

WORLDWIDE SITUATION

One hundred and ten outbreaks/cases of H5N1 HPAI in poultry and wild birds were reported officially worldwide in August 2009. Outbreaks in poultry were reported from Bangladesh, Egypt and Indonesia. In addition, Mongolia reported an outbreak in wild birds. The number of reported outbreaks/cases by country and their location are illustrated in Figures 1 and 2, respectively.

FIGURE 1
H5N1 HPAI outbreaks/cases reported in poultry and wild birds in August 2009
(Source: FAO EMPRES-i)

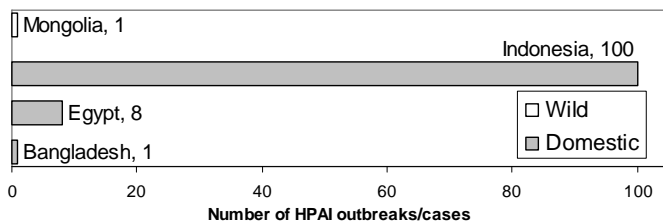
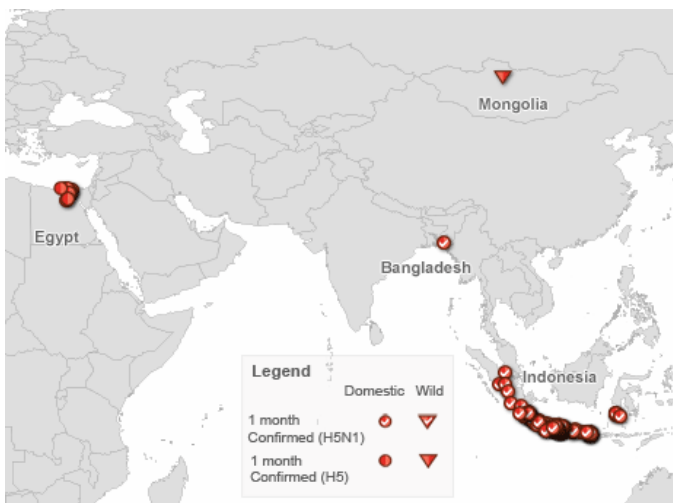


Figure 2
H5N1 HPAI outbreaks/cases reported in poultry and wild birds in August 2009
(Source: FAO EMPRES-i)



NOTE: H5 cases are represented for outbreaks where N-subtype characterization is not being performed for secondary cases or if laboratory results are still pending. Countries with H5 and H5N1 occurrences only in wild birds are not considered infected countries according to OIE status. The original data have been collected and aggregated at the most detailed administrative level and for the units available for each country.

The evolution of the number of outbreaks/cases over the last six months by species group (wild or domestic) and by geographical area is represented in Figures 3 and 4, respectively. The evolution of the number of confirmed cases of H5N1 AI infections in humans reported to the World Health Organization (WHO) by country since November 2003 is illustrated in Figure 5.

FIGURE 3
Weekly number of reported H5N1 HPAI outbreaks/cases in poultry and wild birds between March 2009 and August 2009
(Source: FAO EMPRES-i)

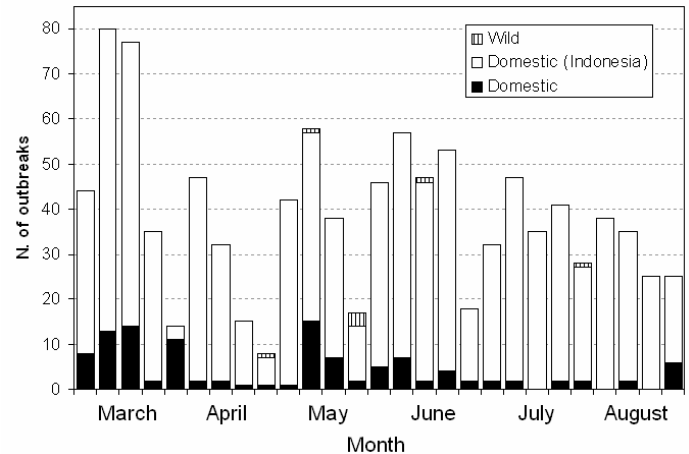


FIGURE 4
Weekly number of H5N1 HPAI outbreaks/cases reported by region between March 2009 and August 2009
(Source: FAO EMPRES-i)

