



Convention on the Conservation of Migratory Species of Wild Animals

Secretariat provided by the United Nations Environment Programme



16TH MEETING OF THE CMS SCIENTIFIC COUNCIL

Bonn, Germany, 28-30 June, 2010

UNEP/CMS/ScC16/Inf.7

**CONCLUSIONS AND RECOMMENDATIONS
OF THE
THIRD TECHNICAL MEETING OF THE SCIENTIFIC TASK FORCE ON AVIAN
INFLUENZA AND WILD BIRDS:
HPAI H5N1 AND WILD BIRDS: REVIEWING THE GLOBAL ISSUE AND ASSESSING
FUTURE PRIORITIES**

15–16 March 2010, FAO Headquarters, Rome, Italy

*For reasons of economy, documents are printed in a limited number, and will not be distributed at the meeting.
Delegates are kindly requested to bring their copy to the meeting and not to request additional copies.*

Third Technical Meeting of the Scientific Task Force on Avian Influenza and Wild Birds:

HPAI H5N1 and wild birds: reviewing the global issue and assessing future priorities

15–16 March 2010

FAO Headquarters, Rome, Italy

CONCLUSIONS AND RECOMMENDATIONS

CONTENTS

Summary and priority issues for immediate attention	2
1. Capacity development and training.....	2
2. Research.....	2
3. Conservation	3
4. Financial support.....	3
5. The future of the Task Force	3
Introduction	4
Current knowledge of HPAI H5N1	5
Field research and surveillance	5
Surveillance for HPAI H5N1 virus.....	5
Farmed ducks in East Asia	7
Falconry	7
Disease detection	7
Role of wild birds in HPAI epidemiology	8
Bridge species.....	8
Training	8
Current research needs	8
Recommendations	9
Laboratory research, diagnosis and detecting occurrence	10
Experimental studies.....	10
Recommendations	10
Risk factors for humans	11
Human health	11
Risk assessment and epidemiological investigations at outbreaks	11
Importance of epidemiological investigations	11
Attribution of sources of infection for poultry.....	11
Investigations at outbreak sites.....	11
Training	12
Syntheses of data on wild bird ecology.....	12
Publication and data availability	12
Recommendations	12
Communication	13
Recommendations	13
Conservation impacts	13
Recommendations	15
The future role of the Scientific Task Force on Avian Influenza & Wild Birds	15
Recommendations	15
Finances	16
Recommendations	16
Abbreviations	16
Annex 1. Scientific Task Force on avian influenza in wild birds: Terms of Reference 2010	17
Annex 2. Formal Resolutions giving guidance on issues concerning the spread of HPAI H5N1	21

SUMMARY AND PRIORITY ISSUES FOR IMMEDIATE ATTENTION

The Scientific Task Force on Avian Influenza and Wild Birds provides a liaison mechanism between those international organisations and multi-lateral environment agreements (MEAs) engaged in activities related to the spread and impact of highly pathogenic avian influenza (HPAI) H5N1. It comprises representatives and observers from 15 international organisations, including four UN agencies.

The Task Force met in Rome in March 2010 for its third technical meeting. The meeting aimed to review what has been achieved in addressing the spread of HPAI H5N1 of Asian lineage, both in terms of Task Force objectives and obligations under the relevant multi-lateral environmental agreements (MEAs), and determine the future role and direction of the Task Force. It built upon outcomes of Task Force meetings held in 2006 and 2007 which were of significant importance in developing a common international understanding of the direct and indirect implications of this disease for bird conservation and broader disease control.

The meeting strongly recommended a new strategy to better understand, better communicate and, from sound advice and policy, better control or manage the evolving situation. This means a more refined and specific approach and geographically this might be much more restricted. The Task Force has learned what works and what has not worked and given the increasingly tight funding there is a clear need to focus efforts. The Task Force should promote actively the following issues identified as priorities:

1. Capacity development and training

Further capacity building and training are essential in terms of establishing infrastructure, logistic as well as human resource competence in the areas of risk assessment, wildlife surveillance, outbreak investigations and wildlife ecology which can compliment efforts made by government agricultural authorities to manage, control and prevent HPAI H5N1. This training should be targeted at those endemic and high risk areas where there is an urgent and pressing need for improved development of relevant skills and should be undertaken cross-sectorally where possible.

2. Research

Determination of the main drivers of HPAI H5N1 from presumed endemic foci

Recent field surveys in East Asia have indicated the development of extensive farming of ducks of wild species (genotypes). These include large numbers of farmed Mallard *Anas platyrhynchos*, Pintail *A. acuta*, Garganey *A. querquedula*, other duck species and Swan Goose *Anser cygnoides*. There is scope for confusion in the potential sampling of duck species of wild genotypes which are actually reared under domestication. Further information is urgently needed on the scale and nature of such duck farming and its implications in relation to HPAI H5N1 maintenance, spread and surveillance, especially between poultry sectors.

Improved outbreak investigation using a One Health model (inclusion of poultry, wild bird and human epidemiological data)

Relatively often, the source of an HPAI H5N1 event is reported to OIE as wild birds when there would appear to have been little time to carry out a thorough epidemiological investigation. In emergency situations, time is lacking and countries are asked to notify immediately after the confirmation of the event. OIE reporting structures allow for countries to report that the source of an outbreak is unknown or inconclusive. When there is no evidence to suggest that wild birds are the source of an outbreak the report should state that this is unknown or inconclusive.

Compliance with OIE reporting requirements, and ensuring that epidemiological information is based on scientific evidence will contribute to a better understanding of potential transmission vectors. It is accepted that any 'default' attribution of wild birds as the source of the outbreak

can result in adverse conservation implications. In follow-up reports, countries have the possibility to better define the source of introduction and can add it in their reports.

Data issues

Data from outbreaks and surveillance programmes are crucially important for understanding this disease and the Task Force encourages both positive and negative data to be made openly accessible, including detailed information about the species, timing and geolocation.

