consultant (Epidemiology). To commence in the week of 30/01/05
- Dr. J. Domenech, FAO AGAH (Rome) Chief AGAH, 23-25/02/05 Regional meeting
- Dr. J. Lubroth, FAO AGAH (Rome) Senior Officer (EMPRES), 23-25/02/05 Regional meeting
- Dr. A. McLeod, FAO AGAL (Rome) Senior Officer (Livestock Policy), 17-25/02/05 Poultry Sector Restructuring Strategy and Regional meeting
- Dr. V. Martin, FAO AGAH (Rome) Animal Health Officer (Infectious Diseases Emergencies), 23-25/02/05 Regional meeting
- Dr. E. Guerne Bleich, FAO AGAP (Rome) Animal Production Officer (Small Animals), 23-25/02/05 Regional meeting
- Dr. H. Wagner, FAO RAP (Bangkok) Senior Officer, 23-25/02/05 Regional meeting
- Dr. W. Kalpravidh, FAO RAP (Bangkok), Project Co-ordinator, 23-25/02/05 Regional meeting
- To be identified, FAO TCEO (Rome), 23-25/02/05 Regional meeting

## 6. Resources available

### Relevant articles, publications and websites:

#### **FAO**

- FAO Recommendations on the Prevention, Control and Eradication of Highly Pathogenic Avian Influenza (HPAI) in Asia  
<http://www.fao.org/docs/eims/upload/165186/FAOrecommendationsonHPAI.pdf> (233KB)
- FAO-EMPRES (Emergency Prevention System against transboundary animal and plant pests and diseases) Avian Influenza website:  
[http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e\\_tadAVI.htm](http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e_tadAVI.htm)
- Guiding Principles : Highly Pathogenic Avian Influenza Surveillance And Diagnostic Networks In Asia (FAO Expert Meeting 21-23 July 2004, Bangkok)  
English: <http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/Guiding%20principles.pdf>  
中文: <http://www.fao.org/ag/againfo/subjects/zh/health/diseases-cards/Guidingprinciples.pdf>

- FAO/OIE Emergency Regional Meeting on Avian Influenza Control in Animals in Asia (26-28 February 2004, Bangkok). The full text of the final report is available on: [http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/HPAI\\_Bangkok.pdf](http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/HPAI_Bangkok.pdf)
- FAO/OIE/WHO Technical Consultation on the Control of Avian Influenza (3-4 February 2004, Rome) The full text of the Conclusions and recommendations is available on: [http://www.fao.org/newsroom/common/ecg/36647\\_en\\_experts.pdf](http://www.fao.org/newsroom/common/ecg/36647_en_experts.pdf)
- Manual on the preparation of national animal disease emergency preparedness plans <http://www.fao.org/docrep/004/x2096e/x2096e00.htm>
- The use of vaccination as an option for the control of Avian Influenza (I. Capua, S Marangon) – 71st OIE General Session (May 2003). Available at: [http://www.fao.org/docs/eims/upload/153564/A\\_71\\_SG\\_12\\_CS3E.pdf](http://www.fao.org/docs/eims/upload/153564/A_71_SG_12_CS3E.pdf)
- Information for shipping international diagnostic specimens to the International Reference Laboratories (see appendix 2 of AIDENews issue 5 or 6, available at: <http://www.fao.org/ag/AGA/AGAH/EMPRES/index.asp>)
- FAO EMPRES Manual on procedure for disease eradication by stamping out (Available at: <http://www.fao.org//DOCREP/004/Y0660E/Y0660E00.HTM>)
- FAO AGAH Avian Influenza website: [http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/special\\_avian.html](http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/special_avian.html)
- FAO AIDENews (Vol. 1 - 26) (Available at: [http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e\\_tadAVI.htm](http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e_tadAVI.htm))
- FAO AIDENews maps (Available at: [http://www.fao.org/ag/AGA/AGAH/EMPRES/maps/e\\_maps.htm](http://www.fao.org/ag/AGA/AGAH/EMPRES/maps/e_maps.htm))

### **OIE**

- OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals 2004 - CHAPTER 2.1.14. Highly Pathogenic Avian Influenza [http://www.oie.int/eng/normes/mmanual/A\\_00037.htm](http://www.oie.int/eng/normes/mmanual/A_00037.htm)
- Proposed new chapter for The OIE Terrestrial Animal Health Code [Chapter 2.1.14.] Avian Influenza: [http://www.oie.int/eng/AVIAN\\_INFLUENZA/safety.htm](http://www.oie.int/eng/AVIAN_INFLUENZA/safety.htm) click the link to the proposed new chapter submitted in May 2004
- OIE Update on Avian Influenza in Animals in Asia web site: [http://www.oie.int/download/AVIAN%20INFLUENZA/A\\_AI-Asia.htm](http://www.oie.int/download/AVIAN%20INFLUENZA/A_AI-Asia.htm)
- OIE Technical Disease Cards: [http://www.oie.int/eng/maladies/fiches/a\\_A150.htm](http://www.oie.int/eng/maladies/fiches/a_A150.htm)