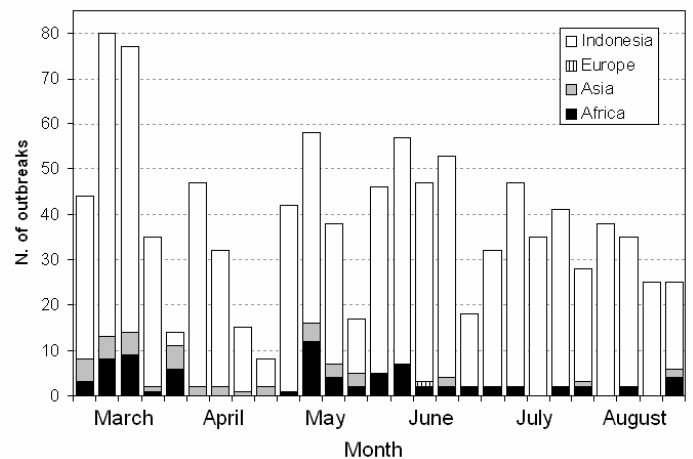
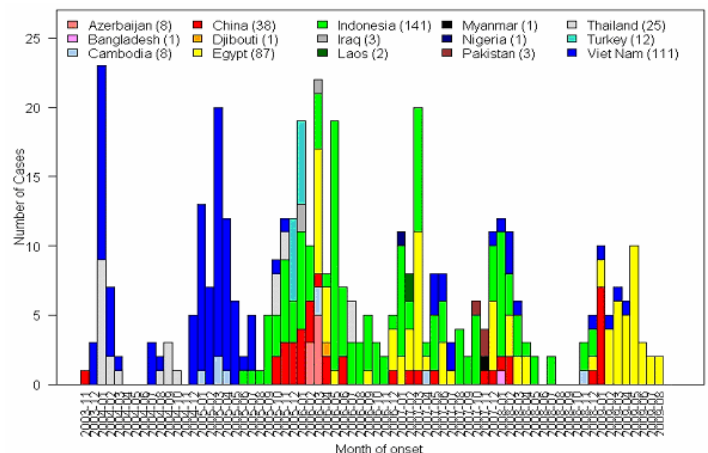


FIGURE 5
Confirmed cases of H5N1 AI infections reported in humans by country and month of onset since November 2003
(Source: World Health Organization)

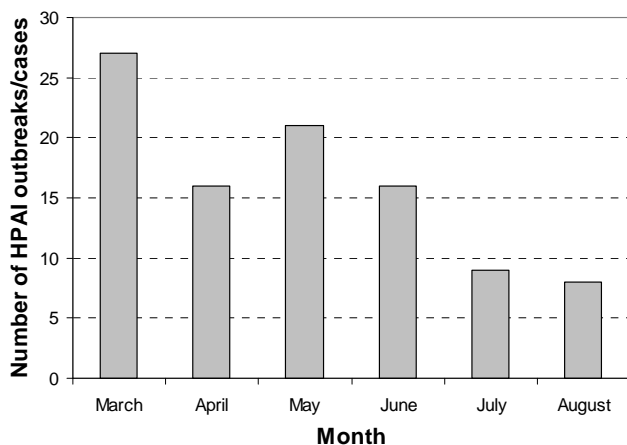


SITUATION BY CONTINENT/REGION

Africa

Confirmed outbreaks of H5N1 HPAI in Africa over the last six months are presented in Figure 6.

FIGURE 6
Number of reported H5N1 HPAI outbreaks in poultry in Africa
between March and August 2009
(Source: FAO EMPRES-i)



Egypt, which reported its first H5N1 HPAI outbreak in February 2006, is considered endemic with regular reporting of outbreaks in almost all of the 29 governorates. In August 2009, Egyptian veterinary authorities reported eight confirmed H5 HPAI outbreaks in poultry (chickens, ducks and geese) from Qalubia (1), Fayoum (2), Al Sharkia (1), Dakahlia (1), Kafr Elsheikh (1), Beheria (1) and Minufiyah (1) Governorates. Six outbreaks (75%) were reported in backyard poultry and two (25%) on farms. During August 2009, 16 Participatory Disease Surveillance (PDS) teams visited 48 villages in seven governorates, (Sharkia, Beheria, Gharbia, Dakahlya, Minufiyah, Fayom and Qalubia). The teams detected two confirmed outbreaks in Dakahlya and Fayom governorates out of five suspected outbreaks matched with the HPAI clinical case definition. Moreover the PDS team at Fayom governorate detected one suspected outbreak matched with the HPAI clinical case definition with positive reaction by Anigen Rapid field test but tested negative by PCR test.

It is important to stress that two outbreaks occurred in vaccinated birds and three in non vaccinated birds, while for the other three, the vaccination status is unknown. An assessment study conducted in the framework of the SAIDR (Strengthening Avian Influenza Detection and Response) project revealed that the coverage of vaccination in the household sector is very low (<20%) and the flock immunity level is also less than 10%.