Similarly, to better inform our understanding of the epidemiology within the ecological complexity of wild bird species and populations, there remains a need to continue to gather, collate and co-ordinate data and information on wild bird distributions, their movements (including via satellite telemetry), stop-over sites and flyways. It is also important to continue to gather data at site level, since such local information is very limited in most parts of the world.

Laboratory science

The Task Force encourages database systems such as Genbank, to require users to enter the source of the viral material, and to no longer make this field optional.

Until such spatial reporting is mandatory, when reporting the source of laboratory-derived genetic sequences, database contributors should be encouraged to provide a precise geolocation where samples were collected, and not location or name of the laboratory undertaking the sequencing.

Communication

The proactive briefing of media with accurate and objective information in lay terminology is essential for informed understanding of risk by the public and others, and should be given significant priority by those with technical understanding of the issues.

The Task Force should play an active role in this to provide the media with the state of the science information and be seen to be one of the key resources for authoritative information through AIWEb (www.aiweb.info). Additionally, the Task Force should actively promote existing guidance on risk assessment and reduction for managers of protected wetlands, re-formatting and translating this as necessary, so as to best reach this target audience.

3. Conservation

The Task Force should document and publish the range of direct and indirect conservation impacts as part of the process of learning from events over the past five years since the first major wild bird outbreak at Lake Qinghai. This review can then be used to inform, and help reduce and mitigate future impacts from both HPAI H5N1 and other emerging diseases affecting wildlife.

4. Financial support

Sustained financial inputs are needed to continue the important programmes of surveillance, field research, training and other capacity building initiated since 2005. This includes essential resources to support the co-ordination of the Task Force. Current resources for addressing HPAI H5N1 have depleted significantly, likely due to the global financial crisis, attention raised concerning the H1N1 pandemic and other issues.

5. The future of the Task Force

The Scientific Task Force on Avian Influenza and Wild Birds has provided a valuable, and extremely cost-effective, co-ordination function between its many collaborating organisations. This Task Force should be maintained in its current structure, and proceed with the slightly

modified terms of reference proposed (Annex 1), including falling within the overall remit of the Scientific Task Force on Wildlife Diseases to be established within the year.

Financial resources are essential to maintain the continued co-ordination of the Task Force.

INTRODUCTION

An international workshop was convened by the Scientific Task Force on Avian Influenza and Wild Birds and hosted by the UN Food and Agriculture Organisation (FAO) in Rome in March 2010.

The Task Force was established by the UNEP Convention on Migratory Species (CMS) in close cooperation with the Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA) in August 2005 following concerns about the role of migratory birds as potential vectors of HPAI virus subtype H5N1 of Asian lineage. The Task Force is currently co-convened by UNEP/CMS and FAO, whilst co-ordination and web-site (www.aiweb.info) maintenance is provided by the Wildfowl & Wetlands Trust.

The Task Force provides a liaison mechanism between those international organisations and multi-lateral environment agreements (MEAs) engaged in activities related to the spread and impact of HPAI H5N1. It comprises representatives and observers from 15 international organisations, including four UN agencies.

The Task Force was established out of a need for information on wild birds to be better reflected in the understanding of HPAI H5N1 and its spread around the world. Its activity has been crucial to help develop collaborations, joint multidisciplinary work programmes and to advance a science-based understanding of the role wild birds play in the epidemiology of HPAI H5N1.

Since the Task Force's establishment, there have been achievements in many areas, and considerable progress in developing understanding of the factors associated with the spread and epidemiology of HPAI H5N1.

Risk factors associated with this disease and means of reducing them have been summarised in a considerable body of guidance, much of it stimulated by the Task Force and its members. Technical guidance has been published by FAO, the World Organisation for Animal Health (OIE), the FAO-OIE joint network of expertise on animal influenzas (OFFLU), and others, whilst advice to policy-makers has been endorsed by several MEAs, notably in 2008 by the Ramsar Convention on wetlands, CMS and AEWA (Annex 2).

In the context of wild bird conservation, it is significant that the views of many have moved from an often automatic blame of wild birds for every outbreak of HPAI H5N1, to more balanced positions that recognise the poultry sector (especially in East Asia) as the primary reservoir of this virus, with regular spill-over of virus into wild bird populations with possible onwards transmission, and spill back. Such changed awareness better reflects current scientific understanding.

The third technical workshop reviewed what has been achieved in addressing the spread of HPAI H5N1 both in terms of the Task Force's original objectives, as well as obligations under relevant MEAs, and determined the future role and direction of the Task Force. It built upon outcomes of Task Force meetings held in 2006¹ and 2007² each of which helped develop a common international understanding of the direct and indirect implications of this disease for bird conservation and broader disease control.

¹ http://www.aiweb.info/documents/nairobi_conclusions_recommendations.pdf

² http://www.aiweb.info/documents/aviemore_ai_workshop_conclusions_and_recommendations.pdf

The third meeting reviewed current activity related to avian influenza (AI) surveillance; most recent research related to the epidemiology of HPAI H5N1; and the known direct and indirect impacts on the conservation of waterbirds and their wetland habitats. It also critically assessed the Task Force's own future role, priorities and modus operandi, and made recommendations for future action.

CURRENT KNOWLEDGE OF HPAI H5N1

There has been considerable progress made in addressing many of the issues which prompted the establishment of the Task Force in 2005. There is now a much clearer understanding of the role of wild birds in the epidemiology of HPAI H5N1. Extensive surveillance over the last five years has provided no evidence to support the hypothesis that wild bird species are a reservoir of the HPAI H5N1 virus but it is advisable that more work be undertaken to determine the epidemiology of the virus in wild, semi-wild and domestic birds.

The Task Force and its member organisations have made a significant contribution to the development of guidance related to wild bird AI surveillance, to research, as well as to maintaining an overview of related issues. It continues to provide information on wild birds and AI to the wildlife, veterinary and health communities, as well as to the public and government bodies. It has sustained a body of expert opinion, skills and knowledge relevant to AI in wild birds.

