

WORLDWIDE SITUATION

Two hundred and fifty outbreaks of H5N1 HPAI in poultry were reported officially worldwide in February 2009 from eight countries: Bangladesh, China, Egypt, India, Indonesia, Lao People's Democratic Republic, Nepal and Viet Nam. H5N1 infections were also confirmed in four wild birds in Hong Kong, China. The number of reported outbreaks/cases by country and their geographical location are illustrated in Figures 1 and 2, respectively.

FIGURE 1

H5N1 HPAI outbreaks in poultry/cases in wild birds
Worldwide in February 2009
(Source: FAO EMPRES-i)

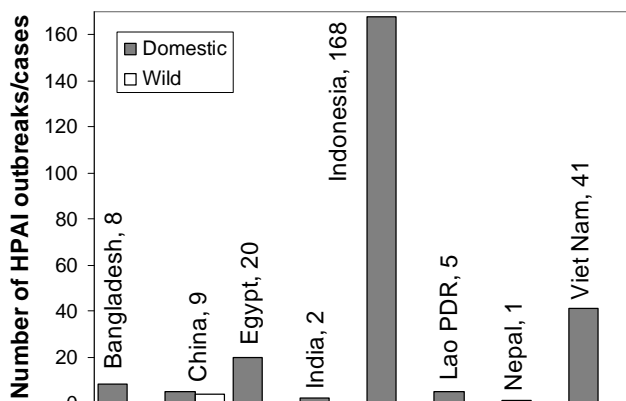
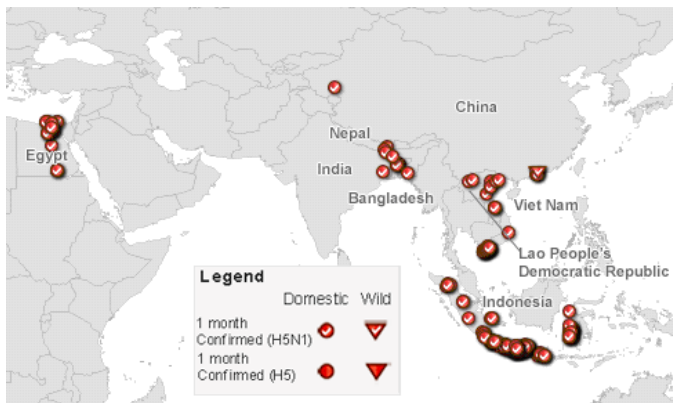


Figure 2

H5N1 HPAI outbreaks in poultry and cases of H5N1 infection in wild birds in February 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 between November 2003 and February 2009 is illustrated in Figure 5.

FIGURE 3

Weekly number of H5N1 HPAI outbreaks/cases per species (poultry vs. wild birds) between September 2008 and February 2009
(Source: FAO EMPRES-i)

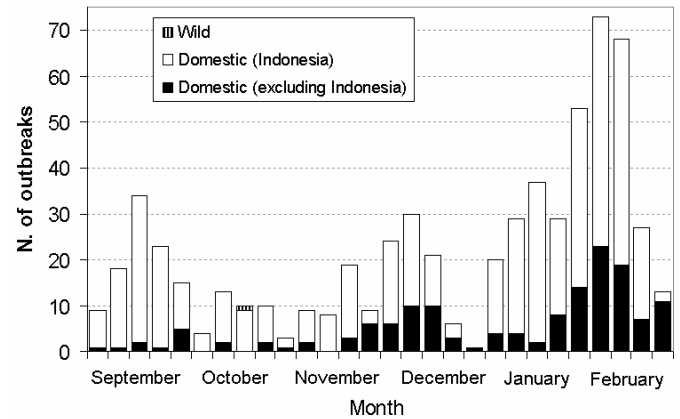


FIGURE 4

Weekly number of H5N1 HPAI outbreaks/cases by region between September 2008 and February 2009
(Source: FAO EMPRES-i)