Surveillance activities are being undertaken targeting both poultry and migratory wild birds around selected important bird areas (IBAs) during winter. Poultry farms are required to test their birds and receive certification (HPAI infection negative status) prior to any planned transportation. During August 2009, 2,405 samples were collected for this purpose and one tested positive in Qalyoubia Governorate. Compliance with certification for poultry transportation is sub-optimal as only registered farms seek such services. In terms of surveillance on commercial farms during August 2009, active surveillance detected H5 HPAI infections on one farm in Kafr Elsheikh Governorate (out of 17 farms from three governorates), and passive surveillance detected no outbreaks (the only sample taken in the country). In terms of surveillance in the backyard/household poultry sector, three households were confirmed positive in three governorates through active surveillance (out of 42 samples from ten governorates), and three samples in two governorates were

found positive through passive surveillance (out of 6 samples from two governorates). Forty-four samples were also collected at road checkpoints and none tested positive for HPAI.

The current government policy is to allow commercial companies to vaccinate their flocks with registered vaccines of their choice. The government was providing vaccination of household/village birds free of charge. However, Since July 2009, vaccination in backyard/household settings has been provisionally suspended until a new vaccination strategy is adopted. This decision was made after three years of a mass avian influenza vaccination programme, with an apparently limited impact on disease incidence. Although there are no official vaccination data, especially from commercial farms, it is assumed that vaccines are widely used in the commercial poultry sectors. All AI vaccines used in Egypt are imported and there are at least 21, all inactivated and mostly the H5N1 Re-1 Chinese vaccine for household poultry and the H5N2 vaccine for commercial farms.

In August 2009, Egyptian health authorities confirmed two human avian influenza A/H5N1 cases from Minufiyah and Damietta governorates in children aged 1.5 and 14 years. Both cases were reported to have had close contact with infected birds. Through August 2009, the total number of avian influenza A/H5N1 human infections in Egypt reached 85, of which 27 (32%) were fatal.

In **Ghana**, with regard to H5N1 HPAI active surveillance, 660 samples (538 tracheal and cloacal swabs and 122 sera) collected between April and June 2009 from regions of the country bordering Côte d'Ivoire were tested at the Accra Veterinary Laboratory. No H5 subtype was detected by conventional RT-PCR. All the negative samples were passaged through eggs twice and again tested by the RT-PCR. Testing is still in progress to determine if other subtypes are present. The sera samples will be tested by blocking ELISA for the detection of antibodies to the Influenza type A virus.

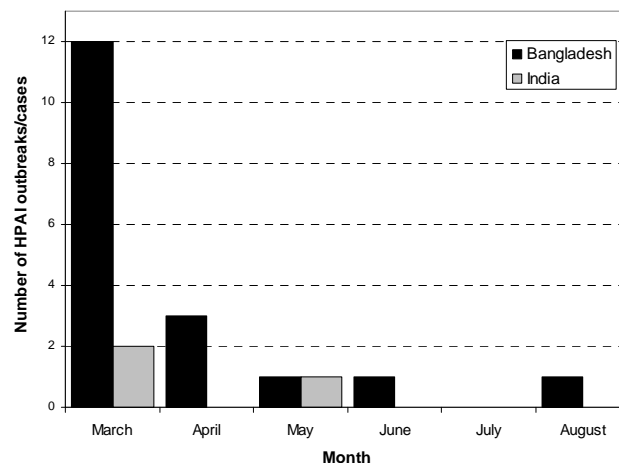
In **Nigeria** baseline surveillance activities for AI in ducks are expected to start before the end of the year.

An active surveillance programme for AI in ducks will be organized under FAO's supervision in five countries previously infected with HPAI (Burkina Faso, Ghana, Cote d'Ivoire, Benin and Niger).

South and Central Asia

Confirmed outbreaks/cases of H5N1 HPAI in South Asia over the last six months are presented in Figure 7.

FIGURE 7
Number of reported H5N1 HPAI outbreaks in poultry in South
Asia, by country, between March and August 2009
(Source: FAO EMPRES-i)



In **Bangladesh**, one H5N1 HPAI outbreak was reported during August 2009 on a poultry farm in Chittagong. With outbreaks of H5N1 HPAI reported almost every month since the first occurrence in February 2007, the country is believed to be endemic. Poultry vaccination against H5N1 AI is prohibited by the government. As of 31 August 2009, a total of 327 outbreaks were recorded in 47 out of 64 districts on both commercial farms and in backyard holdings and nearly 1.7 million birds had been culled. FAO is coordinating and supporting active surveillance that is currently conducted in 150 upazillas (sub-districts) across the country, including the innovative use of the Short Message Service (SMS) gateway (method of sending and receiving SMS messages between mobile phones and a computer) as a reporting tool. Daily, 450 community animal health workers employed by the active surveillance programme send SMS coded text messages to the Department of Livestock Services, reporting disease and death in poultry. SMS messages of suspected AI events are automatically forwarded to the livestock officer in the area, who starts an investigation.