In responding to many of the issues raised by the genesis and spread of HPAI H5N1 however, there is now a need to develop more holistic, system-based approaches to disease prevention and control such as exemplified by the [One Health Initiative](#), [FAO in One Health](#), and [Contributing to One World, One Health - A Strategic Framework for Reducing Risks of Infectious Diseases at the Animal-Human-Ecosystems Interface](#).

The willingness to engage across sectors (agriculture, environment and health) as a result of the challenges of HPAI is welcome, but such liaison often remains superficial and needs to be consolidated both across governmental Ministries and amongst international organisations, NGOs, universities, etc. The One Health approach is welcome as this will help to address the skewed investment and focus among human, livestock, wildlife, and environmental health issues.

The emergence of HPAI H5N1 has had a significant impact on food security, livelihoods and economics of farmers, local communities and the poultry industry with poultry losses of many hundreds of thousands of birds, mainly as a result of slaughter policy for disease control. While financial and media attention have waned, this disease, and its impacts to all sectors remains a true threat for future security. Although human case incidence (~30 human deaths per annum) is relatively low, the HPAI H5N1 case mortality rate is high (currently 59%), and the virus remains endemic in multiple countries where poultry and human populations are at high density and regularly in direct contact.

FIELD RESEARCH AND SURVEILLANCE

Surveillance for HPAI H5N1 virus

There has been five years of massive investment in surveillance and research but these activities have been relatively disjointed across countries with poor standardisation of approaches resulting in data that are not always comparable. Whilst the main agencies concerned have assembled a good core set of information, many countries also have data on surveillance and disease outbreaks that are unavailable to a greater or lesser extent. International standardisation of information also remains a challenge, as does the sharing of information in a timely manner, and amongst databases.

Although wild birds are biologically competent to maintain low pathogenic avian influenza (LPAI) viruses, a reservoir for HPAI H5N1 in wild birds has not yet been identified although recent work in China³ demonstrates different results from almost every other wild bird surveillance programme in the world raising questions about the role of wild birds in the disease cycle in that country and suggesting different ecological dimensions.

Active surveillance programmes such as those conducted by FAO, EU, USGS, USDA, GAINS, and other national programmes, have yielded more than >700,000 samples from live captured or legally mandated hunting of healthy wild birds. Prior to the recent Chinese work³, results demonstrate that the HPAI H5N1 virus has been detected in about 13 healthy wild birds only, from a variety of species, with an apparent gross prevalence of 0.00002%.

Despite the very large number of wild birds sampled, in the context of the total size of these populations (billions of birds), this sampling effort is, and always will be inadequate to determine that with 95% confidence, we have sampled enough birds to accept that negative results mean that a given wild bird population is not the reservoir for this virus-especially if there is such a low apparent prevalence. Current wild bird surveillance has also been conducted in a less than optimally targeted manner in that less sampling has occurred in endemic and epidemic regions and countries.

A review of EU AI surveillance between 2006-2009 showed surveillance was highly variable between Member States with over 80% of samples deriving from just four countries (Germany, Netherlands, Spain and UK) and that there would be benefits of a more strategic focus on eastern Europe, closer to potential sources of infection. Noteworthy is that even in the EU, a region with many ornithological experts, long-standing ornithological programmes, and infrastructure, 8% of birds sampled in 2008 were not identified to species.

To date, nearly all of the reported cases of HPAI H5N1 in wild birds in Europe have been detected through passive surveillance, although it is highly unlikely that all cases of infected birds have been detected. This is due to the vast area and variable habitats occupied by wild birds and given that passive monitoring covers only a small proportion of the total habitat used by wild birds.

There has been an apparent decline in planned active surveillance activities. This has possibly been consequent on reduced funding (changing priorities as disease perceptions change in the political sphere and impacts of the global recession); lowered levels of concern; and/or less interest by the media (and thus lower public pressure on decision-makers) which more recently has focussed on issues related to the spread of pandemic H1N1. However, it is worth noting that wild bird surveillance has been valuable in other ways including mobilising multidisciplinary national and international collaborations, and enabling further infrastructure and capacity building to occur in many countries. This capacity will enhance global wildlife surveillance efforts in the future.

Specifically related to AI viruses in general, information has been collected from many wild birds species on the prevalence rates of many different AI virus subtypes, and this is significant for helping refine information about other viruses that may be problematic in the future. Noteworthy is that several active surveillance programmes identified LPAI H5N2 as a relatively common virus in wild birds and in one study in Nigeria⁴, a HPAI H5N2 was isolated from two relatively nomadic species suggesting that wild birds can carry a highly pathogenic virus and make regional movements. This demonstrates one indirect benefit of wild bird surveillance undertaken in the past five years.

³ Kou, Z., Li, Y., Yin, Z., Guo, S., Wang, M., *et al.* 2009. The Survey of H5N1 Flu Virus in Wild Birds in 14 Provinces of China from 2004 to 2007. *PLoS ONE* 4(9): e6926. <http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0006926>

⁴ Gaidet, N., Cattoli, G., Hammoumi, S., Newman, S.H., Hagemeyer, W., *et al.* 2008. Evidence of Infection by H5N2 Highly Pathogenic Avian Influenza Viruses in Healthy Wild Waterfowl. *PLoS Pathogens* 4(8): e1000127. <http://www.plospathogens.org/article/info:doi%2F10.1371%2Fjournal.ppat.1000127>

No evidence of an environmental reservoir of HPAI H5N1 has been identified to date either, although it is recognized that this virus is difficult to extract from water samples, even in an experimental laboratory setting.

