

Summary of Background Papers

**Technical Meeting on Highly Pathogenic Avian Influenza and
Human H5N1 Infection
27-29 June, 2007, Rome**

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Introduction

A unique panzootic, caused by Highly Pathogenic Avian Influenza (HPAI) viruses characterised as H₅N₁, emerged in eastern Asia more than four years ago raising concerns about the generation of a pandemic of human disease. Now in the second year after the Beijing pledging meeting and in the run-up to the third pledging meeting to be held in New Delhi it is an appropriate time to take stock of the situation. The international community as well as the countries concerned need to carefully evaluate their HPAI status and to learn lessons from the intense effort and financial expenditure made.

The HPAI panzootic spread relatively slowly at first within east and south-east Asia until a sudden widespread burst of virus transmission led to disease occurring progressively across Central Asia, the Russian Federation and onwards into Europe even south into the Middle East and Africa. Migrating wild birds were clearly involved to some extent but it is not possible to exclude trade in poultry and poultry products as an important factor in transmission.

As of June 2007 the global HPAI situation seems, even if only temporarily, to have settled into an unstable equilibrium, with HPAI infection firmly entrenched in several countries which pose a threat as sources of infection to neighbouring and even distant countries. Typifying this situation are Indonesia, Egypt and Nigeria with China having managed to impose a degree of control. Another group of countries were at high risk and became infected but have managed to eliminate infection (e.g. Turkey and Russia) or at least suppress it sufficiently to prevent human cases occurring for a time (e.g. Thailand and Vietnam). Countries not yet infected or which have eliminated infection, sometimes more than once, are highly vulnerable unless they can establish effective biosecurity and strengthen early warning and rapid response systems. The world seems no longer to be in an emergency situation even if invasion of a new country demands activation of emergency response procedures when it occurs.

This situation lends itself to establishment of a science-based vision for a systematic approach to the problem. Clearly there can be no 'quick fix' nor one policy which can be set for all situations. In terms of regional and national policies, then, these must relate to the social and economic circumstances prevailing in countries not just to the virus biology. It is not only a matter of direct zoo-sanitary based procedures to combat disease; long-term behaviour change will almost certainly be required.

Countries and international technical organisations surely need to understand how effective, or otherwise, have been the strategies adopted in different countries and the reasons why they have performed as they have. Can decisions be made as to the likelihood of pandemic emergence, whether global eradication or regional elimination of HPAI are feasible objectives? If they are, how should the tools available be employed to achieve what is expected? If not then how can the risk of pandemic emergence be minimised in a sustainable manner? It could even be asked if it is possible to assess fully the risk of pandemic occurrence when neither the means of acquisition of infection nor the determinants of onward transmission are well defined. There are many fundamental questions which are still lacking answers. For example: is sufficient known about the flow of virus between industrial poultry houses and village poultry to understand what transmission chains are of most importance and in prevailing African conditions, is the disease observed over the last year in village and smallholder poultry a reflection of sustained transmission networks or could the pattern be explained by repeated introductions from large-scale production systems?

A vision to guide the global endeavour must emerge but it is necessary to ask if it is possible on the experience of the last four years to predict what is likely to happen.

The objectives of the Technical Meeting are to:

1. Review the best available scientific, technical and operational evidence to date on the nature of HPAI, and H5N1 influenza virus infection in humans, for its prevention and control and to provide authoritative assessment of risk.
2. Provide strategic guidance to partners on technical and policy options for cost-effective and cost-efficient measures for the prevention and control of HPAI and associated human infections.
3. Identify the current state of pandemic influenza preparedness in the context of H5N1 human infection.
4. Identify and build consensus on geographical and thematic priorities and key constraints that need to be overcome, in the immediate, medium and longer term, to effectively address HPAI and associated human infection.

This Background Summary document is provided to brief participants before the Meeting. There is a strong focus on sharing experiences between technical experts across different disciplines and between countries. The papers to be presented at the Meeting, for which summaries are included below, cover the following topics:

- An assessment of the current global situation with HPAI, epidemiological trends and virus evolution and the implications for human exposure to H5N1 virus and human pandemic risk.
- A consideration of lessons learned in recent years in efforts to prevent and control HPAI and to implement strategies for human influenza pandemic preparedness.
- Identification of the needs and approaches, at national and regional levels, for institutional strengthening and support to improve prospects for controlling and preventing H5N1 virus and other zoonotic pathogens with major global implications for livestock and human health.

Summaries of Presentations

Session 2 Towards a risk assessment

Global situation: HPAI outbreaks in poultry – a synthesis of country reports to OIE

Antonio Petrini, OIE

A tendency has been recently observed for highly pathogenic avian influenza (HPAI) virus subtype H5N1 to re-emerge in some countries that had already eradicated the disease. The HPAI H5N1 epizootic that started in South-East Asia at the end of 2003 and remained confined to this region in 2004, spread to other regions and continents in 2005 and 2006. Three new countries, namely Bangladesh, Kuwait and Saudi Arabia, have been affected in 2007.

In 2006, a total of 47 countries reported HPAI outbreaks due to the Asian strain of H5N1: 8 in Africa, 15 in Asia and 24 in Europe. The disease occurred in poultry and/or wild birds. In Europe the majority of confirmed cases involved wild birds. The very cold winter that occurred in central Europe in early 2006 is thought to have resulted in a movement of wild birds southwards (to Italy, the Balkan region, Greece, etc.) and been responsible for the cases of HPAI identified there during the first half of 2006.

The majority of affected countries succeeded in eradicating the disease in 2006. However, in some countries, such Indonesia, Egypt, Nigeria and to a certain extent the People's Republic of China, the disease became endemic and a large number of outbreaks went unreported.

In late March 2007, Bangladesh reported the occurrence of HPAI H5N1 in layer flocks in Dhaka Region. The disease had never been reported in Bangladesh before. Movement control has been implemented within a 10-km-radius zone around the outbreaks and a stamping out strategy is being used to control the disease. Veterinary Authorities are discussing the possible use of vaccination.

In February 2007, Kuwait reported an outbreak of HPAI in falcons in a zoo. Further outbreaks occurred in backyard chickens in March 2007.

At the end of March 2007, Saudi Arabia reported the reoccurrence of HPAI H5N1, in the Province of Ash Sharqiyah. The main control measures that have been applied are movement control inside the country, stamping out and quarantine.

From these reports of the reoccurrence of HPAI H5N1 outbreaks in several previously affected countries, we can conclude that most of these countries are now better prepared for the early detection of and rapid response to new outbreaks of the disease. The majority of the Veterinary Services are now ready to tackle the disease when it occurs. A few countries that have been affected for several years are still having difficulty in bringing the disease under control. The endemic nature of the disease in these countries constitutes a permanent source of potential contamination for humans and could also be a source of contamination for other countries, through illegal movements of animals, for example. HPAI H5N1 in animals remains a threat to public health.