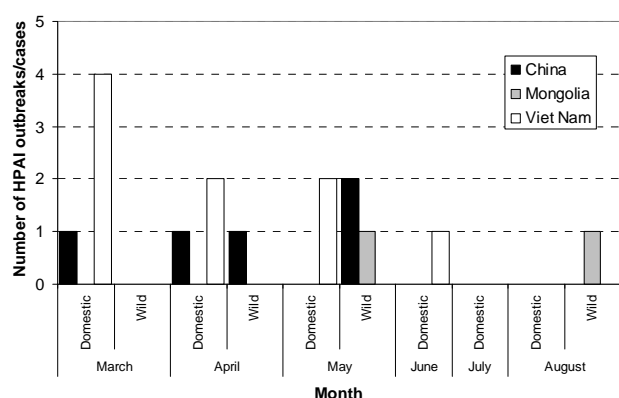
In **India**, no outbreaks have been reported since June 2009. During August 2009, 9,469 active surveillance samples were received at the High Security Animal Disease Laboratory (HSADL), Bhopal. Testing was completed on 2,135 samples (all negative) and another 9,020 were pending. The periodical reports (available at <http://www.dahd.nic.in/birdflu.htm>) also include the number of samples received and tested per state. A three-year long Uttar Pradesh Forest and Wildlife Department project on "Migratory Movements of Waterbirds and Surveillance of Avian Diseases" has collected about 240 samples since January 2009, mostly from migratory bird species. Another 150 wild bird samples have been submitted from samples collected at Chilika Lagoon, Orissa and Koothankulam Reserve, Tamil Nadu, from birds trapped as part of an FAO-facilitated satellite tag marking project (http://www.fao.org/avianflu/en/wildlife/sat_telemetry_india.htm). Samples are in the process of being tested at HSADL. The project will be continued this coming year but at different sites in India.

South East Asia

Confirmed outbreaks/cases of H5N1 HPAI in South East Asia over the last six months are presented in Figures 8 and 9.

FIGURE 8

Number of H5N1 HPAI outbreaks/cases in poultry and wild birds in South East Asia, by country (excluding Indonesia), between March and July 2009
(Source: FAO EMPRES-i)



In **Cambodia**, no additional H5N1 HPAI events have been reported since the human case and poultry outbreak reported in Kandal Province in December 2008. Cambodia routinely reports results obtained from surveillance activities through two hotlines supported by FAO at the National Veterinary Research Institute (NaVRI) that receives reports on suspicious cases from the field as well as inquiries on how AI is transmitted and on prevention measures, etc. During August 2009, four callers reported sick and dying poultry, but

after investigation, they were both ruled out as being H5N1 HPAI. There is also ongoing duck market surveillance in 12 live bird markets in 11 provinces conducted by NaVRI since 2007. None of the samples collected so far have tested positive for H5N1 HPAI. The wild bird surveillance supported by FAO was conducted by the Wildlife Conservation Society in wetlands and markets ended in June. A total of 1,212 samples were collected from January to June for avian influenza virus isolation and submitted to NaVRI. These samples represented 606 birds of 38 species from nine sites in six provinces within Cambodia. All samples were found negative for avian influenza virus, including H5N1 subtype.

In **China**, since 2004, almost 200 H5N1 HPAI outbreaks have been reported in poultry and wild birds in 29 provinces and a total of over 35 million poultry have been culled to control the spread of the disease. No poultry outbreaks have been reported since April 2009 and the last wild bird case dates from May 2009. During the winter 2008-2009 (December - April), surveillance activities found 86 H5N1 HPAI positive samples from chickens, ducks and geese at markets in the administrative divisions of Chongqing, Fujian, Guangdong, Guangxi Zhuang Autonomous Region, Guizhou, Henan, Hubei, Hunan, Inner Mongolia Autonomous Region, Jiangsu, Shandong, Sichuan, Xinjiang Uyghur Autonomous Region and Zhejiang. The Official Veterinary Bulletin released by the Ministry of Agriculture covering surveillance activities in the month of May 2009 shows that no new viruses were detected during that period.

Vaccination has been an important strategy for controlling HPAI since 2004. On mainland China, officially reported vaccination coverage is still very high in all provinces. Mean vaccination coverage through September 2008 is reported to be higher for most provinces than for the same period in 2007. Additionally, all but one province, Xinjiang, reported 80% vaccination coverage or higher. Some of the current challenges are that: 1) the current commercially used H5N1 inactivated vaccines do not allow for serological distinction between vaccination and field infection; 2) it is difficult to access poultry raised on backyard and small-scale farms; 3) vaccination coverage in domestic waterfowl is relatively low; 4) layer and breeder ducks in particular, since they do not show clinical signs, are often only vaccinated when they are young, but no booster vaccination is administered on most farms; and 5) broilers are usually not vaccinated because of the 4-6 weeks of age at the time of marketing.