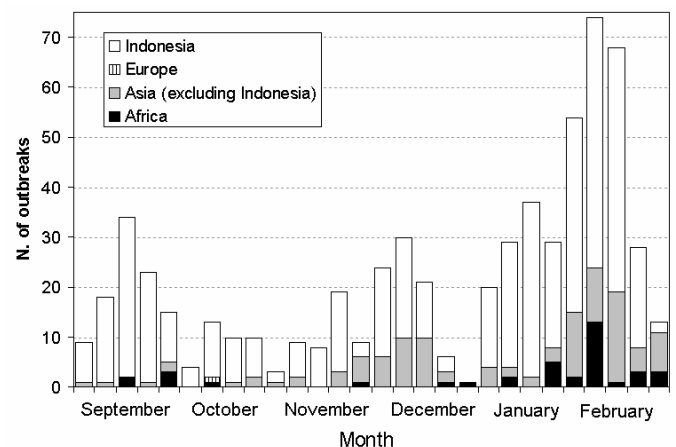
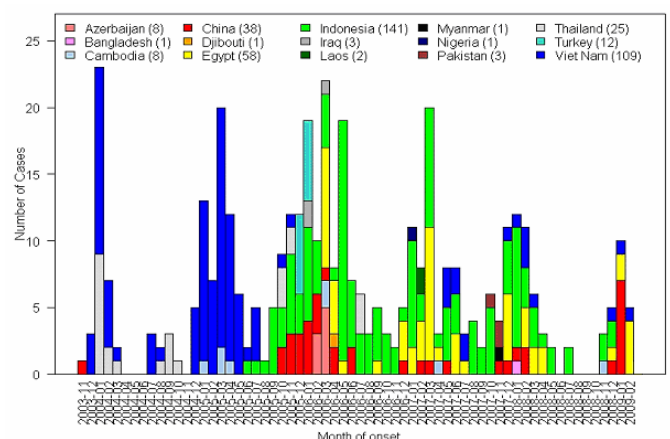


FIGURE 5

Confirmed cases of H5N1 AI infections in humans by country between November 2003 and February 2009
(Source: World Health Organization)

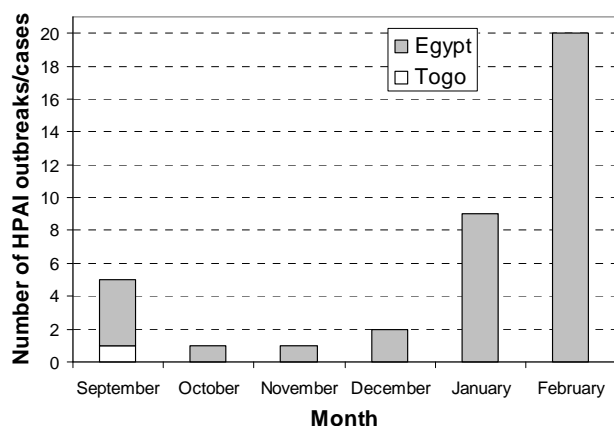


SITUATION BY CONTINENT/REGION

Africa

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

FIGURE 6
Number of H5N1 HPAI outbreaks in poultry
between September 2008 and February 2009 in Africa
(Source: FAO EMPRES-i)



Egypt, which reported its first H5N1 HPAI outbreak was in February 2006, is considered today endemic with ongoing reports of outbreaks in almost all of the 29 governorates. The Egyptian veterinary authorities reported 20 H5N1 HPAI outbreaks in backyard poultry in ten governorates in February 2009: Aswan (2), Gharbia (2), Fayoum (2), Sixth of October (2), Minoufiyah (1), Behaira (4), Giza (1), Sharkia (2), Suez (1) and Helwan (3). Comparable to Indonesia's efforts, participatory disease surveillance (PDS) activities are now implemented through a pilot program implemented in Sharkia, Behaira and Gharbeia Governorates. During February 2009, the PDS teams detected 12 suspected HPAI outbreaks in poultry that matched the HPAI case definition. These reports were from one urban centre and 11 villages from a total of 25 villages visited in four districts. Four of them (20% of February outbreaks) were identified as H5N1 HPAI by RT PCR test. On the other hand, two suspected HPAI outbreaks that were positive to the rapid field test were negative when tested by RT PCR.

Surveillance activities are being undertaken targeting both poultry and migratory wild birds around selected Important Bird Areas (IBAs) during winter. Together with government and NGO partners, FAO is undertaking a telemetry project to better understand wild bird habitat use and migration in the region. Poultry farms are required to test their birds and receive certification as negative for HPAI infection status prior to any planned transportation. During February 2009, 1,052 samples were taken for that purpose. Due to weak monitoring of such movements, however, compliance is sub-optimal. Samples were also taken as part of road check points (one negative sample during February 2009) and active surveillance in poultry farms (22 negative samples in February 2009).