Farmed ducks in East Asia

Recent field surveys in East Asia, led by FAO, have indicated that extensive, farming of wild (genotypes) ducks and geese including large numbers of Mallard, Pintail, Garganey, Spot-billed Duck and Swan Goose as well as other species including hybrids. There is scope for considerable confusion in the potential sampling of duck and other wildfowl species of wild genotypes which are actually reared under domestication in locations where farming of wild birds is occurring, and wetland habitat is shared by both migratory and farmed wild birds. Further information is needed on the scale and nature wild bird farming and its implications for HPAI H5N1 epidemiology, virus maintenance, and spread, especially since this practice has been observed in wetlands that also accommodate farmed domestic ducks, chickens, and migratory waterbirds.

There is a need to investigate interactions between domestic, wild and farmed birds including investigating the relationship between climate (in particular effects of cold weather and resultant congregating birds), environment and onset of disease in populations. This should especially focus on situations where rice production systems involve grazing with domestic ducks, as well as considering those factors facilitating disease persistence in these agricultural wetlands. Finally, studies should aim to better understand the market chains and socio-economic value of farmed wild birds in order to identify additional areas of high risk for virus transmission among birds and between birds and people.

Falconry

Traditional practises associated with falconry, such as the moving of prey species and falcon food (both regulated and unregulated), have been identified as risk factors for the spread of HPAI H5N1 within the Middle East regions. There is a need for further work to quantify and qualify these risks, understand movement patterns of falcons, their food supplies and their prey, as well as the need for stronger biosecurity measures to reduce risks of virus transmission associated with common falconry practices⁵.

Disease detection

For early detection of disease, given that passive methods have detected nearly all reports of HPAI H5N1 in wild birds, there is a need to strengthen HPAI passive situation-based surveillance systems with emphasis on endemic countries, including networking these programmes internationally. This will also benefit data gathering on other wildlife diseases, and improve understanding of HPAI H5N1 nationally and regionally.

Active surveillance of healthy wild birds gives information on the circulation of LPAI viruses, but has not proved effective at HPAI detection (with possible exceptions in areas with high infection loads *e.g.* certain provinces of China). Accordingly, active surveillance is not recommended for HPAI H5N1 early detection or warning. However, active surveillance has important value in studying the epidemiology and characteristics of the virus in areas where the virus is endemic and at outbreak sites (accepting that results require careful interpretation in terms of whether wild bird cases constitute spill-over or spill-back). Furthermore, those LPAI viruses present in wild birds are likely to be the next viruses introduced into poultry where they likely evolve into highly pathogenic viruses that impact the poultry industry and potentially people. It is in the interest of both the public and veterinary health sectors to further support AI surveillance in wild bird populations.

⁵ <http://www.rr-middleeast.oie.int/download/pdf/koweit08.pdf>

Role of wild birds in HPAI epidemiology

Asymptomatic carriage of HPAI H5N1 virus remains poorly understood in wild birds. Although HPAI H5N1 viruses can theoretically be dispersed by individually infected wild birds over long-distances, the individual likelihood for long distance dispersal remains low. Long distance waterbird movements are of infrequent (seasonal) periodicity, and birds are unlikely to spread virus over several consecutive but interrupted long distance movements appreciating that from experimental infection studies, the period of potential viral shedding is probably short.

Wild birds are the reservoir for LPAI viruses, but based on current information, they do not currently appear to be the reservoir for HPAI H5N1 virus or other highly pathogenic viruses. However, there are suggestions of increasing resilience of wild birds to HPAI H5N1 infection, with possibly changed infection dynamics. Recently the number of wild bird mass mortality events has decreased and there have also been cases where Mute Swans (*Cygnus olor*), previously considered the HPAI H5N1 European wildlife sentinel due to their high susceptibility and ease of detection in the environment, have survived exposure to the virus, while other member of the same flock foraging on the same supplemental feed for weeks, died from exposure. Thus, species formerly considered as sensitive indicators of disease, in some situations, no longer show disease signs. This may be a consequence of heterosubtypic immunity⁶, a change in viral pathogenicity, a change in immunological response of wild birds, or complex interactions between host, environment and pathogen. In either case, further research is warranted.

Bridge species

The role of so-called 'bridge' species in virus transmission, including as mechanical vectors, needs to be confirmed. Currently, the only known example of bridge species being involved in the epidemiology of HPAI is limited to one case (Tree Sparrows *Passer montanus* in China⁷) with circumstantial evidence in other cases, particularly, outbreaks in Hong Kong. Further research is needed to understand whether bridge species pose a true risk for disease transmission at a global level, or whether this is a periodic event, or not significant from an epidemiological perspective. It is interesting to note that in the Hong Kong region, this issue is of greatest concern, and perhaps more focused studies in that ecological system would be most appropriate.

Training

There remain needs for building of capacity for wild bird surveillance programmes including ornithological skills in many higher risk areas of the world.

Current research needs

A number of specific areas of desirable field research were highlighted:

- better understanding of the buffering effect of wild bird populations (with circulating LPAI) against HPAI emergence in wild bird populations;
- better understanding of differences in LPAI vs HPAI epidemiology relative to viral circulation and persistence in populations including evaluation of potential immune protection from lethal effects of HPAI H5N1, if birds have had previous exposure to LPAI subtypes; and
- better understanding of the impacts of LPAI and HPAI on the physiology and migration potential of individual birds.

⁶ Breed, A., Gould, G., Rae, D., Hesterberg, U., Harris, K., Moir, R., Choudhury, B., Younas, A. & Cook, A. 2010. [Annual report on surveillance for avian influenza in wild birds in the EU in 2008](#). Community Reference Laboratory for Avian Influenza, UK. 42 pp.

⁷ Kou, Z., Lei, F.M., Yu, J., Fan, Z.J., Yin, Z.H., Jia, C.X., Xiong, K.J., Sun, Y.H., Zhang, X.W., Wu, X.M., Gao, X.B. & Lil, T.X. 2005. New Genotype of Avian Influenza H5N1 Viruses Isolated from Tree Sparrows in China. *Journal of Virology* 79: 15460-66.

