

## SUMMARY

Since 2003, H5N1 has killed or forced the culling of more than 400 million domestic poultry and caused an estimated US\$20 billion in economic damage across the globe before it was eliminated from most of the 63 countries infected at its peak in 2006. The H5N1 HPAI virus remains endemic in six nations. The number of outbreaks in domestic poultry and wild bird populations shrank steadily from 2003 to mid-2008. The number of outbreaks rose progressively from mid-2008 to mid-2011 but has decreased since then (See Figure 2b).

During the reporting period, there were 164 domestic poultry outbreaks reported from ten (10) countries/territories (Bangladesh, Bhutan, China (including Hong Kong), Egypt, India, Indonesia, Israel, Myanmar, Nepal, and Viet Nam), twenty-two (22) confirmed reports of human cases in six countries (Bangladesh, Cambodia, China, Egypt, Indonesia and Viet Nam) and eighteen (18) confirmed wild bird events in China (Hong Kong), India and Nepal.

The period January to March is generally considered the peak of the H5N1 HPAI season, when outbreak numbers increase following an active period of disease events/reports (October to December). Although there was a small increase in the number of outbreaks reported during the first quarter of 2012 compared to the last quarter of 2011 (153 to 182), the number of countries reporting remained the same. In addition, the number of outbreaks recorded during this period represents a six-fold decrease in the number observed during the first quarter of 2011 (See Figure 1b; 3). This reduction may be due in part to the lower reporting numbers from Egypt and Indonesia, as well as a lack of reports from countries where the disease has occurred sporadically like Japan and the Democratic People's Republic of Korea.

Since 2003, 63 countries/territories have experienced outbreaks of H5N1 HPAI. The last newly infected country was Bhutan in February 2010 (Figure 2b). Effective control measures for outbreaks in poultry have been associated with a reduced incidence of human infections in several countries. Even if the apparent decrease in outbreak numbers in poultry (Figure 1b, Figure 2) during the H5N1 HPAI active periods (January to March) for the last three years (2009 to 2012) has resulted in a reduced risk for human infections in affected countries, the fact that the number of countries reporting has remained constant during this period shows there is a continued risk although at a lower level. The H5N1 virus has infected 602 people since it first appeared in 2003, killing 355 of them, according to WHO figures. The latest countries with reported human deaths in March include Bangladesh, Viet Nam, Egypt and Indonesia. Given the continued reports of human infection, there is a need to identify the drivers or factors responsible for the H5N1 HPAI virus evolution in particular in endemic settings such as China, Viet Nam, Egypt and Indonesia.

Although H5N1 HPAI continues to be a global threat for poultry and humans, most countries rely on passive surveillance based on the reporting of clinical cases in poultry. As a result, outbreak information is underreported. Active surveillance in poultry and wild bird species therefore needs to be maintained by governments in endemic countries and countries at risk globally.

The confirmation of clade 2.3.2 in wild birds particularly crows in India and the first confirmation in poultry in Bhutan during this quarter provides some evidence that this virus is continuing to spread. Virus clade 2.3.2 may continue to expand its geographic range from South East Asia to other regions.

## WORLDWIDE SITUATION: OBSERVED TRENDS

Over the last three months (January to March 2012), 164 H5N1 HPAI outbreaks in poultry were reported officially from the following countries: Bangladesh, Bhutan, China (including Hong Kong), Egypt, India, Indonesia, Israel, Myanmar, Nepal, and Viet Nam. Eighteen wild bird events were reported during the same period in China (Hong Kong), India and Nepal (Figure 1). Analysis and interpretation of the HPAI data, as presented in this report, obtained through official reports is limited as the data on outbreaks in many endemic countries is incomplete. A number of endemic countries are currently implementing active surveillance for H5N1 HPAI with assistance from FAO, the outputs of which are considered essential to understand the dynamics of H5N1 outbreaks in those endemic areas and consequent risks to poultry and humans. Reporting of sick poultry is masked in some countries using vaccination against H5N1 HPAI as part of disease control strategies (China, Viet Nam and Egypt) and with little information on the disease situation in the commercial poultry sector.