Vaccination against H5N1 AI in farms started in March 2006, one month after the first outbreak was confirmed, as one of the measures aimed at controlling the HPAI epidemic. Mass vaccinations free of charge in households started in June 2007. There are at least 21 imported vaccines used in Egypt including both H5N1 (Chinese strain) and H5N2 (Mexican strain) vaccines. No national vaccine production currently exists. The current government policy is to vaccinate poultry in backyard settings and to permit commercial companies to vaccinate their flocks with registered vaccines of their choice. Vaccine was used widely in the commercial sector and available data showed that this reduced disease and commercial losses in poultry, but vaccination campaigns in sectors 3 and backyard (sector 4) have had limited impact on

disease incidence, maybe due to difficulties in obtaining widespread vaccine coverage in backyard and small village farms and because of not well defined vaccine strategies. Absence of sustained surveillance in vaccinated flocks is another major limitation of the vaccination campaign. As part of SAIDR (Strengthening Avian Influenza Detection and Response) project, CIRAD (Centre de coopération internationale en recherche agronomique pour le développement) assisted in the assessment of the current vaccination strategy and other alternative strategies in collaboration with FAO and the Ministry of Agriculture and Land Reclamation (MALR). In particular, the final report will assess the feasibility of each of these alternative strategies from the economic, logistic and social points of view, and provide recommendations to select the best strategy.

Due to the continuous evolution of H5N1 which can lead to a virus-poultry vaccine mismatch or potentially lead to virus variants that may increase human disease incidence, the OFFLU team of FAO in collaboration with one of the laboratories of the network (USDA-ARS/SEPRL) and the Egyptian NLOP (the National governmental laboratory authorized for AI testing in Egypt of the MOLR) developed the Avian Influenza Vaccine Efficacy Project in Egypt (AIVEP). The aim of this project is to characterize the circulating H5N1 viral strains in Egypt and to evaluate the efficacy of current used vaccines against the identified strains. The two-year project includes capacity building as a major component. Intensified collection, characterization of AI viruses through genetic characterisation and antigenic mapping, and challenge tests will take place.

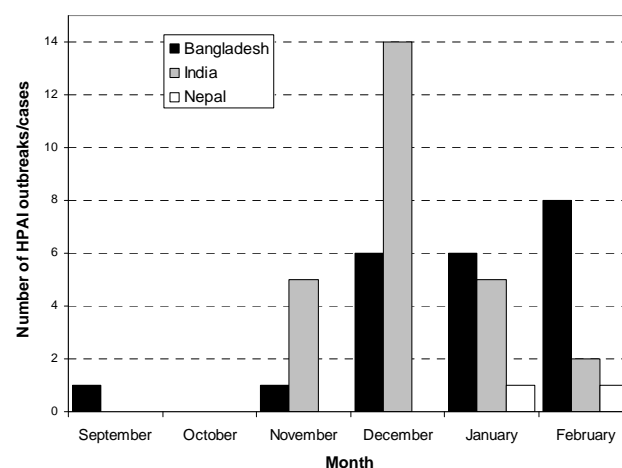
Three cases of H5N1 infection in humans were reported in February 2009: a 2-year old baby girl from Suez Governorate, an 18-month old baby boy from Minya Governorate, and a two-year old male from Fayoum Governorate. All had history of close contact with dead and sick poultry prior to becoming ill. Of the 56 cases confirmed until February 2009 in Egypt, 23 have been fatal. Remarkably, all cases recorded so far this year have been children under three years of age.

In **Togo**, no additional outbreaks of H5N1 HPAI have been reported since September 2008.