Recommendations

- Further information is urgently needed on the scale and nature of the rearing or farming of ducks of wild genotypes in East Asia, and its implication for HPAI H5N1 maintenance, spread and surveillance.
- There is now wide consensus that early detection of HPAI H5N1 is best achieved through passive surveillance of cases of wild bird mortality, whilst active surveillance of live birds is more appropriate for generating information on the circulation of LPAI viruses. AI wild bird surveillance programmes (HPAI H5N1 and LPAI) should be established against precisely defined objectives. Clarity as to objectives is essential if the most appropriate sampling strategies, sampling sizes, and methods are to be used, recognising that programmes will also vary between countries in light of differing risk and capacity. At a minimum, passive surveillance and monitoring around outbreak sites should be set in place with long-term government commitment.
- Surveillance results need to be reported in a timely manner to aid real time risk assessments.
- Data which are both openly accessible (including those which are negative), and of high quality, are crucially important for understanding this disease. It is important to encourage national programmes and NGOs conducting wild bird surveillance to make their data available even if results are negative. It is also essential to ensure the accurate identification of the wild bird species is included when reporting results with additional information such as age if possible.
- There remains a need to continue to gather, collate and co-ordinate data and information on wild bird distributions, their movements (including via satellite telemetry), stop-over sites and flyways. It is also important to continue to gather data at site level, since such local information is very limited in many parts of the world.
- A series of guidance documents for conducting AI surveillance and diagnostics has been prepared by FAO and OIE, and should be considered as programmes are developed.
- Further capacity development and training is essential in terms of establishing logistic as well as human resource competence. This should be targeted at those endemic and high risk areas where there is an urgent and pressing need for improved development of relevant skills, and should be undertaken cross-sectorally where possible.
- There remains a need to develop a better understanding of the behaviour and ecology of 'bridge' species, as well as other means of local or short distance spread of HPAI and LPAIs of subtypes H5 and H7, such that this information might be used to develop enhanced guidance on biosecurity and contribute to risk analysis.
- An effort should be made to document previously unreported cases of mass mortality in wild birds in Central and East Asia.
- Monitoring and surveillance for AI within markets that trade in wildlife, remains highly desirable. This should include research into which species are traded, their origins and movements, as well as locations along the market chain where disease transmission is likely.
- Further research on the potential for asymptomatic carriage of HPAI H5N1 virus is required and the species involved to better inform risk assessments.
- There remains a need for better information on relevant cultural and religious practices, such as falconry or the widespread purchase and release into the wild of birds at certain times of the year (*e.g.* merit releases), and how those practices might be

safeguarded but at the same time, minimise the risk of disease spread to humans, wild birds and poultry.

- Research looking at the nexus of society, industry, environment and HPAI policies is needed to provide a more balanced and scientific rationale, and interventionist approach globally.

LABORATORY RESEARCH, DIAGNOSIS AND DETECTING OCCURRENCE

To date, there are no specific HPAI H5N1 serological tests. Serology is only useful as a general screen for antibodies to the range H or N subtypes and it does not indicate which H and N subtypes were combined in the virus to which the bird was previously exposed, nor does it provide information about pathogenicity.

Molecular epidemiological studies remain important in understanding the spread of HPAI H5N1. In wild birds, one main clade (2.2) has historically been dominant but recently other clades (2.3 and 2.3.2) are becoming more widespread, and in particular, 2.3.2 has recently been detected for the first time in wild birds in Europe.

In contrast to all other studies, recently published surveillance results from China show a significantly different HPAI H5N1 prevalence. This study reports 149 positive samples and 17 virus strains isolated from 14,472 apparently healthy wild birds giving an overall prevalence of 0.01%⁸. These results indicate the importance of further surveillance in regions of endemic occurrence of HPAI H5N1, and the need for providing complete details about methodologies and standardisation of techniques to allow for inter-annual and geographic comparisons.

Experimental studies

Laboratory studies on wild bird species have shown that multiple waterfowl species can shed the HPAI H5N1 virus asymptotically for several days (between one and eight days in studies reviewed) after experimental infection. However, evidence for this shedding remains lacking in free ranging wild birds and may never be possible to determine due to the logistical challenges associated.

Recommendations

- It is known that samples from a number of surveillance programmes and missions have been collected but not yet analysed. Task Force member organisations should work with national governments to better facilitate the movement of samples across national boundaries, identifying and addressing those issues impeding sample transfer and analyses.
- When placing genetic sequences into databases, submitters should always include the location of sample collection (with a precise geolocation), and not solely the laboratory undertaking the sequencing. Conversely, it would be valuable for databases that archive genetic sequences, to strongly encourage submitters to input the geolocation of the source of the sample, upon submission. It is only through this improved information about genetic sequences and their movement and distribution globally that we will gain better insight into the mechanisms by which influenza viruses are transmitted on a global scale.

⁸ An overall apparent prevalence in 14 provinces of c.4% in Mallards *Anas platyrhynchos*, Pintail *Anas acuta* and Whooper Swan *Cygnus cygnus*. Highest local prevalence was showed by Mallards and Pintails in Qinghai Province (10 -11%).

RISK FACTORS FOR HUMANS

Human health

There are no confirmed cases of transmission of virus to humans from wild bird outbreaks despite close contact between live wild birds and people. However, processing of apparently healthy infected hunted birds might be a source of exposure to HPAI H5N1 virus to humans and improper disposal of hunted bird waste (or other infected offal) remains a risk to poultry. Simple guidance should be provided to the hunting community to prevent potential exposure of people and poultry to potentially infected materials from wild birds.

RISK ASSESSMENT AND EPIDEMIOLOGICAL INVESTIGATIONS AT OUTBREAKS

Importance of epidemiological investigations

The ultimate objective of structured epidemiological investigations of outbreaks in domestic poultry is to inform control measures including identification of the most likely source of infection. There has been general lack of progress in identifying sources of infection in many outbreaks of HPAI H5N1. The need for good epidemiological studies in wild birds remains as high a priority as ever.