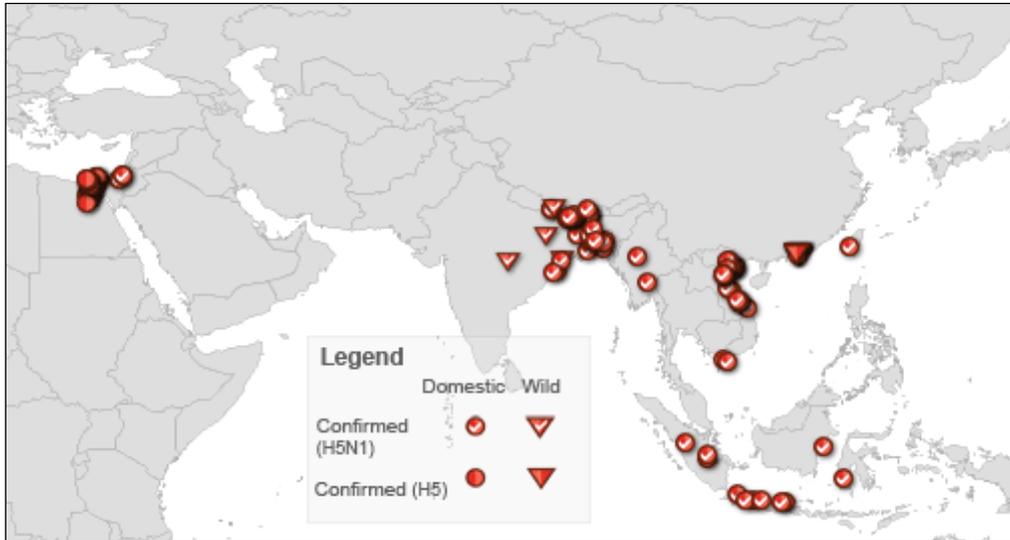
Since early 2011, a number of countries in Asia have experienced new virus introductions, particularly of virus clade 2.3.2.1, which in most cases wild birds were implicated. These include India, the Republic of Korea, Japan, Myanmar and Nepal. Bhutan has reported this clade for the first time during this reporting period in poultry. Of those countries experiencing new virus introductions in 2011, Japan and the Republic of Korea have not reported outbreaks this quarter, having apparently eliminated the virus by applying stamping out policies. Bangladesh, which experienced a new introduction of virus clade 2.3.2.1 in 2010, has had continued reports of outbreaks during all four quarters of 2011 and the first quarter of 2012, with apparent spillover to poultry in India, as suggested by similarities in the genetic characteristics of viruses involved in both countries. India reported three events in wild birds as well as six events in poultry during this period. Indonesia, Viet Nam and Egypt, where the disease is considered endemic, continued to report outbreaks in poultry with no new virus introductions. Confirmation of clade 2.3.2 in Nepal during the last quarter of 2011, two years since the last outbreaks, implies continued risk for poultry in the South Asia region. Clade 1.1 viruses, which evolved from Clade 1, continue to circulate in the lower Mekong. Clade 2.1 variants, both in Indonesia and in new viruses introduced to Viet Nam, are now the dominant strains, replacing Clade 2.3.4. Virus clade 2.3.2 in its various forms is now considered the dominant type in China, although Clade 2.3.4 has not disappeared. However, the available information on virus clade distribution should be interpreted carefully, since this may not represent the true distribution of clades in poultry populations globally. This is because affected countries only send a portion of positive samples to reference laboratories for clade identification.

**FIGURE 1**

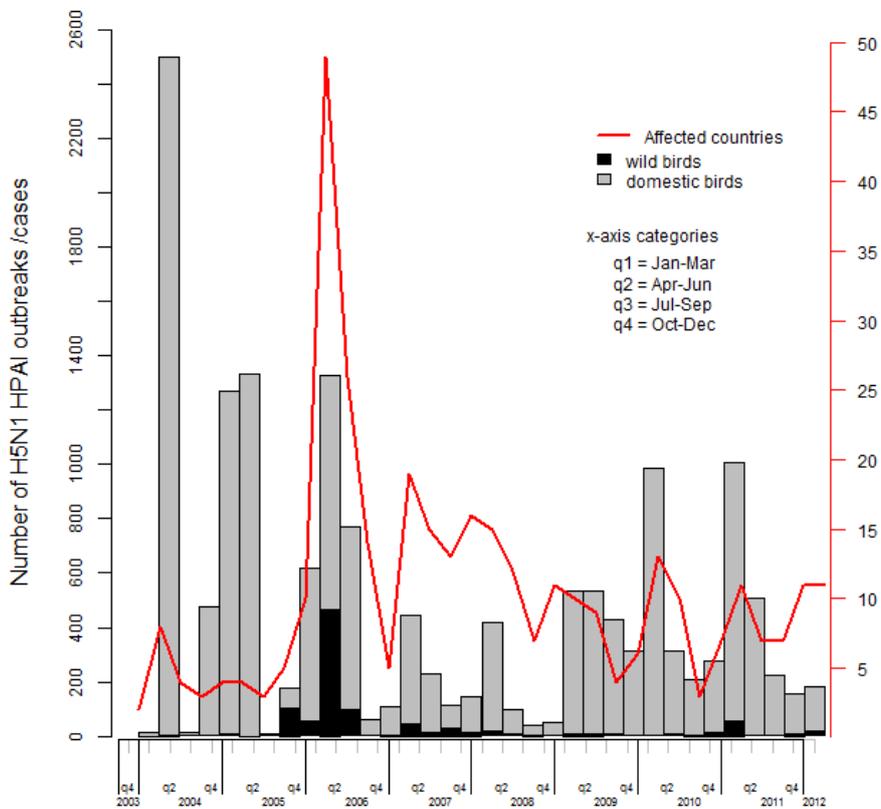
(a) Map showing the location of H5N1 HPAI outbreaks/cases in poultry, H5 and H5N1 infection in wild birds reported between January to March 2012, (b) Bar chart of H5N1 HPAI outbreaks/cases in poultry and H5 and H5N1 infection in wild birds reported per quarter between 2003 to 2012; line graph showing the number of countries reporting per quarter for the same period.