Trends and dynamics of HPAI – epidemiological and animal health risks

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Summary

The H5N1 HPAI situation has improved during the past 3 years with many countries managing to eradicate or control the disease. The tools and methods defined by the specialized technical agencies, FAO and OIE, work if they are implemented appropriately. Around 15 countries have been infected or re-infected during the past 8 months but the early detection and response have allowed most of them to eliminate outbreaks rapidly. Although the awareness and preparedness has improved considerably, the risk of re-incursion remains since H5N1 HPAI viruses are well entrenched in several countries through Asia and Africa with the situation in Indonesia, Egypt and Nigeria a serious concern. The risk of emergence of a new human pandemic virus remains as long as multiplication of these viruses is poorly controlled in poultry

H5N1 HPAI viruses continue to evolve through both reassortment and point mutations resulting in the emergence of new genotypes, considerable variation within existing HA subclades and also emergence of at least one new clade that differed antigenically from existing viruses.

The source of most cases of HPAI is not determined. Epidemiological studies are hampered by limited surveillance data and investigations. Even when these are performed it is not always possible to determine the precise origin of infection.

Based on recent experiences likely risk factors for incursion of virus into a country or flock are becoming clearer. It is also possible to predict the likely outcome after incursion, particularly whether infection is expected to become entrenched. .

Gains will continue to be made locally in controlling and preventing H5N1 HPAI but global eradication of H5N1 HPAI viruses remains a distant and unlikely prospect particularly if high risk production and marketing practices persist. Improvement of epidemio-surveillance and early response capabilities remain indispensable, including the strengthening of veterinary services and the development of strong public-private partnerships.

Highly pathogenic avian influenza (H5N1) and risks to human health

Alice Croisier, Elizabeth Mumford and Keiji Fukuda, WHO

Almost four years after re-emerging in South East Asia, highly pathogenic avian influenza A(H5N1) virus is still circulating and threatening human health in two separate yet related ways.

First, the risk of contracting zoonotic infection from infected birds still remains, especially in countries where human contact with poultry is frequent and where animal disease detection and/or control is a challenge. Most of the 312 laboratory-confirmed cases of human H5N1 infection reported from 12 countries from November 2003 to date (12 June 2007) experienced severe pneumonia, but occasional asymptomatic cases were also reported. The case fatality rate is currently over 60%. The disease pathogenesis is still not completely understood and an optimal treatment regimen has yet to be established.

Disease incidence appears low when compared to the level of potential human exposure. No specific risk factors for human infection have yet been identified beyond unprotected handling of or sharing living areas with infected birds. Rare, un-sustained person-to-person transmission of H5N1 has been observed following very close, unprotected contact with a case at a critical phase of illness. The observation of family clustering of cases could be due to common behaviors or a common contaminated environment rather than linked to some genetic pre-disposing factors, although both hypotheses need to be studied.

Expanded and improved investigation of cases and clusters of H5N1 infection, systematic surveillance, and additional epidemiological studies and clinical research are needed to better understand (1) the potential source of human infection beyond direct contact with infected birds (2) H5N1 transmission patterns to and between humans (3) the risk factors and risk groups for human infection and illness (4) the clinical spectrum of illness and the incidence of asymptomatic infection.

That several of the 10 clades of H5N1 viruses affecting birds have been able to cause human infection and that the virus is evolving rapidly emphasize the need to continuously track virus evolution and epidemiology in order to evaluate changes in transmissibility, up-date testing reagents, monitor sensitivity to anti-viral drugs, and facilitate vaccine research and development.

Second, the emergence of a human pandemic strain of H5N1 (or of another influenza virus of pandemic potential) remains a continuous threat to human health, particularly due to the extent of the distribution of H5N1 both geographically and in range of species. This situation increases the chance that the virus will mutate into a readily human-to-human-transmissible strain or re-assort with another influenza A virus subtype into a new influenza virus of pandemic potential, the mechanisms believed to have been at the origin of influenza pandemics in 1918 and 1957/1968, respectively. A pandemic threat exists from other avian influenza A viruses able to infect humans (e.g. H7, H9). Finally, re-circulation of influenza A(H2N2) after several decades in partly naive populations also represents a potential influenza pandemic threat.

Both zoonotic and pandemic threats will remain as long as influenza viruses are circulating. Among public health actions of high priority for control and prevention of zoonotic infection and pandemic preparedness are (1) Limiting opportunities for contact between humans and infected birds (2) Up-grading human surveillance for early detection of H5N1 and other novel influenza virus infection and enhancement of early reporting under the new International Health Regulations (IHR 2005) (3) Promoting awareness of the potential of a pandemic of influenza at all levels of

government and sectors of society (4) Coordinating research on epidemiology and pathogenesis of H5N1 infection and on optimization of treatment and case management protocols (6) Monitoring of virus evolution for timely detection of important modifications and to support up-dating of testing reagents and development of vaccines.

Session 3.1 Achievements and lessons learned

Main focus human health: South East Asia Region, Western Pacific Region, Eastern Mediterranean Region and European Region of WHO

Stephen Martin, Elizabeth Mumford and Paul Gully, WHO

Achievements

Western Pacific Region (WPRO): Emphasis was on cross-sectoral involvement at the central level, in the construction of national plans. Assessment indicators used by the Asia Pacific Strategy for Emerging Diseases/IHR assessments indicate that this has occurred. There was strong activity in the area of exercise development and facilitation which culminated in March 2007 with PanStop, a pandemic influenza preparedness exercise which was conducted with the Association of South East Asian Nations, the Government of Japan, and WHO. It was designed to test specific aspects of rapid containment and to compliment work carried out on regional antiviral stockpiles. A Global Outbreak Alert and Response Network meeting (April 2007) was convened to strengthen the regional response capacity.

South East Asia Region (SEARO): Assessment missions were conducted to evaluate high-risk Member States' capacities to respond to H5N1 outbreaks and to provide rapid support to laboratories for diagnosing H5N1 virus infections. Rapid Containment Workshops involving over 10 high-risk countries in the Region were held. There was active involvement with clinicians and leading institutions on the South East Asia Influenza Clinical Research Network in conducting trials to produce human H5N1 treatment regimens, and a training workshop in outbreak communications took place in November 2006 which included the participation of FAO, UNICEF and ministries of health and agriculture from 16 countries in the Region.