### **WHO**

- WHO interim recommendations for the protection of persons involved in the mass slaughter of animals potentially infected with highly pathogenic influenza viruses [http://www.who.int/entity/csr/disease/avian\\_influenza/guidelines/en/Avian%20Influenza.pdf](http://www.who.int/entity/csr/disease/avian_influenza/guidelines/en/Avian%20Influenza.pdf)
- Advice for people living in areas affected by bird flu or avian influenza (WHO) <http://www.wpro.who.int/avian/docs/advice.asp>
- Laboratory study of H5N1 viruses in domestic ducks: main findings (WHO) [http://www.who.int/csr/disease/avian\\_influenza/labstudy\\_2004\\_10\\_29/en/](http://www.who.int/csr/disease/avian_influenza/labstudy_2004_10_29/en/)
- WHO Avian influenza web site: [http://www.who.int/csr/disease/avian\\_influenza/en/](http://www.who.int/csr/disease/avian_influenza/en/)

### **Others**

- China-ASEAN Special Meeting on HPAI Control. Beijing (2 March 2004) The full text of the Joint Press Statement "China-ASEAN Special Meeting on HPAI Control" is available on AIDENews issue 8 pages 4 - 5: <http://www.fao.org/docs/eims/upload/153869/AVIbull008.pdf>
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- AUSVETPLAN including HPAI Disease strategies and Operational procedures <http://www.aahc.com.au/ausvetplan/>
- Avian Influenza - Disease and Control Strategies and Contingency Planning (intervet) <http://www.avian-influenza.com/>
- Avian Influenza - Its Causes, Effects & Control (Antec International) <http://www.antecint.co.uk/main/avianflu.htm>
- Biosecurity for the Birds (USDA Animal and Plant Health inspection Service, Veterinary Service) <http://www.aphis.usda.gov/vs/birdbiosecurity/>
- Biosecurity for Poultry Flocks (Joan S. Jeffrey, University of California, Davis, School of Veterinary Medicine) [http://www.vetmed.ucdavis.edu/vetext/INF-PO\\_Biosecurity.html](http://www.vetmed.ucdavis.edu/vetext/INF-PO_Biosecurity.html)
- DEFRA(UK): Low Pathogenic Notifiable Avian Influenza (H5 and H7) in poultry meat (386 KB) - 5 January 2005 <http://www.defra.gov.uk/animalh/diseases/monitoring/pdf/lpai-poultrymeat.pdf>
- DEFRA(UK): Low Pathogenic Notifiable Avian Influenza (H5 and H7) in poultry eggs for consumption (363 KB) - 5 January 2005 <http://www.defra.gov.uk/animalh/diseases/monitoring/pdf/lpai-poultrymeat.pdf>
- CFIA(Canada): the response to a review of the 2004 outbreak of avian influenza in British Columbia. <http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/2004sum/revexae.shtml>
- Vietnam Livestock Working Group web site <http://www.livestockworkinggroup.org>
- CDC(USA): Updated Information for Travellers about Avian Influenza A (H5N1) <http://www.cdc.gov/travel/other/h5n1apr2004.htm>
- CDC(USA): Research: Human Disease from Influenza A (H5N1), Thailand, 2004 [http://www.cdc.gov/ncidod/EID/vol11no02/04-1061.htm#content\\_area](http://www.cdc.gov/ncidod/EID/vol11no02/04-1061.htm#content_area)
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- 6) Matrosovich et al (2004) <http://www.pnas.org/cgi/content/full/101/13/4620>
- 7) Kung et al (2003) [http://avdi.allenpress.com/avdionline/?request=get-document&doi=10.1043%2F0005-2086\(2003\)047%3C1037:TIOAMR%3E2.0.CO%3B2](http://avdi.allenpress.com/avdionline/?request=get-document&doi=10.1043%2F0005-2086(2003)047%3C1037:TIOAMR%3E2.0.CO%3B2)
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**Annex 1: Situation in Asian Countries (as of 28/01/2005)**