(Source: FAO EMPRES-i, OIE WAHIS)

(a)



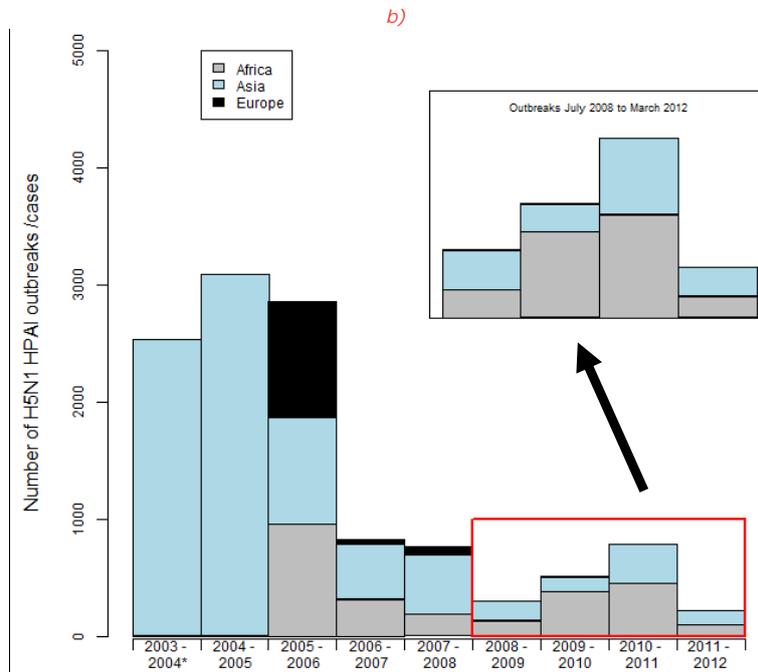
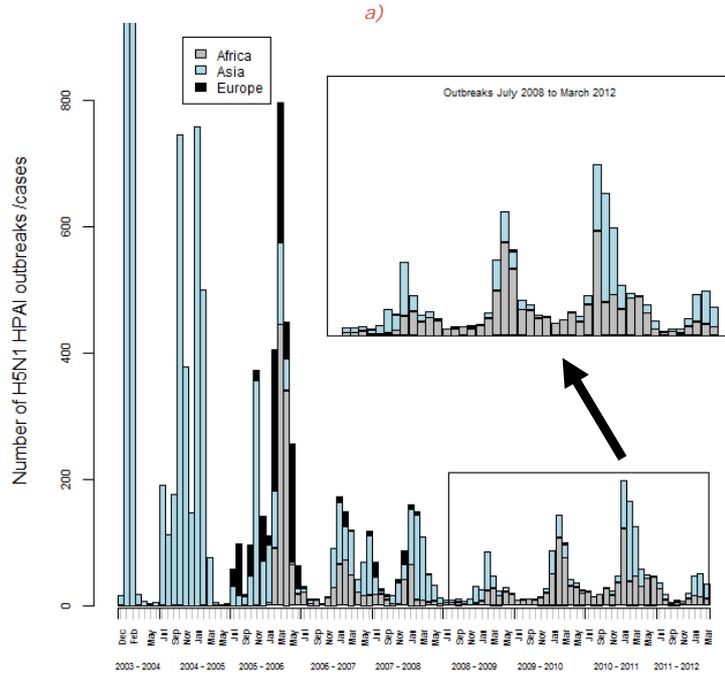
(b)