Eastern Mediterranean Region (EMRO): Multiple outbreak and risk assessment missions were made to evaluate high risk member states' capacities to respond. A communications workshop was held in Cairo (Feb 2007) attended by 30 countries and 30 partner organisations. Three sub regional rapid containment workshops have been held in Egypt, Saudi Arabia and Pakistan and Inter-country Pandemic Influenza Technical Decision Makers and Outbreak Communications meetings were held in Egypt and Jordan (February & March 2007).

European Region (EURO): Multiple national pandemic preparedness assessments have been completed by WHO-EURO and the European Centre for Disease Control. Through an EU grant, WHO EURO is supporting surveillance and response capacity strengthening. Active assistance for national outbreak investigations has been rendered to Romania, Turkey, Azerbaijan and Ukraine. Two desk-top pandemic simulation exercises were conducted in Turkey, a third is planned involving the sub-regional level. The 'Strengthening Capacity to Prevent Avian Flu in Humans in the Russian Federation' project was launched (March 2007). A training curriculum and teaching materials on avian influenza A(H5N1) preparedness and response in the Russian Federation were developed, adapted and successfully tested.

Session 3.2 Assessment of efforts for HPAI control and prevention

Implementing FAO/OIE prevention measures

Christianne Bruschke, Alex Thiermann and Bernard Vallat, OIE

The current highly pathogenic H5N1 strain with its rapid spread over continents and its pandemic potential has led to a global influenza crisis. Although the majority of the countries infected in 2006 succeeded in eradicating the disease, the situation in some endemically infected countries remains very worrisome. Re-emergence of the disease has recently been observed in several countries that had eradicated the disease earlier but these countries seem to be able now to get the virus quickly under control again. In few new countries (Bangladesh, Kuwait and Saudi Arabia) the virus has occurred for the first time in early 2007. Currently this HPAI strain remains primarily an animal disease with only occasional and incidental human infections. Therefore, the OIE and FAO recommend eradication at animal source and implementation of the following principles: early detection and early warning, rapid confirmation of suspects, rapid and transparent notification, and rapid response (increase of biosecurity, containment, culling of infected animals and disinfection and the use of vaccination when appropriate).

It has been shown that countries that are able to implement these key control measures have been able to prevent establishment of the disease whereas a delayed or less adequate response may lead to an endemic situation. The main constraint to HPAI control is the weakness of the National Veterinary Services in many developing countries, which are in the frontline of the early detection and rapid response to the disease. Other important constraints are the poor laboratory capacities in many countries, the limited ability to implement biosecurity measures and control livestock movements especially in backyard poultry. Most countries do not have a compensation program implemented and many countries do not have a clear national chain of command and appropriate legislation.

However, also in view of the risk of prevention of the development of a pandemic virus all countries should be able to detect and control the virus quickly in animals. Direct technical assistance and support should be given to endemic and newly infected countries where attention must be given to reducing the incidence of the virus. In countries with sporadic outbreaks the goal should be to eliminate the virus with implementation of good surveillance and response measures and countries that are still free from the disease should be supported in the preparation of contingency plans. On the medium and longer term capacity building programs to improve veterinary services including laboratories is essential. The OIE has developed an evaluation tool ("Performance, Vision and Strategy") to evaluate veterinary services and to define programs using national and international resources to help them to achieve the needed quality level as described in the OIE international standards of quality adopted by Member Countries.

Achievements, issues and options on strategies for HPAI control and prevention

Les Sims, Independent Expert

Much has been achieved in controlling H5N1 highly pathogenic avian influenza, although some of the achievements have been masked by the continuing occurrence of disease in countries where infection remains entrenched. The main achievement has been the eradication of these viruses from poultry in many countries and reductions in the prevalence of infection in most other countries in which the viruses have been found.

A major achievement is the acknowledgement that H5N1 HPAI viruses will not be eradicated globally in the medium term., This allows a shift in the emphasis away from emergency measures to a longer term approach in places with entrenched infection and long-established, high risk rearing and marketing practices. This allows socially and economically equitable restructuring of the production and marketing system to reduce these risks. This shift is already occurring in places such as Vietnam and China. Other countries, such as Indonesia, are establishing response systems that, over time are expected to reduce levels of infection, although the gains from these, in terms of reductions in new human and avian cases are yet to be seen. These will also need to be accompanied by restructuring to maximize long term benefits.

The strengthening of laboratory diagnostic capacity is perhaps the most visible change in countries supported by donors. The range of appropriate tests available in these laboratories has increased and turnaround time for results has decreased through provision of equipment, reagents and training. These laboratories also have nascent quality management systems on which they can further improve the consistency of their performance. This improved laboratory capacity has supported increased targeted and scanning surveillance in infected and at-risk countries.

Despite these gains, veterinary capacity remains a major constraint. Specific capacity issues are being documented through the PVS process to allow remedial measures to be developed. However, some of the institutional problems such as devolution of authority to provincial or district level, low wages and allowances and inadequate staffing levels will be difficult to overcome given these are not easily addressed using donor funds. There is still insufficient veterinary capacity to perform all required active and passive surveillance.

Disease reporting has improved considerably during the course of the outbreak with a number of countries that rarely reported disease providing comprehensive summaries of reported cases to international agencies. This was facilitated by the contacts made through regional networks developed through emergency funding. However, these regional networks are proving difficult to sustain.

International organizations and donors have provided considerable support to national governments in controlling this disease, including provision of technical material and development of standards and guidelines, and specific technical advice to individual countries or regional groups.

Many lessons have been learned about the control of this disease and the need to adopt different approaches, depending on the state of infection or risk. Those countries with entrenched infection will adopt different measures to those with outbreaks that have recently occurred. In the former case, widespread stamping out is likely to be of limited benefit and may even be counterproductive unless a very high proportion of infected flocks are detected and changes are implemented after stamping out to prevent recurrence. Vaccination will be required as a control measure

in the foreseeable future especially in places where for technical, social, economic or environmental reasons changes cannot be made to high risk production and marketing practices. Farm biosecurity remains an important disease reduction measure but some farming systems cannot be made biosecure without drastically changing the way that the birds are reared.

Evidence on and lessons learned from short-term socio-economic impacts of HPAI

Anni McLeod and Jim Hancock, FAO

Socio-economic issues are those that concern the livelihoods and welfare of people and the strength of economies. Why are we concerned? Pragmatically, it is more likely that people will comply with measures that enhance their livelihoods or at least do minimum damage and are implemented in ways that take account of cultural norms. From a political perspective, it is preferable to apply measures that balance the needs of one's constituents and do not damage the economy. Countries that have signed up to the millennium development goals have a commitment to protect their most vulnerable citizens. This section reviews the immediate impacts that arise from fears of disease and outbreak control measures, while section 3.2.c discusses the impacts of longer term changes to biosecurity. The majority of evidence is drawn from studies managed by FAO, with sources provided in the background material.