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 H5N1 HPAI outbreaks/cases in poultry/wild birds
between September 2008 and February 2009 in South Asia
(Source: FAO EMPRES-i)



In **Bangladesh**, eight H5N1 HPAI outbreaks were reported in Dinajpur, Thakurgaon, Manikganj (3), Gazipur, Narayanganj and Chittagong Districts. With H5N1 HPAI outbreaks reported almost every month since the first occurrence in February

2007, the status of the country is believed to be endemic. The government has prohibited poultry vaccination against H5N1 AI. As of 28 February 2008, a total of 307 outbreaks were recorded in 47 out of 64 districts in both commercial farms and backyard holdings. Over 1.6 million birds have been culled through 28 February 2009. FAO organized and supported active surveillance, which is currently conducted in 150 upazillas (sub-districts) across the country, including the innovative use of Short Message Service (SMS) gateway (=method of sending and receiving SMS messages between mobile phones and a computer) as a reporting tool when monitoring disease and death in poultry. Daily, some 1,200 SMS coded text messages were received at the Department of Livestock Services, which include negative as well as positive findings.

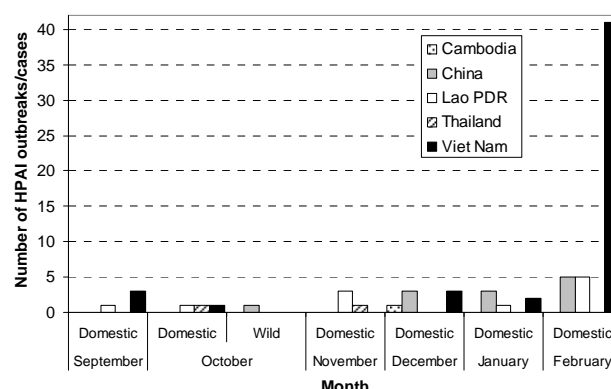
In **India**, two outbreaks were reported in West Bengal (Darjiling and Medinipur Districts). This new wave of outbreaks started in November 2008 (five outbreaks), when it had been over five months since the previously reported outbreak. During the period between 2 and 22 February 2009, 15,396 active surveillance samples were received at the High Security Animal Disease Laboratory (HSADL), Bhopal. Testing was completed on 15,444 samples and another 6,535 are pending. The [periodical reports](#) also include the number of samples received and tested per state. An Uttar Pradesh Wildlife Department project has collected about 240 samples so far 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](#). Samples are in the process of testing at the High Security Animal Disease Laboratory (HSADL). The project is to continue for a three-year period.

Nepal reported its second H5N1 HPAI outbreak, which killed 150 birds. It was declared by government on 20 February 2009 by the Shranamati Village Development Committee (VDC) of same district and lead to 2,558 chickens, 24 ducks, 54 pigeons and 264 eggs being destroyed on premises in the immediate vicinity of the infected premises judged as being at risk of infection. Measures taken have so far succeeded in containing the disease to one district (Jhapa). The major threat is to the intensive commercial production areas in the central region. Both H5N1 and H9N2 subtypes have been isolated by VLA (Veterinary Laboratory Agencies, Weybridge, UK). Co-infection by Newcastle disease virus and H9N2 AI virus was found in one sample. The haemagglutination (HA) gene from the virus isolated from the index case was sequenced at VLA, demonstrating ~99% similarity with publicly available sequences from contemporary viruses in Eastern Asia, including viruses originating from India and West Bengal. The Bird Flu Coordination Committee, Central Region, decided to strictly prohibit the supply of birds like ducks, pigeons, chickens and their eggs, which are brought from India through the Nepal-India border to Kathmandu on passenger buses and vehicles. Similarly, the committee decided to prohibit the local hens and roosters to be kept for sale at the weekly open markets that are organized in different districts of the Central Region. The committee likewise decided to render the animal quarantine check post set up along the East-West Mahendra Highway more effective by deploying the technical human resources and the police personnel.

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/wild birds between September 2008 and February 2009 in South East Asia (excluding Indonesia)
(Source: FAO EMPRES-i)



In **Cambodia**, after the human case and poultry outbreak reported in Kandal Province in December 2008, no additional H5N1 HPAI events have been reported. Cambodia regularly reports the results obtained from their surveillance activities through an animal health hotline at the National Veterinary Research Institute (NaVRI) that receives reports on suspicious cases from the field. During February 2009, NaVRI received seven calls reporting sick and dying poultry, and received seven samples of different types of sparrows collected by the Wildlife Conservation Society, all with negative results.