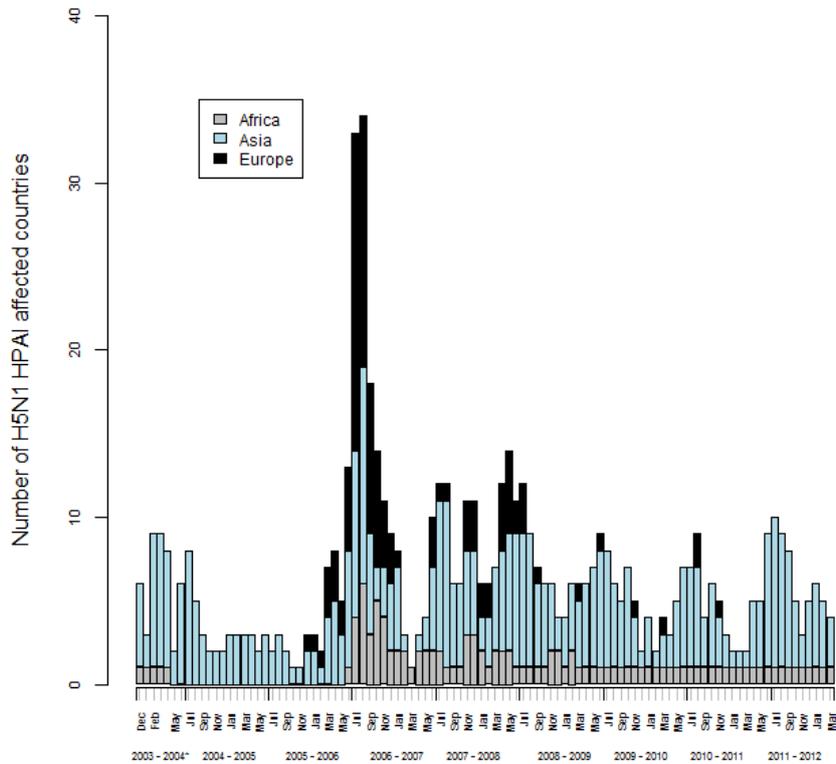
**Figure 2**

Epidemic curve showing: (a) the monthly and, (b) annual number of H5N1 HPAI outbreaks/cases reported between December 2003 and March 2012 classified by continent

(Source: FAO EMPRES-i, OIE WAHIS; Note 1: Indonesia data are not included in this graph, because the epidemiological unit definition for the PDSR data was modified from household level to village level in May 2008 and is not comparable to global HPAI data); Note 2: \* 2009 – 2010 refers to the period 1 July 2010 to 30 June 2011; Note 3: Months with more than 800 outbreaks have been truncated so the rest of the graph is not distorted). The insert in figure 2a and 2b highlights outbreaks from July 2008 to March 2012. Data for H5N1 HPAI from Indonesia is displayed in figure 7.)



**FIGURE 3**  
 (a) Number of countries that reported H5N1 HPAI outbreaks since December 2003 by continent, month and year  
 (Source: FAO EMPRES-i, OIE WAHIS)



**SITUATION BY CONTINENT/REGION**

**Africa**

During this period, **Egypt** reported 39 outbreaks in poultry from thirteen (13) governorates, mostly from the household sector (30 out of 39; Figure 4). These occurred mostly in non-vaccinated flocks while 8 out of 39 outbreaks were confirmed invaccinated commercial flocks. Of the 30 outbreaks reported in the household sector, 19 were detected by Community-based Animal Health Outreach (CAHO) practitioners. The CAHO teams operate in high-risk governorates and collect samples only from suspected HPAI cases. Of the 1500 samples collected as part of a regular pre-movement testing from commercial poultry farms, only one was confirmed positive.

In addition, a total of 185 commercial poultry farms were subject to ongoing active surveillance activities and only 6 tested positive for H5 HPAI infection. Active surveillance was also carried out in 136 villages in the household poultry sector and 28 samples (from 10 governorates) confirmed positive for H5 HPAI. Only 2 out of 17 suspected outbreaks of H5 HPAI notified from commercial farms were confirmed positive. By contrast, there were seven (7) suspected outbreaks notified from the household sector with two of these confirmed positive. During the reporting period, no samples were collected from road check points and Live Bird Markets (LBMs). Seventy-six (76) samples tested from commercial farms in (13) governorates were confirmed positive for low pathogenic H9 influenza virus.