Understanding the routes of transmission and spread of HPAI H5N1 remains a challenge. It is crucial that there is accurate knowledge of the timing and sequence of events ('time-lines'). Time-lines, together with an understanding of which species are involved and exact geolocation information are all essential to the generation of hypotheses that can then be used to direct subsequent epidemiological investigations and conduct meaningful phylogenetic studies based on genome sequencing data.

The importance of rapid but accurate official reporting to OIE is critical.

Attribution of sources of infection for poultry

The apparent reduction in culling of wild birds associated with HPAI H5N1 is welcome although the tendency to blame wild birds for outbreaks remains a persistent problem - compounded by statements from some official veterinary agencies suggesting wild bird involvement based entirely on circumstantial evidence. Too often wild birds are reported as the cause of outbreaks apparently before a thorough epidemiological investigation has been undertaken. This is important to address since 'default' attribution of infection source to wild birds impedes better scientific understanding of actual transmission vectors - which have been shown to be multiple and various at different times and places - thus also impeding addressing other risk factors. Moreover this 'default' attribution can result in adverse conservation impacts, and this hidden threat to birds is not being systematically documented or reported.

Investigations at outbreak sites

Wild bird surveillance around outbreak sites may be an important component of the epidemiological investigation, and it should be highlighted that positive findings in wild birds should not have implications for trade.

It is important to learn epidemiological information from each case of H5N1 relating to the interface between people, wildlife, and poultry.

National planning for outbreak investigation has developed in many countries over the last five years, but continued review and update of such plans should be strongly encouraged.

Training

Training in epidemiological principles continues to be important, in particular where there is limited national capacity especially in wildlife health. Organisations represented on the Task Force are promoting such training but need much more support and financing to make an impact in endemic and high risk areas for HPAI H5N1.

Syntheses of data on wild bird ecology

There has been considerable progress in understanding migration routes of wild birds. In those regions where synthesised information on the distribution and movements of wild birds do not exist, there remains an important need to gather, collate and provide such information to aid both epidemiologists and decision makers. This should include tools that summarise the likely bird movements at various scales and in different seasons.

Publication and data availability

The results of epidemiological investigations are not always published and raw data are rarely made available to the international community. This constrains efforts to elucidate epidemiology and risk factors. Such investigations should always be published or made accessible, including when they are inconclusive.

All organisations involved in the Task Force should continue to encourage transparency in reporting and openness in data sharing.

Recommendations

- In order to encourage scientific accuracy and objectivity in reporting, countries should comply with OIE reporting requirements, and should ensure that information about the *source of an outbreak is based on scientific evidence. When there is a lack of evidence, countries should report the source as unknown or inconclusive. When the source of introduction is clearly confirmed after investigation, countries can introduce it in their follow-up reports. Countries should comply with their reporting requirements by immediately notifying OIE of HPAI occurrences in wild or domestic birds, LPAI H5 and H7 in poultry and should include findings from LPAI surveillance in wild birds in their annual report for non listed OIE diseases submitted through WAHIS-Wild.*
- There remains a need to add from a wildlife perspective, protocols that supplement current outbreak investigations at poultry farms, in order to evaluate the role that wild birds may play in disease introduction, or the potential for disease to be spread from farms into wild bird populations.
- It is important that there is a more holistic approach to AI outbreak investigations. There should be routine, integrated inclusion of epidemiological, veterinary (wildlife health), virological, biological and ornithological expertise in field outbreak investigation or response teams, including at poultry farms. The development of national and international registers of experts able to assist in such missions would be valuable.
- The Task Force should promote actively, the development of additional protocols related to wildlife that supplement current guidance on outbreak investigations at poultry farms. Such elaborated guidance is necessary to evaluate any role that wild birds may play in disease introductions, or the potential for disease to be spread from farms into wild bird populations.
- Where possible a 'lessons learnt' review should be undertaken by the relevant authorities following the application of an HPAI outbreak response, and any conclusions concerning how better to improve responses or preparedness subsequently implemented.

- Further work should be undertaken to understand the nature and extent of the wild and ornamental bird trade, fighting cock exhibits, and the like, as well as giving special emphasis to trade through wet (live bird) markets.

COMMUNICATION

The communication of accurate and objective information is essential for informed understanding of risk by the public and others, and much attention was given to this at the Task Force's meeting in 2007². Whilst there has been little recent media coverage of issues in countries without infection, this would rapidly change should infection again spread widely. It is essential that those with understanding of the technical issues continue to provide pro-active briefings to media and others.

The Task Force has previously developed guidance related to risk assessment and response for managers of protected wetlands. There is a need to actively promote and further disseminate this guidance, 're-packaging' it as necessary in order to reach target audiences.

Recommendations

- The proactive briefing of media with accurate and objective information in lay person's language is essential for informed understanding of risk by the public and others, and should be given significant priority by those with technical understanding of the issues.
- The Task Force should update its leaflet on HPAI H5N1 so that this summary of scientifically accurate information represents most recent understanding.
- The Task Force should promote actively its existing guidance on risk assessment and reduction for managers of protected wetlands, re-formatting and translating this as necessary, so as to best reach this target audience.
- The Task Force should continue to provide and promote the globally recognised authoritative resource for information on HPAI in wild birds i.e. AIWEB (www.AIWEB.info).

CONSERVATION IMPACTS

A review of direct and indirect impacts of HPAI H5N1 on nature conservation interests has been initiated by the Task Force for subsequent publication.

Whilst relatively few globally threatened species have been reported to have died as a direct result of infection, significant numbers other waterbirds have been reported dead. Other impacts include the mortality of 5-6% of the world population of Bar-headed Geese *Anser indicus* in a single incident at lake Qinghai in May 2005.