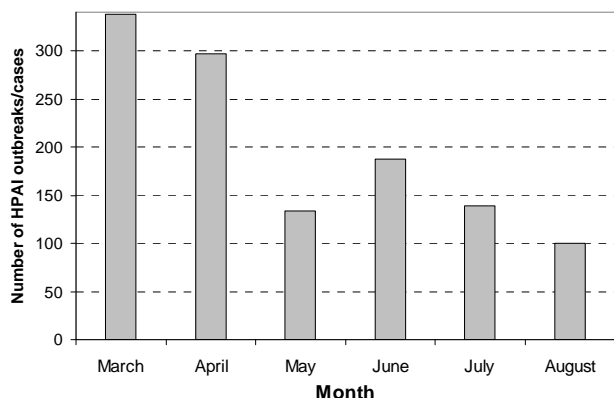
Indonesia continues to report a high number of H5N1 HPAI outbreaks in poultry (Figure 9), as it has for the past three years. HPAI is confirmed to be endemic on the islands of Java, Sumatra and Sulawesi, and probably Bali, with sporadic outbreaks reported elsewhere. HPAI prevalence by village varies widely. Only two of Indonesia's 33 provinces have never reported the occurrence of H5N1 HPAI. The high number of reports each month is partially explained by the implementation of the 'participatory disease surveillance and response' (PDSR)* programme that targets village poultry production systems (mainly backyard) and reports evidence of virus circulation in the village. The programme is supported by FAO with USAID and AusAID financial support and is operating in 331 of 448 (74%) districts through 31 Local Disease Control Centres (LDCCs) in 27 (82%) of 33 provinces in Java, Sumatra, Bali, Sulawesi and Kalimantan, including all known endemic areas. Larger and less densely-populated provinces report HPAI outbreaks less often than more densely populated provinces.

* In the event that more than one bird dies suddenly in a flock, with or without clinical signs, Participatory Disease Surveillance and Response (PDSR) teams carry out an influenza type A rapid test. A mortality event consistent with clinical HPAI and a positive rapid test in affected poultry is considered a confirmed detection of HPAI in areas where HPAI has previously been confirmed by laboratory testing.

FIGURE 9

Number of reported outbreaks/cases of H5N1 HPAI in poultry in Indonesia, between March and August 2009

(Source: FAO EMPRES-i)



During August, PDSR officers visited 1,976 villages, of which 134 (6.8%) were infected (100 were newly found, while the remaining thirty-four carried over the infection status from the previous month). This was slightly lower than the July 2009 infection rate of 7.5%. During the previous 6 months, PDSR officers visited 10,808 villages (16.7%) in the 331 districts under PDSR surveillance. Since May 2008, they have visited about 40% of villages under coverage. An average of 12.4 % of the villages visited during the previous six months were classified as infected at the time of visit. Bali continued to have infected villages. Cases over the last six months were concentrated in provinces on Java (especially DI Yogyakarta).

Soon after H5N1 HPAI was identified in 2003, large commercial poultry producers implemented vaccination using a range of vaccines, both imported and locally produced. The Indonesian Government introduced vaccination against H5N1 HPAI in mid-2004 as one of the measures aimed at controlling the epidemic in small flocks of poultry. Vaccines containing either an Indonesian H5N1 antigen (A/chicken/Legok/2003) or H5N2 viral antigen have been used in government programmes, and there are now approximately 20 different vaccines containing a variety of influenza strains licensed for use in Indonesia. The government's policy was that vaccine and vaccination services would be provided free of charge to the backyard poultry sector, layer farms up to 10,000 birds, and broiler farms up to 15,000 birds in all affected provinces. However, because of limited operational funding for vaccination activities, vaccine coverage was not widespread. In 2006 and 2007, again due to limited funding, vaccine distribution was focused on the backyard sector in twelve high-risk provinces. As a result of concern over the efficacy of currently registered vaccines against circulating field strains, the central government did not purchase vaccines in 2008. In the commercial sectors, vaccination is not coordinated by government, thus vaccination practices there are based on risk as perceived by the farmer. Today, preventative vaccination is practiced in all breeder facilities and nearly all layer farms nationwide. Single dose vaccination of broilers with inactivated vaccine is practiced sporadically during the wet season on Java. Vaccination of ducks is not practiced.

In **Mongolia**, an outbreak of H5 AI started on 1 August 2009 in Doroo nuur Lake, Tsetserleg soum, Arkhangai, affecting 56 wild birds. Species found dead at this location included great crested grebe, wild duck, gulls, greater black headed gull, bean goose, magpie, spoonbill and black kite.