Eight human avian influenza (AI) type A H5N1 cases were confirmed during the three-month period, of which four were fatal. This brings the total number of A H5N1 confirmed human cases in Egypt since 2006 to 166, with 59 fatalities (CFR=36%). While most cases reported in 2009 were in children under four years of age, in 2010 and 2011, 75% of confirmed human infections occurred in patients above that age. The CFR in 2011 is lower than the one reported in 2010 (38% vs. 45%), but higher than that reported in 2009 (10%).

Generally, due partly to the prevailing civil unrest, HPAI surveillance activities showed an apparent decline during 2011. Any inferences that could be drawn from the above stated figures thus need to consider the socio-political dimensions and animal health activities on the ground.

Egypt first reported outbreaks of H5N1 HPAI in poultry in February 2006. Despite a vigorous initial response to the disease, including the culling of over 40 million birds, Egypt is considered an endemic country where outbreaks are regularly reported from different governorates. Circulating viruses belong to Clade 2.2.1 and cluster in two major genetic groups, indicating that there have been no new introductions of H5N1 viruses since 2006. The work on gene sequencing indicates that currently there are two major groups of A/H5N1 viruses: i) The group which is closely related to the originally introduced viruses and is circulating mainly in household poultry flocks; and ii) the variant group that emerged in late 2007 and which is circulating mainly in commercial poultry farms. In 2010, the latter (variant) group has been further divided into two minor subgroups (1 and 2). A new clade nomenclature for avian influenza viruses has

indicated the continued presence of Clade 2.2.1.1 in the commercial poultry sector, implying further evolution of clade 2.2.1 in Egypt.

([http://www.who.int/influenza/resources/documents/2011\\_09\\_h5\\_h9\\_vaccinevirusupdate.pdf](http://www.who.int/influenza/resources/documents/2011_09_h5_h9_vaccinevirusupdate.pdf)).

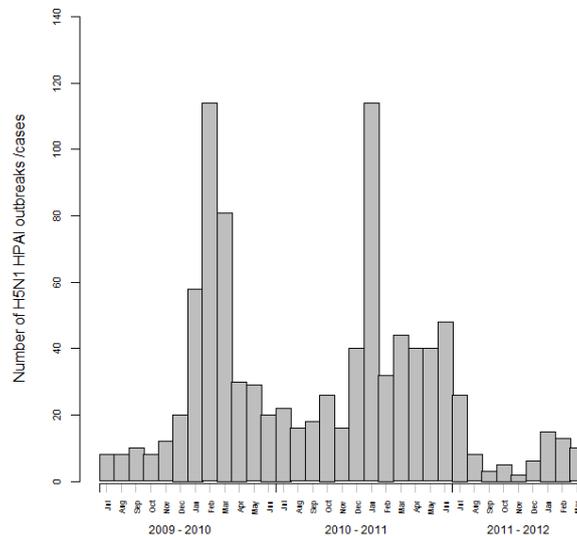
### South Asia

In January, February and March 2011, **Bangladesh** experienced twenty outbreaks of H5N1 HPAI in poultry. Virus clades from outbreaks during 2011 belonged to clade 2.3.2.1 and 2.2.2 whilst isolates from the 2010 outbreaks belonged to Clade 2.2, sublineage III and clustered with sequences of viruses from Bangladesh isolated from 2007 to 2009. This provides supporting evidence that the same virus is being maintained unnoticed within the country. However, a new incursion of clade 2.3.2.1 was confirmed for the first time in Bangladesh in crows and chickens in January and February

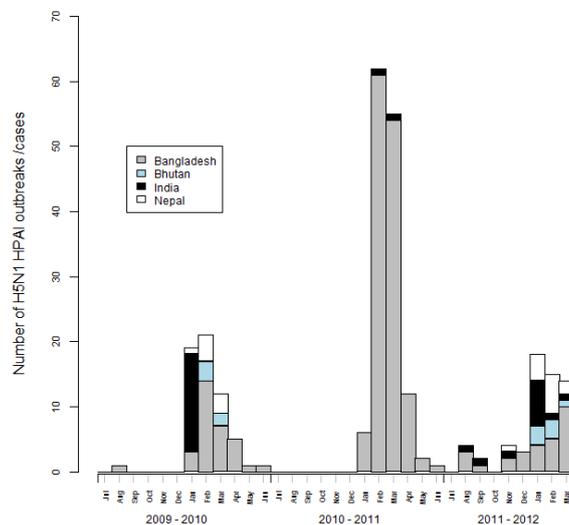
2011, and this is now the dominant strain with spillover into India. Clade 2.3.4 was identified from poultry in February 2011 in Potiya Upazila, Chittagong District.