Market shocks originating from consumer fears and country protective action may occur during and even before outbreaks. During the first wave of outbreaks in 2004 consumers switched from poultry to other meats, import bans were imposed on live birds and chilled meat and international trade volumes fell. International prices rose by nearly 20%, but domestic prices in affected countries dropped sharply. Since 2005 global trade has almost recovered but there has been a shift in exports from Asia towards Latin America. Many economies reported local shocks. Studies from six countries show a consistent pattern in the first shock of a steep fall followed by quite rapid recovery. If disease outbreaks recur the shock diminishes but studies from Vietnam show a long term loss of demand of around 6% in the delta areas. In Jakarta, a sudden announcement of strict control measures after a series of media stories about human deaths resulted in a severe market shock and continued market instability. It seems that little can be done to avoid shocks since HPAI is perceived by consumers as a food safety problem. Effective communication and marketing should be promoted to reduce their length and severity.

The best way to minimise economic and livelihood damage is to find disease outbreaks as soon as they occur and respond quickly. This requires excellent **disease intelligence**. Designing an animal health information system requires not only a scientific understanding of surveillance but an ability to take into account the institutional setting ("rules of the game"). Different incentives are needed to promote reporting from sector 1 and 2 systems compared to sectors 3 and 4, with a good understanding of motivations to report (or not). Models for sectors 3 and 4 have been tested e.g. in Viet Nam, Indonesia and Thailand but they have not yet been subjected to socio-economic analysis to assess their start-up costs (which will almost always need external funding) and minimum maintenance requirements (which must be internally funded).

When an outbreak occurs, **culling** will be one of the first stamping out actions. This causes loss of livelihood, and the threat of culling discourages reporting and encourages panic selling. A well designed **compensation** scheme can reduce the damage but not remove it since compensation schemes never cover all of the value of lost production and may exclude the most vulnerable people. Some reports suggest that there are unresolved gender issues; women are predominantly the owners of small flocks in poor families but may not receive compensation. Countries are progressively reviewing their strategies but many lack funding to implement them. Sustainable strategies must focus on minimising culling. Viet Nam has used vaccination to reduce the down number of outbreaks and hence culling levels and has raised compensation rates. Thailand has used tracing and selective culling to reduce the number of birds killed. Culling has been observed to cause distress to owners and

culling teams and resulting loss of trust. Yet there has been little progress in introducing humane culling methods in the worst affected countries.

Outbreak control contingency plans seldom give sufficient thought to the **recovery phase**. Uncertainty over restocking disrupts livelihoods and can result in long term loss of market access for smallholders. An effort needs to be put into synthesising existing information on coping and recovery strategies and support mechanisms in order to build them into contingency plans.

Ring vaccination used in a modified stamping out programme has the potential to substantially reduce culling and disruption of livelihoods. **Preventive vaccination** can be used to reduce the risk of outbreaks. It may be used in government campaigns to reduce the transmission and cost of disease or by farmers as insurance for their own farms. Cost effectiveness of delivery and cost sharing between government and farmers will be important in making vaccination sustainable. The cost of a single vaccination has been estimated at between US 6 and 16 cents, with full protection of a layer costing up to 50 cents, depending on local delivery conditions and the type of vaccine. Until more is done to establish systems such as compartmentalisation, vaccination will remain a difficult choice for exporting countries.

More work is needed to assist with prioritisation, targeting and full economic analysis of **outbreak control systems and strategies**. There is a need to move on from examining single measures to reviewing packages of measures and their impact on livelihoods and gender dynamics including the special problems of vulnerable groups. Desktop simulation exercises and value chain approaches are being used as a way of bringing disciplines and organisations together.

Trends, issues and options in applying long term biosecurity measures on production systems and sector structure

Olaf Thieme, FAO

During the past decades the rapid growth of the poultry sector has created a multitude of different production systems leading into complex and often unregulated value chains. The HPAI crisis has shown that in many countries the biosecurity of those production systems and the food safety measures applied to value chains are not sufficient to prevent the spread of disease and major losses from disease outbreaks and control measures. Biosecurity is defined as the application of health control measures to prevent introduction and spread of new infectious agents into flocks ("bio-exclusion") and to prevent the spread of current and existing diseases ("bio-containment"). Integrated value chains exist alongside dynamic semi-formal chains and backyard flocks serving local markets, each with different exposure to risk and different challenges for bio-containment and bio-exclusion. Restructuring of the poultry sector, which is defined as the change of the production or marketing systems through external interventions, in particular through Government authorities, is seen as a solution to these problems, by creating a simplified production and marketing system that will be easier to regulate and control. However, without introducing adequate animal health services, restructuring does not automatically guarantee lower risks.

Farms of all sizes and production systems have been affected by HPAI. Differences in the structure of the poultry production systems present challenges in the design of appropriate disease mitigation strategies. Improving the biosecurity level of the different systems may involve both structural and behaviour changes. Responsibility for improving biosecurity measures of larger farms (sector 1 and 2) has been largely left with the producers assuming that they will take the necessary measures. However, if their biosecurity breaks down they have the potential to spread disease rapidly through the value chains. Backyard flocks have little or no investment in biosecurity, but if they are in remote and sparsely populated areas they are little exposed to risk and have limited chance to infect others. Biosecurity improvements for the smaller producers (sector 3 and 4) are considered more difficult to implement and measures have been therefore suggested or implemented which restrict or ban the existence of these producers or the marketing of their products. Production and income opportunities for sector 3 producers have been affected by these measures, but so far efforts to close live-bird markets and to reduce the number of small producers have shown only limited success. Producers and traders have found ways of hiding birds which contribute to cases of reduced cooperation with the authorities. To improve biosecurity a comprehensive plan to restructure the poultry sectors 3 and 4 has been proposed for Vietnam and similar ideas are discussed in Egypt and other countries.

A review of the conditions for restructuring in Vietnam revealed significant difficulties and the need for a complex process which would require the involvement, participation and interaction of a large variety of stakeholders. Limited availability of land to relocate farms to safer locations has been found an important constraint for improving biosecurity. This is especially affecting sector 3 farms which are often located close to each other and in residential areas. Lack of credit to invest in structures for improved biosecurity and the production of specific types of birds which are recognized by the consumers through live-bird markets are additional constraints for changing into new production practises with improved biosecurity. Specific support programmes would be required to allow sector 3 farmers to change production practises or to move to other sources of income generation. For ducks, changing from grazing systems to feeding of confined birds as suggested for Vietnam may be even more difficult to implement. Instead of imposing restrictions on producers, a change of

consumer preferences for specific products could have more impact on production systems and related change of biosecurity conditions. However, both the quality and safety of birds marketed slaughtered fresh or frozen do not yet match the expectations of many consumers.