area	date of first official reporting to the OIE	type	species affected since the start of the outbreak	human case	Latest information <sup>1)</sup>		
					last known case suspected and/or confirmed	source of the latest information and OIE declaration	comments
Republic of Korea	12/12/03	H5N1	Layer, duck; virus isolated: magpie	no	24/03/04	Government; media websites. Declared to OIE	AHD/MAF informed OIE the negative result of the final serological testing of the sentinel birds on 19/07/04; Final report submitted to OIE on 21/09/04
		H9N2 (LP <sup>3)</sup> )	Layer	no	10/12/04	Government, media websites	
Viet Nam	8/01/04	H5N1	Chicken, quail, duck, muscovy duck	yes	28/01/05	FAO <sup>2)</sup> , Government	30 provinces have been affected since 1 January 2005. Eleven human cases were confirmed this winter.
Japan	12/01/04	H5N1	Chicken, crow	sero-positive	05/03/04 (crow)	Government and media website; Declared to OIE	All the movement restrictions lifted by 13/04/04
Taiwan Province of China	20/01/04	H5N2 (LP)	Chicken, duck, pheasant	no	09/03/04	Meeting report, media website. Declared to OIE	
Thailand	23/01/04	H5N1	Tiger, virus isolation: chicken, duck, goose, quail, turkey, stork. Surveillance: the Little Cormorant, Asian Openbill, Scaly-breasted Munia, Red Turtle-Dove, Black Drongo and pigeon.	yes	25/01/05	Government, FAO, media websites. Declared to OIE	
Cambodia	24/01/04	H5N1	Chicken, duck, goose, turkey, guinea fowl, wild bird	no	14/10/04	Government, FAO.	A human case is suspected.
Hong Kong SAR	26/01/04	H5N1	Peregrine falcon; Grey heron, Chinese pond heron	no	10/01/05	Media website	
Lao, PDR	27/01/04	H5N1	Chicken, duck and quail	no	13/02/04	Government, FAO	
Pakistan	28/01/04	H7N3 H9N2 (LP)	layer; broiler	no	November 04	Government, FAO	
Indonesia	06/02/04	H5N1	Chicken, duck and quail	no	13/12/04	ProMED, media website	HPAI in Lombok island
China	06/02/04	H5N1	Virus isolation: chicken, duck, goose, quail, pigeon, pheasant, black swan	no	06/07/04	Government, FAO, media websites. Declared to OIE	Export ban of poultry products from Anhui Province was lifted on 31/08/04.
Malaysia	19/08/04	H5N1	Chicken, fighting cocks (?)	no	19/11/04	Government, media websites. Declared to OIE	Final report submitted to OIE on 03/01/05

1) Official (OIE) and unofficial information (ProMED, press agencies, FAO tracking systems...)

2) FAO: FAO representative in concurrence with Government sources

3) LP: low pathogenic strain 4) Gphin: Global Public Health Intelligence Network (Health Canada)

**Annex 2: Situation in other Countries (as of 28/01/2005)**

area	date of official reporting to the OIE	type	species affected since the start of the outbreak	human case	Latest information <sup>1)</sup>		
					last known case suspected and/or confirmed	source of information and its OIE declaration	comments
United States of America	11/02/04	H7N2 (LP)	Chicken	no	11/02/04 (Delaware)	Delaware Department of Agriculture Statement; FAO.	Final report submitted to OIE on 15/05/04
		H2N2 (LP)	Chicken	no	03/02/04 (Pennsylvania)	Pennsylvania Department of agriculture website; ProMED	
	23/02/04	H5N2	Chicken	no	Late February (Texas)	Texas Animal Health Commission and USDA website; FAO. Declared to OIE	USDA informed OIE the eradication of HPAI in Gonzales County, Texas on 01/04/04; 17/08/04
		H7N2 (LP)	Chicken	no	09/03/04 (Maryland)	Maryland Department of Agriculture News Release; FAO; Declared to OIE	Final report submitted to OIE on 15/05/04
		H7N3 (LP)	non-commercial	no	22/06/04 (Texas)	Texas Animal Health Commission website	
		H3N2	Turkey	no	17/09/04 (Missouri)	ProMED	
Canada	19/02/04	H7N3 (LP)	Chicken	yes (conjunctivitis)	29/04/04 (British Columbia)	Government website. Declared to OIE	CFIA informed OIE that the identified zone is no longer considered as infected, as of 9 July 2004; Final report submitted to OIE on 23/11/04.
	09/03/04	H7N3					
South Africa		H6 (LP)	commercial poultry	no	25/03/04	ProMED	
	06/08/04	H5N2	Ostrich	no	early December (Eastern Cape province)	Web Media	
Egypt		H10N7 (LP)	Wild duck	yes	18/04/04 (from survey sample)	ProMED	

1) Official (OIE) and unofficial information (ProMED, press agencies, FAO tracking systems...)

2) FAO: FAO representative in concurrence with Government sources

3) LP: low pathogenic strain

4) Gphin: Global Public Health Intelligence Network (Health Canada)