In **Viet Nam**, no H5N1 HPAI outbreak has been reported since June 2009. From January 2009, the Department of Animal Health (DAH) officially reported 52 HPAI outbreaks in 15 (24%) of 63 provinces, mostly on duck farms (65%) and in the small-scale commercial sector (69% of outbreaks in flocks with 50 to 1,000 birds). Consistent outbreak

investigations are still not undertaken on infected farms and key information is usually missing from the field, so that it is difficult to have a good understanding of the way the virus is spreading throughout widely distributed regions of the country.

Disease control measures include stamping out of infected farms, movement restrictions for 21 days, compensation (up to 70% of market value; around USD 1.3/bird) and vaccination. Vaccination is implemented throughout the country in two annual campaigns (March/April and October/November), but in some areas, vaccination between the seasonal campaigns is also being practiced. By the end of the April seasonal vaccination campaign, 154.4 million poultry had been vaccinated (70.9 million ducks and 83.5 million chickens) as reported by the DAH. Recently the DAH changed the vaccination regulation, with full financial support now available for vaccination of commercial flocks below 2000 head/flocks (instead of 500 previously applied).

Post-vaccination monitoring is routinely carried out after each campaign. For 2009, a total of 50,400 samples are to be collected in 28 provinces for sero-monitoring and about 19,200 swab samples are to be taken to monitor HPAI virus circulation in slaughter-houses/-points or in live bird markets of 16 provinces. The analysis of the samples collected after the first round of 2009 vaccination is currently being done. Results for 2008 showed that around 65% of birds were protected, while between 75% and 80% of flocks were protected, i.e. flocks with more than 70% of birds showing protective titres $HI \geq 1/16$. However, it is likely that sampled flocks are not really selected at random for administrative reasons, so this assessment of the vaccination programme is more a monitoring of the immune response on vaccinated flocks rather than a monitoring of the vaccine coverage.

Active surveillance for AI is a component of numerous projects currently being implemented in Viet Nam, including:

- ACIAR (Australian Centre for International Agricultural Research) project started in June 2006 for three years and includes longitudinal studies to determine the prevalence of past and present infection in smallholder farms in the Mekong River Delta–South Viet Nam (on-going).
- NZAID (New Zealand's International Aid & Development Agency) project will run for two years and includes longitudinal studies on nomadic ducks in the Mekong River Delta–South Viet Nam (on-going).
- CIRAD (French Agricultural Research Centre for International Development) project started in 2007 and includes epidemiological studies in the Red River Delta–North Viet Nam (on-going).
- VAHIP (Vietnam Avian and Human Influenza Control and Preparedness Project) project is being funded by the World Bank for three years and includes various surveillance activities, including market surveillance for virus circulation and outbreak investigations (on-going).
- UNJP (Joint Government - United Nations Programme) project was implemented by FAO Viet Nam in 801 communes of ten pilot provinces to monitor the duck and chicken population at village level on a monthly basis. About 17.8 million birds have been under clinical observation during the six months of project implementation and an average mortality rate of 1.18% was observed, but no HPAI outbreak was detected in these targeted communes.
- USAID (United States Agency for International Development) project by FAO Viet Nam in seven pilot provinces focuses on strengthening the reporting system at district and provincial level. This project has been implemented for five months (on going).

Based on the monitoring of surveillance activities, three currently circulating virus clades have been isolated: 1) HA clade 1 (predominant in southern Viet Nam and also isolated in Cambodia); 2) HA clade 2.3.4 (predominant in northern

Viet Nam and also circulating in China); and 3) HA clade 7 (detected in poultry seized at the Chinese border and at markets near Hanoi). So far in 2009, ten viruses isolated from outbreaks have been sent to the U.S. Centers for Disease Control and Prevention (CDC) for sequencing, and to date, no new circulating clade has been detected.

No human cases were reported in August, leaving the figure at five human cases confirmed in 2009 (of which one recovered). Since the beginning of the epidemic in late 2003, Viet Nam has declared 111 human cases, of which 56 (50%) have been fatal.

Europe

The last case in Europe was reported in wild birds on the coast of Ubsu-Nur Lake in the Russian Federation, which lies on the border with Mongolia. The last H5N1 HPAI event in poultry was detected in October 2008 on a mixed poultry farm in Germany.

Non-infected countries/territories

There have been no HPAI outbreaks reported in **Australia**, **New Zealand**, the **Pacific Community**, **Papua New Guinea** (outbreaks have occurred in the Indonesian province of West Papua) or **the Philippines**. To date, no outbreaks have been reported in **Timor-Leste**, but here surveillance capacity is weak. In South Asia, **Sri Lanka**, **Maldives**, and **Bhutan** have not experienced disease. Some Asian countries regularly report negative results obtained from their surveillance activities and suspected cases. **Bhutan** produces a clinical surveillance report weekly for each administrative level (available at: <http://www.moa.gov.bt/birdflu/main/reports.php?show=all>).