In Vietnam investigations show that few small sector 4 producers have changed their production practises in order to improve biosecurity. Opportunities for such changes have been investigated for the specific production conditions in Egypt. Appropriate carcass and litter disposal, reducing contact with wild birds and adequate quarantine for sick birds have been identified as feasible options to improve biosecurity of small producers. Confinement of birds may only be possible under specific conditions as for the rooftop systems.

It appears that there is substantial opportunity to increase knowledge and promote changes of behaviour of poultry producers through training and awareness campaigns. Such interventions are required for all types of producers, but for smaller producers they might be the main intervention. It would be important that such training is focussed on good husbandry practises and not only on the protection of humans from HPAI.

In order to improve overall on-farm biosecurity it is recommended that:

- More investigations are needed to better understand the functioning of the value chains and the levels of risk at different points, as well as possible consequences of changes to sector structure for livelihoods of smaller producers.
- Training and awareness campaigns for improved biosecurity should take a high importance for all sectors and production systems.
- Official control and enforcement of good biosecurity status by the veterinary services will be required for the larger poultry producer (sector 1 and 2).
- A proper consultation and involvement of the concerned stakeholders, especially from the private sector should be part of planning and implementation for restructuring of poultry sectors from the very beginning.
- If relocation or closing of production and market chains are required to improve biosecurity, consequences for the livelihood of smallholders should be taken seriously into consideration and necessary means of compensation included in the interventions.

Role of Communication in Avian/Pandemic Influenza Programme

Ketan Chitnis and Osman Mansoor, UNICEF

The importance of communication to achieve programme goals is widely understood. The challenge of communication for behaviour change is the complex nature of human behaviour. Information is usually not sufficient on its own to achieve behaviour change, but communities need to be engaged in a dialogue as well. Cultural and socioeconomic issues can also impede change. For example, it is difficult to encourage reporting of sick birds when this leads to economic hardship and promotion of hand-washing when access to water and soap is not assured.

Since 2006, UNICEF has mobilised on its traditional strengths in behaviour change communication and social mobilization to support the UN response to the pandemic threat, under the technical leadership of WHO and FAO to help control highly pathogenic avian influenza (HPAI) in birds and prevent human H5N1 infections. With its extensive field presence in over 140 countries, UNICEF has been providing support to national governments to develop and implement communication strategies by developing alliances, creating tools and working with counterparts. Efforts by UNICEF globally have been catalyzed by two grants from Japan and one from Canada, and individual countries have been funded by several bi-lateral donors.

A key lesson learned is that all stakeholders under the lead of the technical agencies need to enhance its cooperation and identify those priority behaviours that are absolutely critical for prevention and control of avian influenza. At the same time, these behaviours must be feasible and appropriate for change through communication strategies, and need to be informed by ongoing dialogue with communities. A major achievement for avian influenza communication has been that despite competing national priorities, most affected countries created inter-sectoral partnerships including a national inter-agency communication taskforce and advocated with ministries to develop and implement communication plans. Preliminary research in affected countries indicates that knowledge and awareness of AI is high in the general population and in high-risk groups. However, risk perceptions of the threat posed by AI are low and individuals and communities continue to practice unsafe behaviours. Additionally, behaviour change is difficult to achieve in resource-poor settings due to socio-economic hardships and competing priorities.

A critical challenge for communication is the ongoing confusion between two very distinct issues: avian influenza and a pandemic. The connection between avian and pandemic flu is that the H5N1 virus that is currently causing highly pathogenic avian influenza (HPAI) in birds (and the rare human infection) could change and become a human virus causing a pandemic. Controlling H5N1 reduces the risk of a pandemic emerging as a result of a new virus, but in general, the response needed is very different for AI compared to PI, though there are some overlaps (e.g., hand hygiene). Recent discussions with technical partners have underscored the fact that controlling avian influenza requires particular attention to animal health communication issues, which should be a priority in the coming months. While at the same time pandemic preparedness plans and communication strategies need to be kept ready for rapid implementation.

Communication experts need timely guidance from their technical counterparts who need to work closely with communicators on determining the behavioural changes that will have the greatest impact on controlling and minimizing the threat of avian and pandemic influenza. Reality checks are needed, however, not all solutions are feasible given the socio-economic, political and cultural context within which communities live. Both technical experts and communicators need to be mindful of building upon local practices and integrating new behaviours with culturally relevant practices.

Global animal health communication strategy to support prevention and control of H5N1 HPAI

Summary of key recommendations from the FAO/OIE Animal Health Communicators' Roundtable, April 16-19, Rome.

Satyajit Sarkar, FAO

Multi-disciplinary experts attending a four-day FAO/OIE international animal health communicator's roundtable in Rome agreed to develop a global animal health communication strategy to support the FAO/OIE Global Strategy for Prevention and Control of Highly Pathogenic Avian Influenza H5N1. The 45 participants from 14 countries included representatives from governments, technical/UN agencies (FAO, OIE, WHO, UNICEF and UNSIC), donor agencies (USDA, USAID, WB, EC), private sector and academia. The expert practitioners included epidemiologists, socio-economists, communication specialists, veterinarians and program managers.

The purpose of the meeting was to define the contribution of communication as a process in the response to the on-going threat of the highly pathogenic avian influenza H5N1 virus, and in stopping its spread at source in poultry.

The meeting recognized the need for communication strategies to be embedded in a framework, which adheres to the principles of inclusion, participation and self-determination. Effective communication values local knowledge and socio-cultural norms, and at the same time strengthens capacities of all key actors and stakeholders through the provision of relevant technical information and tools. In this way, the response to animal diseases can be understood, contextualized and, acted upon at all levels.

The meeting acknowledged the need for a comprehensive communication strategy, which is integral to a coherent response to major zoonotic disease outbreaks such as highly pathogenic avian influenza H5N1. It identified that communication professionals brought specialized skills to augment and improve the effectiveness of the technical aspects of the prevention, preparedness, response, and recovery phases of animal disease occurrences. Additionally, and most importantly, the experts recognized that communication strategies adopted for highly pathogenic avian influenza H5N1 would be applicable to other emerging and re-emerging animal diseases. In developing such a global strategic communication framework and plan of action to support the prevention and control of HPAI H5N1, the recommendations of the meeting included the need to:

1. Advocate the importance of the process of communication, and the need for enhanced capacity-building in the area of animal health communication, as critical elements in addressing and managing animal health issues
2. Ensure that strategic communication is integrated into the veterinary infrastructure and policy response at country level, and to gain international support for this where required
3. Establish an international network of animal health communication experts dealing with this disease to work in cooperation with animal health experts, as well as with other relevant partners
4. Develop a comprehensive communication action plan to address the animal health aspects of highly pathogenic avian influenza H5N1 transmission, including the creation of communication tools for immediate use and longer-term strategies to sustain positive social and behavioral change
5. Ensure consistency in messaging and accuracy of technical information which is adaptable to local contexts, and

6. Develop a multi-sectoral and multi-disciplinary approach to communication that engages all relevant stakeholders in a participatory and inclusive process.