The emphasis of the current policy of the government is placed on early detection and containment by culling, as well as the improvement of biosecurity in various production sectors. Poultry vaccination against H5N1 HPAI is officially prohibited. Over 2.4 million birds have been culled and over 3.1 million eggs destroyed since 2007. FAO is coordinating and supporting active surveillance that has been expanded to 306 upazilas (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 central server) as a reporting tool. As of 31 March 2012, a total of 524 outbreaks were recorded in 52 out of 64 districts and most outbreaks were in commercial poultry farms.

**Figure 4**  
H5N1 HPAI outbreaks in poultry in Egypt between June 2009 and Egypt 2012  
(Source: FAO EMPRES-i; \* 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)



**Figure 5**  
H5N1 HPAI outbreaks/cases reported in poultry, H5 and H5N1 infection in wild birds in South Asia, by country, between July 2009 and March 2012  
(Source: FAO EMPRES-i; \* 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)



In **Bhutan**, Between January and March 2012, eight outbreaks due to H5N1 HPAI were reported in backyard farms located in the districts of Thimphu, Chhukha and Mongar. All affected villages were located along the main national highway between Phuentsholing and Thimphu and include . Preliminary laboratory results have identified the virus clade involved in the outbreaks as clade 2.3.2.1. This is the first report of this clade in Bhutan. The clade involved in the outbreak in February 2010 was clade 2.2.

Another outbreak in one backyard farm was also detected during late December 2011 adjacent to national highway in Tshimasham in Chukaha district. This outbreak was confirmed in January 2012 by the National Veterinary Referral Laboratory at National Centre for Animal Health (NCAH) in Bhutan and the High Security Animal Disease Laboratory (HSADL), Bhopal, India.

Culling and other control measures were immediately implemented following the National Influenza Pandemic Preparedness Plan (NIPPP) guidelines and SOPs.

**India** has officially confirmed six H5N1 outbreaks in poultry and three wild bird events during the first quarter of 2012. Poultry outbreaks were detected in chickens located within large state and research farms in the states of Odisha, Meghalaya, Tripura and in backyard birds in the state of Odisha. Crow mortalities (first identified during the last quarter of 2011 in the State of Jharkhand associated with the death of 1,143 crows) were officially reported from the states of Bihar, Maharashtra and Orissa. The HPAI H5N1 virus was isolated from three states (Odisha, Bihar, Jharkhand and Maharashtra) where crow mortalities were reported. Further investigation is underway and official confirmation of the virus clade(s) involved in outbreaks during the period January to March 2012 is pending. The outbreaks in state and research (parent stock) farms were not associated with disease in backyard poultry as there were no confirmation of infection in nearby households. The absence of reports of disease in backyard poultry suggests that outbreak detection in this sector is poor. The occurrence of disease in state and research farms indicates that biosecurity measures are insufficient. Although these outbreaks appear to be isolated sporadic incidents, their frequency and widespread nature, and the detection of infection in crows suggests that areas of India are endemically infected. Continuing outbreaks of disease should be expected. The ongoing threat to human health must be mitigated by active extension and awareness campaigns.

Samples from suspected outbreaks of HPAI are sent to the High Security Animal Disease Laboratory (HSADL), Bhopal for parallel testing by conventional and real time PCR and virus isolation. Virus isolation is required to confirm an outbreak in a 'new' area. Official confirmation is made by the central government Department of Animal Husbandry Dairying and Fisheries (DADF) of the Ministry of Agriculture. HSADL carries out virus characterisation – sequencing (full or in part) pathogenicity and antigenicity testing.

In response to confirmed outbreaks, the Government implements a number of measures including: movement control, 3km culling zone of any remaining poultry and disposal, followed by cleaning and disinfection; restocking is not allowed for at least three months and usually sentinel stock are introduced for a period. Approximately 55,870 birds were culled in response to outbreaks during this quarter.

Sero-surveillance activities conducted at HSADL are periodically reported by the government on

<http://www.dahd.nic.in/>, including the number of samples received and tested per state.

The Ministry of Environment and Forests of the Government of India and the Department of Wildlife and Forests of Uttar Pradesh are continuously funding the sampling of wild water birds. Laboratory results are pending.

FAO facilitated a migratory waterfowl satellite tracking project in January 2010 and the flight paths can be found at (<http://www.werc.usgs.gov/Project.aspx?ProjectID=60>).