In **China**, a number of H5N1 positive poultry carcasses (four chickens and one duck) were found washed ashore in a beach in Lantau Island and in Tuen Mun, Hong Kong SAR, during the first week of February. There is still no official explanation for what may have caused this event, which started in January 2009. There are no poultry farms within 3 km of the area, so the government launched an investigation on the possible causes of the recent discovery of bird carcasses; whether illegal backyard poultry keeping is involved, or if prevailing water currents could have brought the carcasses from the mainland. It has been speculated that carcasses could come from China's Pearl River Delta, which flows out into the South China Sea surrounding Hong Kong SAR. Also, the carcasses of four wild birds (a crested myna, a large-billed crow, a peregrine falcon and a grey heron) found at different locations in Hong Kong, tested positive for H5N1. However, no live healthy positive wild birds were documented at the time of these outbreaks and Hong Kong University has tested 30,000 samples from healthy wild birds in the Deep Bay wetland, Mai Po Reserve since 2003, none which tested positive for H5N1.

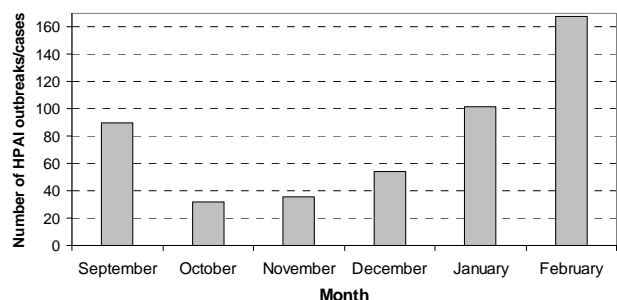
In mainland China, vaccination coverage officially reported is still very high (and higher than previous years) in all provinces. Mean vaccination coverage through September 2008 is reported to be higher for most provinces than for the same period in 2007. Additionally, all but two provinces, Xinjiang and Bingtuan, report 80% vaccination coverage or higher.

After the seven human cases reported during January 2009, no additional human cases were reported during February 2009.

Indonesia continues to report a high number of H5N1 HPAI outbreaks in poultry, as it has for the past three years. HPAI is endemic on Java, Sumatra, and Sulawesi islands with sporadic outbreaks reported from other areas. Incidence varies widely. Only two of its 33 provinces have not reported the occurrence of H5N1 HPAI. The high number of reported outbreaks each month is partially explained by the implementation of the 'participatory disease surveillance and

response' (PDSR)* programme that targets village-type poultry production systems (both backyard and small-scale intensive) and reports evidence of virus circulation in the village environment. The programme is supported by FAO with USAID financial support and is operating in 331/448 (74%) districts through 31 Local Disease Control Centres (LDCCs) in 31 out of 33 provinces in Java, Sumatra, Bali, Sulawesi and Kalimantan, including all known endemically infected areas. Larger, less densely-populated provinces report HPAI outbreaks more infrequently than more densely populated provinces. It appears that H5N1 HPAI is more sporadic in the smaller, more dispersed poultry populations.

FIGURE 9
Number of outbreaks of H5N1 HPAI
between September 2008 and February 2009 in Indonesia
(Source: FAO EMPRES-i)



During February 2009, PDSR officers visited 1,483 villages of which 204 (13.8%) were infected (this includes villages that were already infected during the previous month). This was noticeably higher than the January 2009 infection rate of 8.5%. During the previous 6 months, PDSR officers visited 20.2% of villages (11,345) in the 331 districts under PDSR surveillance. Since May 2008, they have visited 32.4% of villages in the areas covered by PDSR. An average of 6.4% of the villages visited during the previous 6 months were classified as infected at the time of visit. During February 2009, when compared to January 2009, an increased percentage of villages were classified as 'infected'. HPAI positive villages were reported in Bali for the first time since March 2008. Infected villages are reported throughout Java, mainly in East Java. South Sulawesi reported more infected villages than last month, while Kalimantan continues reporting no infection. Cases over the last 6 months were concentrated in Yogyakarta, Banten and Lampung.