At the meeting, representatives from countries infected/affected by HPAI H5N1 strongly recommended that all external aid and technical agencies must fully coordinate their strategic communication thinking, plans and activities before offering assistance to countries. Furthermore, they also endorsed the view that FAO and OIE need to play a strong leadership role in animal health communication.

While significant work is being done with regard to animal health communication, several gaps and challenges have been identified (see ANNEXE), particularly in the context of avian influenza H5N1, which need to be addressed as part of the strategy and a global plan for action.

The experts concluded by recognizing the urgent need to strengthen communication capacity and the role of communication professionals in the process of supporting responses to emerging animal diseases, particularly those that pose a risk to human health, and especially highly pathogenic avian influenza H5N1.

Session 3.3 Issue and options for pandemic preparedness

Assessment of preparedness to respond to pandemic influenza

Stephen Martin, Elizabeth Mumford and Paul Gully, WHO

The possibility of an influenza pandemic is one of many infectious disease threats to Global Health Security. This sobering reality requires the international community to progress from reactive and individual responses to specific emergencies towards proactive development of sustainable systems and response strategies that reduce our collective risk and increase our collective level of readiness. The pandemic threat remains and preparedness should be seen, not as short-term and disease-specific, but of broad, long-lasting benefit. Globally, great progress has been made in pandemic preparedness and great experience has been gained. The activities and initiatives should be continued and expanded. Gaps need to be addressed and funding streams identified. Multiple actors have emerged in the area of pandemic preparedness, but greater collaboration and synergy of effort would be of benefit to all.

Pandemic preparedness should be seen within the context of generic national emergency planning and response. Though there is an essential health component to this type of emergency, implementation of pandemic and contingency plans have a large operational component which is beyond the scope of one ministry. Many plans lack an integrated approach at all levels of government, lack operational completeness and have not been fully tested through exercises. In many cases, rapid containment protocols and their wide planning implications have not been incorporated into, or addressed by, national authorities or plans.

Technical and resource needs vary. Even for resource rich environments, implementing recommended strategies may take years to complete and consume significant resources and investment. Adoption of the International Health Regulations (IHR 2005) should assist resource poor environments to meet their core capacity obligations for infrastructure, surveillance and reporting systems, which are essential for the detection of influenza and other pathogens of national and international concern.

Stronger focus should be given to the resilience of health systems. Consideration has been given to the need for surge capacity resulting from the increase in demand from a pandemic. Greater attention needs to be given to the continual provision of their normal activities and services. Pandemics have a spectrum of severity. Even a less severe pandemic may result in a dramatic increase in morbidity and mortality with the potential to overwhelm health care facilities and other essential services.

Significant work has been done to develop key non-pharmaceutical interventions that could be used by the general public to help limit the spread and impact of a pandemic. For these to be effective, the population has to be engaged. Practical, simple tools should be developed and pre-positioned throughout society, targeting networks and community leaders, so when the need arises, capacity exists to scale-up their availability and implementation rapidly.

National and regional preparedness for an influenza pandemic: assessment of strategy, implementation and support from international bodies (including UN system)

William Paton, UNSIC and Peter Scott-Bowden, WFP

The presentation will: a) assess the development and implementation – by countries – of influenza pandemic preparedness plans, b) analyze the success of this planning process, and (c) propose modifications that might be necessary to our strategies for supporting national pandemic preparedness in the light of this analysis.

Infectious disease outbreaks have strong impacts on the functioning of social and economic systems. Preparedness for an influenza pandemic should, inter alia, focus on increasing the resilience of the systems through which people are able to access food, water, satisfy other basic needs, benefit from security and protection, finance, banking and transport infrastructure. When done well, preparedness engages civil society and the private sector, receives strong support from senior legislators and government ministers, and is backed by a broad-ranging and effective communications campaign. The goal is to create a popular movement which provides the local-level underpinning for societies to be resilient in the face of a pandemic. If a multi-sectoral approach to preparation is not followed, the economic and social impact of an influenza pandemic will be substantial and recovery will be slower.

The countries with the lowest government budgets and capacities are generally the farthest behind in pandemic contingency planning, and need external support for planning and readiness that focuses on resilience in a few key economic and security functions. This international support effort should include a) tracking the state of pandemic readiness, b) advocacy for multi-sectoral preparation with a focus on areas of greatest vulnerability, and c) practical assistance with the contingency planning process, where and when it is needed.

An influenza pandemic may well evolve into a worldwide catastrophe on an unprecedented scale: preparation should provide for a response that limits the extent of the catastrophe through the development of robust and resilient institutions. The UN system works with national bodies to contribute to the continuity of essential services endangered by absenteeism, movement restrictions and shortages of skilled staff.

Humanitarian organizations have started to simulate the challenges they will face in ensuring that their current caseload can access food, water and other basic needs. They also have to anticipate the potential for substantial increases in the numbers of vulnerable people in need of relief. But given that international humanitarian action is likely to be massively restricted because of limitations on inter-country transportation, the emphasis must be on empowering and equipping local communities to undertake humanitarian action themselves.

Session 3.4 Institutional strengthening and support

Performance, Vision and Strategy: a tool for governance of Veterinary Services

A. Thiermann, OIE

In this era of globalisation, the development and growth of many countries, as well as their ability to detect and respond to emerging disease threats, depend on the performance of their agricultural policies and economies, and this, in turn, directly relates to the quality of their *Veterinary Services* (VS). According to the OIE, VS means the governmental and non-governmental organisations that implement animal health and welfare measures, international veterinary certificates and other standards and guidelines in the *Terrestrial Code* in the whole country. The VS are under the overall control and direction of the *Veterinary Authority*. Efforts to strengthen VS and to support them to comply with OIE international standards on quality and evaluation of VS require the active participation and investment on the part of both the public and the private sectors. To assist in this effort, the World Organisation for Animal Health (OIE) and the Inter-American Institute for Cooperation on Agriculture (IICA) have joined forces to develop the Performance, Vision and Strategy (PVS) tool. The PVS tool is designed to assist VS to establish their current level of performance, to identify gaps and weaknesses regarding their ability to comply with OIE international standards, to form a shared vision with stakeholders, and to establish priorities and carry out strategic initiatives.