**Nepal** reported 11 outbreaks of H5N1 HPAI in poultry and one event in wild birds (crows) during the reporting period. This follows one report of H5N1 HPAI in poultry in November, two years after the last confirmed report. The clade of the virus involved in the outbreak in November is 2.3.2.1. Phylogenetic analyses of virus isolates from previous outbreaks have identified the involvement of clades 2.2 and 2.3.2.

### **South East and East Asia**

There were no poultry outbreaks and two human cases of H5N1 HPAI reported in **Cambodia** during the three months reporting period. The two human cases were reported in January and March in Banteay Meanchey Province and Kampong Chhnang Province, respectively. Both cases were children who had a history of contact with poultry.

The last outbreak in poultry was reported in October 2011 in a broiler farm in the northwest of Cambodia on the Thailand border. The virus clade involved in the last outbreak is currently unknown. All available human and animal isolates since 2004, including all those from 2010 and the first two quarters of 2011, are Clade 1.1 and are most closely related to Clade 1 viruses previously circulating in Cambodia. This is also the same virus clade which circulates predominantly in southern Viet Nam, which could be explained by transboundary movement of animals and animal products between these two countries.

Cambodia routinely reports results obtained from surveillance activities through two hotlines (supported by FAO until February 2010) at the National Veterinary Research Institute (NaVRI). Joint FAO, NaVRI and IPC environmental surveillance was implemented in four markets during the Khmer New Year period. Eighteen percent (18%) of samples collected during the study period tested positive for H5N1 by PCR. Though only two percent (2%) of environmental samples tested resulted in the isolation of infectious viral particles, these provided sufficient virus for the full sequencing and identification of a number of virus strains/groups. Phylogenetic analysis of the viruses isolated from study markets provides additional insights into virus circulation. The results show evidence of co-circulation of viruses originating from different flocks within markets. In addition, there was evidence that some viruses circulated for a long period of time (6 weeks) and that at least one of the virus groups isolated from markets was similar to virus isolates which caused the death of two children in 2011. Interestingly, all the strains detected in markets during the study period belonged to the Cambodian endemic lineage, which suggests that the viruses detected were most probably originating from poultry that were raised in Cambodia.

**Myanmar** reported two outbreaks during the three months period, one in February and the other one in March, in distant areas with no obvious epidemiological connection. The first outbreak was observed in the Sagaing Region in the north/central area in two small-scale layer farms while the second was observed in one layer farm in the Bago Region in

the south/central area of the country. Investigations into the first outbreak found in addition to the 1400 birds affected, affected backyard chickens in four surrounding villages, each with a history of undiagnosed mortalities. Outbreaks in poultry during the first quarter of 2011 were associated with virus clades 2.3.2 and 2.3.4.

In **China**, an outbreak of HPAI H5N1 was reported in a poultry farm in Yunnan in March. This outbreak resulted in the subsequent destruction of all susceptible birds ( $n = 35018$ ) on the farm. In **Hong Kong SAR**, H5N1 virus positive house crow ( $n=1$ ) and geese carcasses ( $n=1$ ) were found in January and March. Fourteen cases of H5N1 HPAI in wild birds were reported in various locations during this quarter. Affected wild bird species include oriental magpie robin, peregrine falcon, black-headed gull, crested goshawk, grey heron and little egret.

China has an ongoing active surveillance programme in live bird markets at national and provincial levels conducted during specific time periods each year, the result of which are periodically published in the Official Veterinary Bulletin. Information is not yet available for the first quarter of 2012, but the results of activities conducted during 2011 have identified a number of virus positive provinces in the absence of outbreak reports. These include Chongqing, Guangdong, Guangxi, Hubei, Hunan, Fujian and Zhejiang provinces.

On 24 January, 2011, a 39-year-old male from Guiyan City, Guizhou Province was confirmed as H5N1 positive, and died of multiple organ failure on 22 January 2012. Up to present, China has reported 412 human cases, of which 28 (66%) were fatal, since the beginning of the epidemic.