In Europe, the most significant HPAI H5N1 impacts resulted from exaggerated and often inaccurate media reporting. This fuelled public fears, leading to a range of consequences such as changed attitudes towards birds. Public visitation to wetland reserves fell – with financial implications for the organisations running these.

Other **negative conservation impacts** identified include:

- Destruction of wetland and other waterbird habitats as a misguided response (either by public or encouraged through formal policy).
- Killing of waterbirds or destruction of their nests as a misguided response (either by public or encouraged through formal policy).

- Apparent release of formerly captive non-native birds into the wild in response to public fears of proximity to birds.
- Reduced garden bird feeding in developed countries.
- Negative impacts on the undertaking or planning of captive breeding programmes for threatened wildlife.
- Negative impacts the financial viability of zoos and collections as a response to reduced public visitation and the need for significant resources to prepare and implement contingency planning.
- Direct mortality of (rare and threatened) animals within zoos and collections.
- Culling of village poultry increasing demand for bushmeat and other animal protein sources with impacts on other wild animal populations.
- Cessation of hunting, in some instances giving negative impacts on well-regulated recreational shooting.
- Research on wild birds (*e.g.* bird ringing) suspended or stopped in response to actual or potential outbreaks of infection (leading to fewer ringing recoveries).
- Drain on resources of conservation organisations.

Positive consequences identified include:

- Enhanced international co-operation between countries in issues related to HPAI H5N1.
- A high level of co-ordination, information and exchange and promotion of common positions, promoted through the Task Force.
- Cessation of hunting, reducing numbers of birds killed (and restriction on poorly-regulated recreational shooting activity).
- Demand for better data and information for evidence-based decision making, including: more attention to wildlife disease issues strategically within governments and nature conservation institutes; enhanced study of migration of a range of waterbird species including through telemetry studies; development of new analytical tools; development of novel risk-assessment tools (*e.g.* spatial analyses relating distribution and densities of poultry vs. higher risk bird species); and more resources for research.
- Demand for training and capacity building for waterbird monitoring, trapping and AI surveillance.
- Development of systems for better risk assessment, contingency planning and surveillance both nationally and internationally (*e.g.* the New FluBird project in the EU).
- Development of better integrated responses to outbreaks.
- Temporary EU ban on importation of wild birds.
- Inclusion in multiple MEA and resolutions, information about AI and the importance of the environmental community working in partnership with the veterinary community, contributing to address the role of wild birds in the epidemiology of this disease.

There remains a need to develop much more effective communication strategies necessary to give policy makers, stakeholders and the general public more balanced information on the real

levels of risk and appropriate responses. The information on the Task Force's web-site (www.AIWEB.info) should be promoted as a core source of information.

Recommendations

- The Task Force should document and publish the range of direct and indirect conservation impacts as part of the process of learning from recent events and of seeking to reduce or mitigate future such impacts.

THE FUTURE ROLE OF THE SCIENTIFIC TASK FORCE ON AVIAN INFLUENZA & WILD BIRDS

A questionnaire survey of Task Force members and observers as to its *modus operandi* was undertaken prior to the workshop and the results fully reviewed there. There was acknowledgement of the substantive value of the Task Force in promoting common organisational positions and policies, and of encouraging information exchange between member organisations and others over the last five years.

Particular achievements include the:

- development and maintenance of the Task Force's web-site www.aiweb.info; as the authoritative source of current knowledge on HPAI in wild birds.
- drafting of six formal Resolutions for three MEAs which have established policy guidance endorsed by the international community (Annex);
- representation and briefings provided to local, national, regional and international technical meetings;
- production of technical summaries and proceedings following previous Task Force meetings; and
- provision of a forum for the dissemination of key science-based messages in response to need.

It was agreed that the Task Force should continue its work, meeting at frequencies necessary to undertake its activity.

Recommendations

- The Task Force has provided a valuable, and extremely cost-effective, co-ordination function between its many collaborating organisations. It should continue to convene, and continue to ensure dissemination of relevant information to governments and other interested parties.
- Financial resources are essential to maintain the continued co-ordination of the Task Force and a strategy for securing these funds is necessary.
- The Task Force should periodically review progress in relation to its Recommendations, and undertake actions to promote their implementation as necessary.
- For many, access to the most recent scientific literature is constrained, and the Task Force should continue to provide reviews, access to copies of published papers through its website, and other summary information to assist researchers in key areas.
- The Task Force should continue to explore means of disseminating summaries of key research related specifically to HPAI and wild birds. These should be disseminated via

the website and use appropriate linkages to draw in other summaries of information published by member organisations and other research groups.

FINANCES

The Task Force has previously stressed the long-term nature of necessary investments needed to develop surveillance programmes and to sustain these. These investments include the critical need to build technical capacity in countries at risk through training programmes and other skills development. However, organisational investment in these areas is declining. This is highly undesirable and has the potential to undo much of what has been achieved.

Recommendations

- It is suggested that the current knowledge on HPAI H5N1 (the summary provided in this situation report) provide a basis for the reassessment of funding by the international donor community.
- Sustained financial inputs are needed to continue the important programmes of surveillance, field research, training and other capacity building initiated since 2005. This includes essential resources to support the co-ordination of the Task Force.

ABBREVIATIONS

AEWA	Agreement on the Conservation of African-Eurasian Migratory Waterbirds
AI	Avian influenza
CMS	Convention on the conservation of Migratory Species
EU	European Union
FAO	UN Food and Agriculture Organisation
GAINS	Global Avian Influenza Network for Surveillance
HPAI	Highly Pathogenic Avian Influenza
LPAI	Low Pathogenic Avian Influenza
OIE	World Organisation for Animal Health
USDA	United States Department of Agriculture
USGS	United States Geological Service

ANNEX 1. SCIENTIFIC TASK FORCE ON AVIAN INFLUENZA IN WILD BIRDS: TERMS OF REFERENCE 2010



Scientific Task Force on Avian Influenza and Wild Birds

Terms of Reference

1. Establishment

The Task Force was established by the UNEP Convention on Migratory Species (CMS) in close cooperation with the Agreement on the Conservation of African Eurasian Migratory Waterbirds (AEWA) in August 2005 following concerns about the role of migratory birds as potential vectors of highly pathogenic avian influenza (HPAI) virus subtype H5N1.