In light of the growing international requirements and opportunities facing each country, it behoves VS to be more responsive and to adopt a broader mandate and vision, and provide new services to complement the portfolio of existing services. This will entail stronger alliances and closer cooperation with its stakeholders, trading partners and other countries, national VS counterparts and relevant intergovernmental organisations.

Experience has shown that countries, which are viewed as having more credible VS, in the eyes of its stakeholders, trading partners and other countries have developed their VS around four fundamental components: 1. human and financial resources; 2. technical capabilities; 3. interaction with stakeholders; and 4. access to markets. These four fundamental components comprise the basic structure of the PVS tool.

To establish the current level of performance, form a shared vision, establish priorities and carry out strategic initiatives, six to eight critical competencies have been elaborated for each of the above mentioned fundamental components, and for each critical competency, qualitative levels of advancement are described. Additional critical competencies might be added as the field application of the PVS tool progresses. For each critical competency a list of suggested indicators will be used by the assessors. In addition, an OIE Manual, including relevant information and procedures, will be provided.

The OIE has trained a cadre of veterinary experts who are prepared to assess VS from countries which have officially requested a PVS Evaluation from the OIE. To date, the VS of over 20 countries have been assessed.

More than a diagnostic instrument, the PVS tool promotes a culture of raising awareness and continual improvement, which can be used either passively or actively depending on the level of interest, priorities and commitment of the VS and its stakeholders. Continuity of this process requires a true partnership between the public and the private sectors. Leadership on the part of the public sector is a fundamental and critical determinant of success.

Public and private sector roles in addressing animal health issues

Rob de Rooij, Independent Expert, Jonathan Rushton, Anni McLeod and Joseph Domenech, FAO

The recent HPAI crisis has highlighted that public veterinary services have not adapted to changing livestock sectors, in particular the dynamic and rapidly changing poultry sub-sector. This has provided an opportunity to review the state of the current international and national policies on public veterinary services, and how these services relate to the overall animal health system and the livestock sectors that they serve. The objective of such a review would be to identify the means of improving mechanisms to deal with the present HPAI crisis and future transboundary disease problems.

The paper outlines the need to go beyond the public veterinary services and incorporate the private animal health services in order to strengthen national **animal health systems**. To achieve this there are strong arguments for strengthening the relationship between public and private sectors involved in the poultry sector. A critical component of such a general strengthening process has to be a strong public veterinary service that through its organisational capacity (human and infrastructure) can provide vision, leadership and control in national animal health issues.

On the basis of the information presented the authors suggest that a number of actions need to be implemented to strengthen national animal health systems in order to make them more able to cope with transboundary disease control:

- Development of programmes to strengthen the public veterinary services (details of the elements to this programme can be found in the paper)
- Development of training programmes on “Leadership and vision for national animal health systems” (details of the elements to this programme can be found in the paper)
- Development of guidelines on cost sharing for HPAI control measures such as compensation funds and vaccination
- Regional and global engagement of the poultry private sector industries in discussions on animal health strategies, market mitigation measures, value chain biosecurity and social responsibilities.

Regional and global technical support for HPAI prevention and control Gardner Murray, OIE and Joseph Domenech, FAO

Emerging and re-emerging diseases of animals, often of a highly contagious nature, have had significant adverse socio-economic impacts on countries, particularly developing economies. Many of these diseases are zoonotic, that is they are transmissible from animals – production, wildlife and companion – to humans. In fact up to 75% of new infectious diseases of humans over the last 20 years are of animal origin.

Many of these diseases are trans-boundary in nature and can spread within countries and regions and even between continents, sometimes at an alarming rate, resulting in national and international crises. Socio-economic impacts of such diseases have included human suffering, lost development and trade opportunities, and concerns about food security.

Factors contributing to this situation include population growth, demographic changes, increased trade and tourism and intensified production systems, as well as climate change and environmental damage which have had impacts on host-pathogen ecology. Emerging disease risks are expected to increase and it is therefore critical that countries and regional and international organizations work together to help understand the changing nature of risk and establish prevention and management systems.

Key to this is the need to have regional and international coordinated approaches as well as highly effective inter-agency technical/scientific collaboration. Past and present experiences with H5N1 HPAI have demonstrated the essential nature of such approaches in achieving success, and the effective groundwork established forms a very sound basis for improving and refining approaches in the future.

FAO and OIE are the key players at the international level in the animal health area, with WHO a critical partner in the case of zoonotic diseases such as HPAI. A number of significant and innovative initiatives outlined below have been introduced.

A Global Framework for the progressive control of TADs (GF-TADs) has been developed as an FAO-OIE initiative. In this Global Framework, the global and regional approaches are highlighted with a strong axis regarding the support to, and collaboration with, the Regional Organisations (ASEAN, AU-IBAR and others). A chart of complementarities and synergies between FAO and OIE has been agreed and recently revised (February 2007).

Mechanisms have been put in place at global and regional levels for international coordination of support for HPAI control and for management of particular technical issues.

The global coordination of the animal health approach for addressing HPAI prevention and control is integrated with public health initiatives for prevention of human H5N1 virus infection and pandemic influenza preparedness, through the UN System for Influenza Coordination (UNSIC).

The two lead agencies FAO and OIE collaborate individually with partner agencies, with donors and with recipient country animal health authorities. They coordinate their approaches through activities such as conducting meetings on particular thematic issues (eg. the recent HPAI Vaccine Conference held in Verona in March, 2007), preparing strategic documents (e.g. the FAO/OIE Global Strategy for Prevention and

Control of H5N1 Highly Pathogenic Avian Influenza¹) or developing information bulletins, health situation updates and warning messages.

FAO has reorganised itself to better respond to crises: establishment of a CVO position, of a special emergency fund and of an Emergency Center for Transboundary Diseases which is a multidisciplinary team associating veterinary, socio-economic, institutional development, policy, farming systems, ecology and communication experts, in order to address the prevention and control of disease with a global/holistic approach. OIE has strengthened its official information capabilities (WAHIS) and warning systems, as well as its network of Reference Laboratories and specialised Ad Hoc and Working Groups.

Several joint FAO-OIE tools have been developed at the global level to bring technical support to Regional Organisations and member countries. All of them are under the GF-TADs umbrella and they include:

(1) The OIE World Trust Fund for Animal Health and Animal Welfare, created for projects of international public utility relating to the control of animal diseases, including those affecting humans as well as the promotion of animal welfare and animal production food safety.