A recent surveillance study reported on 4,067 captive, resident, and migratory birds comprising 98 species in 23 genera that were sampled between October 2006 and September 2007. The most commonly collected birds were the common sandpiper (6% of total), striated heron (3%), and the domestic chicken (14%). The overall prevalence of H5 antibodies was 5.3%. A significantly higher percentage of captive birds (16.1%) showed antibody evidence of H5(N1) exposure when compared to migratory or resident birds. The greatest number of seropositive birds in each category were Muscovy duck (captive), striated heron (resident), and the Pacific golden plover (migratory). Seven apparently healthy captive birds yielded molecular evidence of H5N1 infection. Phylogenetic analysis of the HA gene showed that the isolates were 97% similar to EU124153.1 A/chicken/West Java/Garut May 2006, an isolate obtained in a similar region of West Java. [Read the original paper.](#)

In February 2009, **Lao People's Democratic Republic**, H5N1 was diagnosed in five villages in Khoua District,

Phongsaly Province. This resulted in the establishment of three 1 km culling zones comprising of 11 villages, where a total of 2,662 poultry were culled. Compensation was paid at 60% of the market value (total amount, nearly USD 5,200) within four weeks, according to the National Compensation Guidelines. The outbreaks were reported by Village Veterinary Workers and were followed by immediate disease investigation efforts including sampling by district livestock staff.

In total, Lao People's Democratic Republic reported outbreaks in February 2008 (Luang Namtha, clade 2.3.4.), in August/September 2008 (Oudomxay and Luang Prabang, clade 2.3.2.), in November 2008 (Sayaboury, clade 2.3.2.) and in February 2009 (Phongsaly, sample about to be sent). We can conclude from this that the virus has been re-introduced in Oudomxay and since then, it has been circulating at low level (Sayaboury).

From 1 January 2009 to 28 February 2009, the National Animal Health Center of the Department of Livestock and Fisheries (NAHC / DLF) received the following notifications of sick or dead poultry: 36 through the hotline via the National Avian Human Influenza Coordination Office (NAHICO), and 168 directly from the provincial and district livestock offices (final data compiled for 7 provincial offices). Reports were followed by disease investigations, with samples taken for laboratory confirmation where necessary. From 1 January 2009 to 28 February 2009, the avian influenza laboratory of the NAHC / DLF tested a total of 29 poultry carcasses, 1,706 cloacal swabs and 1,723 sera. All collected samples, except those that identified the outbreaks in Phongsaly, have yielded negative results during these two months. Also from 1 January 2009 to 28 February 2009, active surveillance supported by FAO was conducted in 14 out of 17 provinces, in all registered or known commercial farms, and in 64 live bird markets. Additionally, a total of 352 villages were visited for clinical surveillance targeted activities. Samples were taken in villages where poultry mortality was observed or reported to have occurred during the preceding four weeks.

Thailand did not report any HPAI activity after the two outbreaks recorded in October and November 2008. From 10 November 2008 to 11 February 2009, the Department of Livestock Development (DLD) received 285 notifications of sick or dead poultry that fit the HPAI case definition. All reports were followed by prompt investigation. If necessary, additional samples were collected for laboratory confirmation. To present, there has been no laboratory evidence of HPAI. In terms of active surveillance, from 10 November 2008 to 11 February 2009, a total of 101,153 poultry premises were visited for clinical surveillance targeted activities. 205 poultry keepers (0.2%) reported their observations on poultry deaths. From these households/farms, 265 poultry carcasses and 15,304 cloacal swab samples (from totally 83,957 birds) were submitted to the DLD laboratories for diagnosis. All collected samples have yielded negative results thus far.

In **Viet Nam**, 41 HPAI outbreaks were reported in poultry (chickens, ducks and Muscovy ducks) during February 2009 in the following provinces: Bac Lieu, Bac Ninh, Ca Mau, Dien Bien, Hau Giang, Khanh Hoa, Nghe An, Ninh Binh, Quang Ninh, Quang Tri and Soc Trang. This compares to only two outbreaks the previous month, but this upsurge follows a similar pattern every year of increasing disease occurrence immediately before and after the Tet period in January/February and in its extent is no greater than previous years (Tet 2007: 91 outbreaks; Tet 2008: 79 outbreaks; Tet 2009: 43 outbreaks). Disease control measures include stamping out of infected farms, movement restrictions for 21 days, compensation (up to 70% of market value; about USD 1.3/bird) and vaccination. Vaccination is implemented throughout the country through two annual campaigns (March/April and October/November), but in some areas age-based vaccination is being applied. The vaccination strategy for 2009-10 has been announced with the continuation of two mass campaigns per year in high risk areas (main river

* PDSR case definition in Indonesia: When poultry mortality events are encountered in which more than one bird died suddenly, 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.

deltas) with cost recovery now being applied to small commercial flocks over 500 birds.