The FAO, originally an observer of the Task Force, became a full member in March 2007. In June 2007, FAO was acknowledged for its commitment and dedication to understanding the role of wild birds in the spread of HPAI H5N1 and was invited to co-convene and co-coordinate the Task Force with UNEP/CMS.

2. Vision statement

That the role of wild birds in the epidemiology of highly pathogenic avian influenza is well-understood and incorporated appropriately into the response activities of all relevant sectors.

3. Purpose

To improve both understanding of the role of wild birds in the epidemiology of highly pathogenic avian influenza and the level of integration between relevant sectors, and to work to minimise detrimental conservation impacts.

4. Objectives

- Promote objective information on the role of wild birds in the epidemiology of highly pathogenic avian influenza aiming to avoid inappropriate responses that could be detrimental to the conservation of wild birds and their habitats.

- Promote integrated approaches, at both national and international levels, to address highly pathogenic avian influenza, in particular bringing together the sectors traditionally responsible for public health and agriculture with those traditionally responsible for wildlife and the environment;
- Encourage governments to support co-ordinated, well-structured and long-term monitoring and surveillance programmes for wild birds to assess current and new disease risks, making best use of, and building on, existing schemes;
- Maintain an active overview of the developing situation especially as regards wild birds;
- Provide technical advice about HPAI and related topics to governments and relevant non-governmental organisations on request or as necessary;
- Identify priorities for the following areas and promote as appropriate:
 - Contingency planning, risk assessment and response strategies
 - Surveillance and monitoring systems
 - Epidemiological investigations
 - Communication, education and public awareness
 - Research and data needs

5. Membership

Membership is considered for organisations working internationally in areas either directly or indirectly affected by highly pathogenic avian influenza. Each organisation will be assessed on an individual basis. For more information, contact Scott Newman (scott.newman@fao.org) and/or Borja Heredia (bheredia@cms.int).

Each member organisation must appoint at least one focal point and that focal point must have the following:

- i) demonstrated capacity for networking with avian influenza experts at local, national and international scales and/or experience working with such experts at local, regional and national levels, including *inter alia* MEA National Focal Points;
- ii) full access to electronic mail and Web-based communication systems, through which the majority of the work of the Task Force will take place;
- iii) fluency in written and spoken English (the working language of the Task Force); and
- iv) commitment to undertake the work of the Task Force with the support, where relevant, of the member's organisation or institution.

As of May 2010, the Task Force comprises representatives and observers from 15 international organisations, including four UN bodies and specialist non-governmental organisations.

Task Force members:

AEWA, the UNEP African-Eurasian Waterbird Agreement
Birdlife International
CBD, the UNEP Convention on Biological Diversity
CIC, the International Council for Game and Wildlife Conservation
CMS, the UNEP Convention on Migratory Species
FAO, the UN Food and Agriculture Organization
ISDR, the UN International Strategy for Disaster Reduction
Ramsar, the Ramsar Convention on Wetlands
Wetlands International
WCS, the Wildlife Conservation Society
WWT, Wildfowl & Wetlands Trust
ZSL, the Zoological Society of London

Task Force observers:

OIE, the World Organisation for Animal Health
UNEP, the United Nations Environment Programme
WHO, the World Health Organisation

For a description of the Task Force member and observer organisations visit <http://www.aiweb.info/document.aspx?DocID=13>.

6. Mode of operation

The Task Force is jointly co-ordinated by UNEP/CMS and FAO. Co-ordination of member organisations is through regular e-mail correspondence and teleconferences. Member organisations regularly cooperate on joint projects (including with third parties) and keep other Task Force organisations regularly informed of such activities so as to avoid duplication.

The Task Force maintains a web site (www.aiweb.info), which is the main means by which information concerning HPAI H5N1 and birds is disseminated internationally. Member organisations contribute information to that web site and publicise it as much as possible. Other means of disseminating information include the issuing of press releases and statements.

The Task Force aims to undertake regular reviews of relevant research and relevant activity worldwide, identify gaps and make suggestions for strengthening responses.

The Task Force also organises special international seminars and workshops (e.g. Nairobi, Kenya 2005; Aviemore, Scotland 2006; Rome, Italy 2010) to

review the latest scientific studies concerning the evolution and spread of Asian lineage HPAI H5N1, its impacts on wild birds and the implications for the wider environment. Such seminars have also discussed, for example, issues related to further transmission risks and corresponding risk mitigation strategies.

7. Reporting

Progress will be reported to the meetings of CMS's Scientific Council, Standing Committee, and Conference of Parties.

8. Reviewing

The terms of reference will be reviewed annually.

ANNEX 2. FORMAL RESOLUTIONS GIVING GUIDANCE ON ISSUES CONCERNING THE SPREAD OF HPAI H5N1

Ramsar Convention on wetlands

- 2005 [Resolution 9.23](#). Managing wetlands and waterbirds in response to highly pathogenic avian influenza
- 2008 [Resolution X.21](#). Guidance on responding to the continued spread of highly pathogenic avian influenza H5N1

Convention on Migratory Species

- 2005 [Resolution 8.27](#). Migratory Species and Highly Pathogenic Avian Influenza
- 2008 [Resolution 9.8](#). Responding to the challenge of emerging and re-emerging diseases in migratory species, including Highly Pathogenic Avian Influenza H5N1

Africa-Eurasian Waterbird Agreement

- 2005 [Resolution 3.18](#). Avian Influenza
- 2008 [Resolution 4.15](#). Responding to the spread of Highly Pathogenic Avian Influenza H5N1