CONCLUSIONS

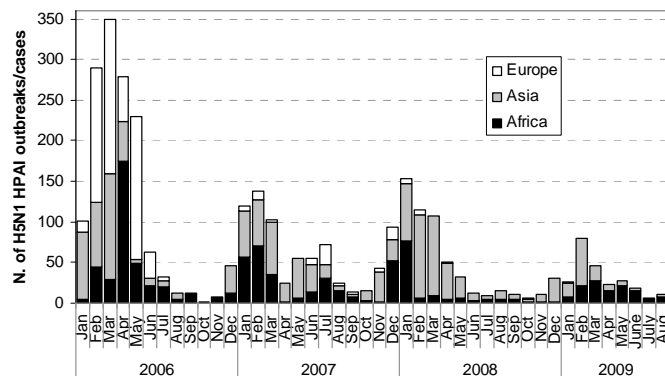
Since 2003, 62 countries/territories have experienced outbreaks of H5N1 HPAI. Effective control measures for outbreaks in poultry have been associated with reduced incidence of human infections in several countries. However, H5N1 HPAI remains entrenched in poultry in parts of Asia and Africa (Egypt) and thus the risk of human infection remains, as suggested by the two human cases reported in Egypt in July 2009.

Data from previous years have shown a peak in the number of outbreaks/cases during the January-March period in both poultry outbreaks (Figure 10) and human cases (Figure 5) with February 2009 representing the peak. A secondary peak has been shown in 2007 and 2008 during the June-August period. This year it has not yet been clearly observed. Countries considered endemic such as Viet Nam or China have not reported any H5N1 HPAI activity during August 2009. However, we will need to wait a few more months to see if the trend continues before we can consider these countries to be no longer endemic. The disease seems to be under control in those countries that experienced a re-emergence of HPAI over the last few months, i.e. Cambodia, India, Lao People's Democratic Republic and Nepal. It remains unknown whether these new cases occurred because of the re-introduction of the infection, or the undetected circulation of the virus at a low level. HPAI prevalence and incidence are likely to be much higher than presented in this report, because variations in the quality of disease surveillance and outbreak investigations in affected countries and areas preclude a thorough epidemiological analysis of global H5N1 HPAI.

In the case of Egypt, the situation in terms of human infections seems to be worsening since last year. There have been 33 human cases, which compares to seven human cases during the same period in 2008. However, the situation

seems similar in terms of poultry outbreaks (126 in 2009 compared to 108 during the same period in 2008).

FIGURE 10
Number of reported H5N1 HPAI outbreaks/cases by continent, by month since January 2006
(Source: FAO EMPRES-i; Indonesia data are not included, because the epidemiological unit definition for the PDSR data was modified from household level to village level in May 2008 and is not comparable)



August 2009 showed similar activity when compared to August 2008, both in terms of affected countries (4 vs. 4 - Figure 11) and number of outbreaks (10 vs. 15 - Figure 12). When compared to August 2006 and August 2007, however, H5N1 HPAI activity seems to be lower in August 2009, in terms of countries affected, although the total number of reported outbreaks remains similar. Although there has been an improvement in disease awareness, outbreaks/cases of HPAI are still likely to be under-estimated and under-reported in many countries and regions because of limitations in the capacity of veterinary services to implement sensitive and effective disease surveillance for H5N1 HPAI, and because of the weakness of compensation schemes.

FIGURE 11
Number of countries by continent that reported H5N1 HPAI in August 2006, 2007, 2008 and 2009
(Source: FAO EMPRES-i)