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 Chinese border and at markets near Hanoi on active surveillance samples). This pattern suggests periodic introduction of new virus into northern Viet Nam and occasional introduction into southern Viet Nam.

Regarding the clade 7 findings, 15 out of 495 chickens seized at the border with China (Lang Son Province) in the first five months of 2008 were positive for clade 7 H5N1 HPAI, which had not been found in an outbreak since the one in China's Shanxi province in 2006. The genetic distance between these clade 7 viruses and the isolates used to make vaccines raises doubt as to whether antibodies generated by the vaccines would protect against clade 7 viruses. It was recommended that intensive monitoring for antigenic variants should be conducted so that appropriate antigens could be used in vaccines.

Two new human cases were reported in February 2009 in Northern Viet Nam. The first was a 23-year old woman from Dam Ha District, Quang Ninh Province, who developed symptoms on 28 January 2009. The second was a 32-year old man from Kim Son District, Ninh Binh Province. These two cases had recent contact with sick poultry prior to the onset of illness and were both fatal. Of the 109 cases confirmed to date in Viet Nam, 54 have been fatal.

Europe

The last case or outbreak in Europe was reported in a wild duck shot in Bavaria, Germany. This was the first and, so far, only case of H5N1 infection in Europe in 2009. The last H5N1 HPAI outbreak in poultry was detected last October 2008 in a mixed poultry farm, also in Germany.

Non-infected countries

There have been no HPAI outbreaks in the **Pacific Community, Oceania, 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 the negative results obtained from their surveillance activities and suspected cases. **Bhutan** produces a [clinical surveillance report](#) weekly for each administrative level.

Iraq, where the last H5N1 HPAI outbreak was in February 2006, reported recent laboratory results of their surveillance activities for February 2009 for all governorates except Kurdistan Province, in the north of the country. All samples taken were negative for H5N1 [poultry farms (453), backyard poultry (1,608), game and wild birds (298), and markets and slaughterhouses (30)]. Poultry farms in Babel were found infected with a H9 low pathogenic strain of AI.

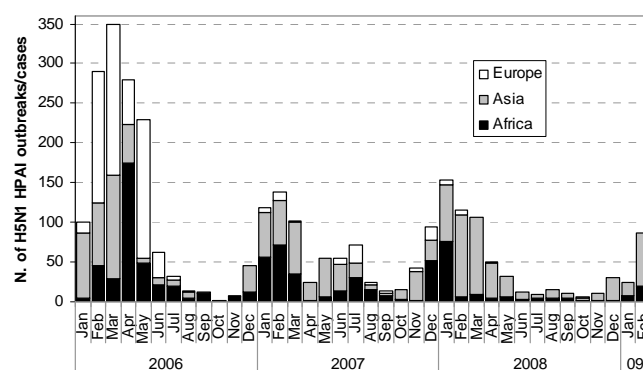
CONCLUSIONS

Since 2003, 62 countries/territories have experienced outbreaks of H5N1 HPAI. Effective control measures for outbreaks in poultry have been associated with reduced risk 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 proven by the five human cases reported this month in two countries considered endemic.

Data from previous years have shown a peak in the number of outbreaks/cases during the January-March period in both

poultry outbreaks (Figure 12) and human cases (Figure 5). In fact, February 2009 represents a peak in this period.

FIGURE 10
Number of H5N1 HPAI outbreaks/cases by continent
since January 2006
(Source: FAO EMPRES-i)



It is difficult to undertake thorough epidemiological analysis of the situation of HPAI globally, based only on official disease reporting and the poor disease outbreak investigations carried out in some affected countries. HPAI prevalence and incidence are likely much greater. A number of countries that had not reported HPAI activity for some time have faced outbreaks in the last few months. That is the case of Cambodia, China, India and Thailand. It remains unknown whether these new cases are because of (a) a re-introduction of the infection, or (b) if the virus was circulating at low level.