(2) The Global Early Warning and Response System (GLEWS) as a collaborative effort between FAO, OIE and WHO which uses many kinds of data (including diseases, land use, animal populations, socio-economic information, disasters and climate), to provide disease intelligence and enable modelling, making possible disease outbreak prediction and then warning. GLEWS provides the international community with advice on significant occurrences of transboundary and zoonotic diseases and it is being applied in the first instance to HPAI. GLEWS is also responsible for rumour tracking.

(3) A Crisis Management Centre has been established within FAO and the Animal Health response component is coordinated jointly by FAO and OIE. The Centre operates on an Incident Command System that is designed to support rapid response missions in response to country requests for support in the event of new disease events.

(4) A network of OIE and FAO influenza Reference Laboratories, together with groups with HPAI epidemiological expertise called OFFLU. This network was established to exchange scientific data and biological material, share information, offer technical advice and training, promote research and ensure their coordination, as well as supporting the development of human vaccines.

(5) A wildlife surveillance programme, coordinated by FAO and involving several partners, has made significant progress in understanding the role of migratory birds (and mammalian species) in the dissemination of HPAI. The research has implications for epidemiological understand of HPAI spread and for surveillance for early warning of HPAI incursions into new countries and regions.

All of these Global/International support tools were established to bring support to Regional Organisations and to member countries. They must be mirrored as appropriate at the Regional level, in order to better serve the needs of the countries and of the Regional Organisations.

Several specific tools which have been put in place and need to be strengthened include:

(1) Regional Animal Health Centres (RAHC) which are FAO and OIE joint Centres, regrouping the necessary technical expertise and operational staff to implement programmes at the regional and country level. For Africa, these RAHCs are combining OIE, FAO and AU-IBAR resources. These Centres are operating under the guidance of the five existing GF-TADs regional steering committees, hosted by and secretariat provided by the OIE Regional Representations.

¹ <http://www.fao.org/docs/eims/upload//228807/a1145e.pdf>

(2) Regional and Sub-Regional Networks of national laboratories and epidemiology teams or Regional and Sub-Regional networks of socio-economic, farming system and bio-diversity national experts. These networks are established to create a group spirit, to break the isolation of the national technicians and in so doing to better identify national constraints and weaknesses. They will also enable the identification of the national laboratories, epidemiology centres and national socio-economic expert groups which can serve as models for the others in the sub-region.

The building blocks for sound and effective coordination and cooperation have now been established by FAO and OIE in consultation with other organizations. Success has been achieved. However it needs to be recognized that continuous improvement will be essential if we are to meet the challenges of the future in providing global and regional protection. Enhancements will include improved coordination, communication and inter-agency collaboration, making efforts to remove any duplication and, importantly, ensuring approaches are consistent with the most up-to-date scientific knowledge. It is essential that countries assume responsibility for their own animal health programmes and ongoing efforts to improve animal health service delivery must continue be promoted through for example the OIE PVS approach. This will require the ongoing allocation of resources to meet the challenges not only of H5N1 but of other diseases which will inevitably emerge.

Ensuring inter-governmental support to national and other stakeholders for integrated action to tackle HPAI and prepare for the next influenza pandemic
David Nabarro, UNSIC

The challenge of responding to Highly Pathogenic Avian Influenza (HPAI) in poultry, reducing the likelihood of human infection with H5N1, and preparing for the next influenza pandemic is being addressed across government as an integrated issue in many countries. The threats posed by HPAI and the next influenza pandemic have to be tackled by all countries working together as infectious viral pathogens do not respect national borders. Events and actions in any one country affect the risks faced by all other countries. International intergovernmental partnerships on avian and pandemic influenza were initiated during 2005 to provide a political impetus for joint action by different nations in response to the threats of HPAI and the next influenza pandemic. Several regional intergovernmental political initiatives have also been initiated. All intergovernmental meetings since 2005 have requested that external support for national actions be both strategic and well coordinated. The responsible international institutions were asked to develop an integrated strategy for responding to the threat of HPAI and the next influenza pandemic on a global scale and did so at a partners' meeting in Geneva November 2005 with a series of broad principles attached to evidence-based strategies for responding to HPAI and pandemic preparedness.

The strategic focus of the November 2005 partners' meeting was on the livestock and health sector outcomes required at country level, and the support to be provided through UN system specialized agencies and the OIE. The institutional arrangements and framework for financial support to integrated national programmes were agreed in January 2006: bilateral donors, the European Commission and multilateral development banks pledged a total of US\$1,834 million as external assistance for country, regional and global functions. Despite the generous pledges made in Beijing, insufficient funds were available for some countries to make urgent responses to new outbreaks of HPAI in poultry and cases of H5N1 being transmitted from birds to humans. Increased demands were being made of the UN specialized agencies at this time and additional financial and human resource support was sought. The intergovernmental political partnership on Avian and Pandemic Influenza (IPAPI) agreed to review progress at a senior officials' meeting in Vienna in June 2006 with a particular focus on assessing the HPAI situation, reviewing pandemic risk, communication of information and coordination of external assistance. A further intergovernmental review of progress in December 2006 in Bamako, Mali revealed that funds pledged during the Beijing meeting were committed comparatively quickly during 2005-2006.

Countries responding effectively to the threats of HPAI and the next influenza pandemic in 2006 pursued the core elements of principles agreed at the partners' meeting of November 2005 and subsequent strategies deriving from them by UN System agencies and their partners: six additional factors were identified as key to the success of national action against HPAI. Experiences during 2007 confirm that these factors need to be pursued jointly by governments, as partners, if the global dimensions of the HPAI epizootic, of H5N1 infections in humans and the potential of a human influenza pandemic are to receive the attention they require. Sustaining political commitment for a concerted response to the threats of HPAI and the next influenza pandemic has not been easy. There is a need for effective work among and within governments to ensure that Government Departments responsible for livestock and human health within individual countries work together efficiently and effectively at local and national levels and that this work is aligned with international standards. Without the perception of adequate incentives for intergovernmental cooperation the degree of joint work between governments with regard to both responses to HPAI threats and to pandemic preparedness may yet be insufficient. The UN System

Influenza Coordinator and the World Bank will continue to track the extent of intergovernmental consensus as well as the ways in which funds pledged in Beijing and Bamako are being used, and will, by August 2007, have assessed the extent to which there are still serious shortcomings in national, regional or global responses to the current epizootic of HPAI and the threat of an influenza pandemic. Findings of this work will help inform those responsible for developing intergovernmental positions and shaping the way forward for responding to the global threats of HPAI in poultry and an influenza pandemic.