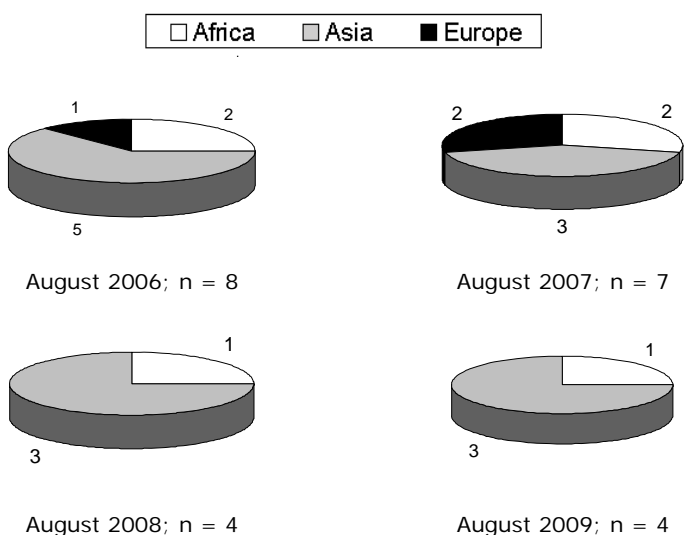
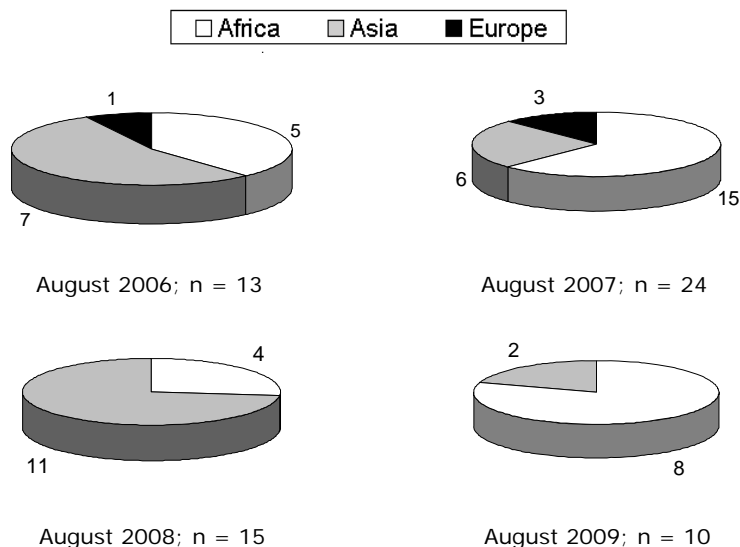


FIGURE 12

Number and distribution of H5N1 HPAI outbreaks/cases by continent in August 2006, 2007, 2008 and 2009

(Source: FAO EMPRES-i; Indonesia data are not included, because the epidemiological unit definition for the PDSR data was modified from household level to village level in May 2008 and is not comparable)



In May 2009, 107 great crested grebes, 3 bar headed geese and 11 brown headed gulls found dead in Genggahu Lake, Hainan Prefecture, Qinghai, tested positive for the H5N1 AI virus. Later on that month, another 163 dead wild birds were found in Nanhai Prefecture, also in Qinghai, at around the same time as a migratory swan was found dead in Mongolia (Doitiin Tsagaan Lake, Ugii-nuur Soum, Arkhangai). In June 2009, 58 great crested grebes *Podiceps cristatus* were found in Ubsu-Nur Lake, Ovursky, Respublika Tyva, Russian Federation, which lies on the border with Mongolia. Finally, early this month 56 wild birds were found dead in Doroo nuur Lake, Tsetserleg soum, Arkhangai, Mongolia. These reports seem to follow a similar pattern that occurred in South East Asia and southern Siberia in the Russian Federation in 2006. In 2006, these reports marked the start of a wider dissemination of H5N1 AI to many countries across Europe and Asia. The FAO EMPRES Wildlife Unit has been marking wild waterbirds that move from India through China and on to Mongolia in an effort to understand their potential role in the spread of virus. For more information about these disease ecology projects, please see the website:

http://www.fao.org/avianflu/en/wildlife/sat_telemetry.htm

FIGURE 13

Distribution of H5N1 AI outbreaks in wild birds during May-August 2009 in Central Asia

(Source: FAO EMPRES-i)



An animated map showing the evolution of outbreaks over the last six months including August 2009 is available at: www.fao.org/ag/againfo/programmes/en/empres/maps.html.

DISCLAIMER

The designations employed and the presentation of material in this information product do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations (FAO) concerning the legal or development status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The mention of specific companies or products of manufacturers, whether or not these have been patented, does not imply that these have been endorsed or recommended by FAO in preference to others of a similar nature that are not mentioned.

The views expressed in this information product are those of the author(s) and do not necessarily reflect the views of FAO. All rights reserved. Reproduction and dissemination of material in this information product for educational or other non-commercial purposes are authorized without any prior written permission from the copyright holders provided the source is fully acknowledged. Reproduction of material in this information product for resale or other commercial purposes is prohibited without written permission of the copyright holders. Applications for such permission should be addressed by e-mail to glews@fao.org.

© FAO 2008

This overview is produced by the GLEWS team of FAO in EMPRES, which collects and analyses epidemiological data and information on animal disease outbreaks as a contribution to improving global early warning under the framework of the Global Early Warning and Response System for Major Animal Diseases including Zoonoses. EMPRES welcomes information on disease events or surveillance reports on H5N1 HPAI (and other TADs) both rumours and official information. If you want to share any such information with us please send a message to glews@fao.org. Information will be treated confidentially if requested.