February 2009 showed a similar activity when compared to February 2008 both in terms of affected countries (8 vs. 11 - Figure 11) and the number of outbreaks (86 vs. 116 - Figure 12). When compared to February 2006 and 2007, however, HPAI activity seems to be much lower in February 2009. February 2006 experienced a particularly high activity (33 countries reporting 292 outbreaks/cases), reflecting when the panzootic was spreading across Europe. Although there has been an improvement in disease awareness, outbreaks/cases of HPAI are likely still under-estimated and under-reported in many countries and regions because of limitations in the capacity of veterinary services to implement adequate and effective disease surveillance for HPAI, and because of the weakness in compensation schemes.

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

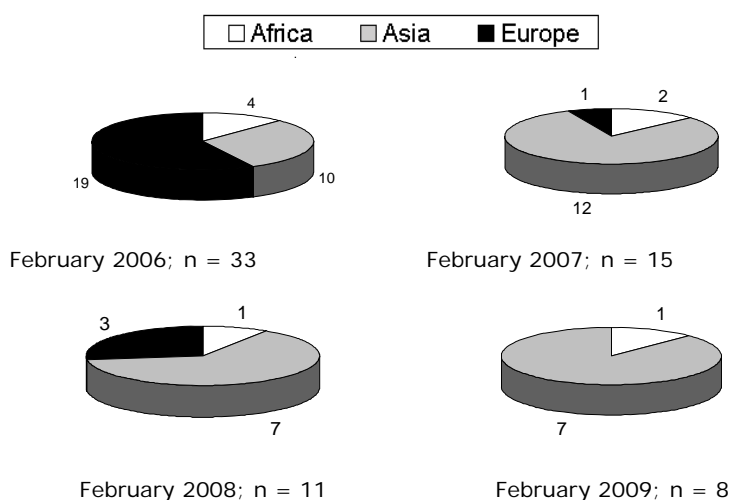
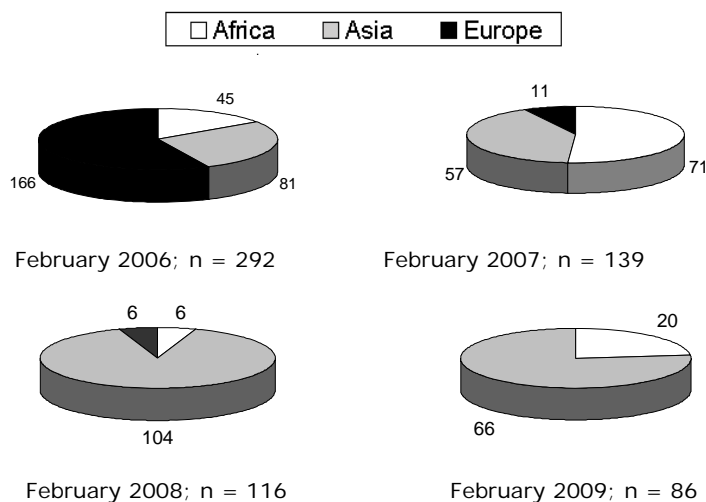


FIGURE 12

Number and distribution of H5N1 HPAI outbreaks/cases by continent in February 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)



A recent paper reports on the phylogenetic analysis done on African H5N1 HPAI isolates from the 11 countries affected from its emergence in Nigeria in early 2006 to early 2008. The research group generated 494 full gene sequences from 67 African isolates and applied molecular analysis tools to a total of 1,152 A/H5N1 sequences obtained from viruses isolated in Africa, Europe and the Middle East between 2006 and early 2008. Detailed phylogenetic analyses of the eight gene viral segments confirmed that three distinct sub-lineages were introduced that persisted and spread across the continent over this two-year period. Additionally, the molecular epidemiological studies highlighted the association between genetic clustering and area of origin in a majority of cases. Molecular signatures unique to strains isolated in selected areas also gave a clearer picture of the spread of A/H5N1 viruses across the continent. Mutations described as typical of human influenza viruses in the genes coding for internal proteins or associated with host adaptation and increased resistance to antiviral drugs have also been detected. These findings raise concern for the possible human health risk presented by viruses with these genetic properties and highlight the need for increased efforts to monitor the evolution of H5N1 viruses across the Africa. The paper is available at <http://www.ncbi.nlm.nih.gov/pubmed/18387755>. An animated map showing the evolution of outbreaks over the last six months including February 2009 is available at: www.fao.org/ag/againfo/programmes/en/empres/maps.html.

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