The recent HPAI positive events in wild birds and poultry carcasses are associated with clade 2.3.2.1. The study by Kou et al. (2009) provides some information on virus clades isolated from wild birds in China between April 2004 and August 2007, which can be found at <http://www.plosone.org/article/info:doi%2F10.1371%2Fjournal.pone.0006926>

In **Lao People's Democratic Republic (Lao PDR)**, no HPAI events have been reported since the last outbreak was observed in April/May 2010 in a commercial layer farm in Vientiane, the capital. In 2011, an active surveillance programme was carried out in 10 provinces (selected on the basis of historical H5N1 HPAI outbreaks) in ducks in live bird markets, and villages and farms with high concentrations of ducks for active infection and historical exposure. A total of 33 markets, 40 villages and 19 farms were visited during two rounds of samplings undertaken during March and June 2011. During the first and second rounds, 2 027 and 1 915 cloacal swab samples, 1 047 and 973 environmental swab samples and 2 005 and 1 873 serum samples were collected, respectively. From all the samples taken, four (0.19%) cloacal swab samples taken from healthy ducks at a market in Vientiane tested positive for influenza type A by real-time RT-PCR, and of these one (1) was positive for H5 subtype by real-time RT-PCR. The remaining three samples had unclear results for H5. Of the four positive swab samples sent for further testing, two yielded virus isolates of H5N1 HPAI, clade 2.3.2.1, and similar to virus isolates from China (2010) and Viet Nam (2011). Of the sera samples tested, 221 (11.02% of 2005) and 157 (8.38% of 1873) were positive for avian influenza type A by ELISA. Further laboratory test results for these two rounds are pending.

**Indonesia** continues to report a high proportion of H5N1 HPAI outbreaks in poultry compared to the rest of the world (Figure 7). Reported outbreak numbers are lower compared with the same period in previous years. This may be due not

only to a decline in outbreaks but also to a decline in surveillance activities over recent months. H5N1 HPAI Clade 2.1 is confirmed to be endemic on the islands of Java, Sumatra and Sulawesi, and probably Bali, with sporadic outbreaks reported elsewhere. H5N1 HPAI prevalence by village varies widely. Only one of Indonesia's 33 provinces has 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 village poultry. The programme is supported by FAO with USAID and AusAID financial support and is operating in 385 of 496 (77%) districts through 33 Local Disease Control Centres (LDCCs) in 29 (88%) of 33 provinces in Java, Sumatra, Bali, Sulawesi and Kalimantan, including all known endemic areas; however, the quality and intensity of surveillance is not the same in all districts. Larger and less densely-populated provinces report H5N1 HPAI outbreaks less often than more densely populated provinces.

During January 2012 PDSR officers visited 1,027 villages, of which 47 (4.6%) were infected. Of these, 42 were new infections. In February 2012, PDSR officers visited 1,261 villages, of which 53 (4.2%) were infected. Of these, 50 were new infections. During the previous 12 months (January 2011 to January 2012), 15 406 (21.3%) of 72,255 villages were visited in the 385 PDSR surveillance districts. Since August 2008, PDSR officers have visited approximately 60,0 % of villages under coverage. Approximately 7.8 % of villages visited during the previous 12 months were classified as newly infected. Cases over the past 12 months were concentrated in Sumatra, Java, Bali and Sulawesi.

In **Mongolia**, no H5N1 HPAI events were reported during the January to March 2011 period. One wild bird AI event was previously reported in April 2011 in whooper swans (*Cygnus cygnus*) at Zegst Lake. The clade information of this event in wild birds is unknown. Phylogenetic analyses of the 2010 wild bird isolates placed them in the 2.3.2 Clade.

The **Republic of Korea** reported no outbreaks or events in domestic poultry or wild birds during this period. Previous detection of domestic and wild bird HPAI events occurred in November 2010 and March 2011. Viruses involved in the 2010 and 2011 poultry outbreaks and wild bird events were clade 2.3.2.

In **Viet Nam**, during the three months reporting period, the Department of Animal Health officially reported 20 HPAI outbreaks in chickens, ducks and pigeons in north, central and southern provinces ( $n=13$ ). See Figure 8.

Additionally, there were four (4) human cases during this period in Soc Trang, Bing Duong, Kien Giang and Dak Lak Provinces, all in south Viet Nam. Two out of four (4) survived and all the cases had exposure associated with slaughtering sick chickens or consuming dead and/or sick chickens. Three were males and one (1) female and ranged from 18 to 31 years of age.

Disease control measures include stamping out on infected farms, movement restrictions for 21 days and compensation. Since 2011, Viet Nam has temporarily halted government-sponsored vaccination in north and central Viet Nam in response to the emergence of a new clade of H5N1 virus, when the vaccine in use was found to be ineffective against a particular virus strain within the predominant clade 2.3.2.1 circulating in the north. However, vaccination occurs in the south and an emergency stock of vaccine for ring vaccination is maintained for use in the country.

Surveillance and molecular genetics have indicated the presence of four circulating virus clades in Viet Nam since 2003. These are: (1) Clade 1 (predominant in southern Viet Nam from 2004 until now) (2) Clade 2.3.4 (predominant in northern Viet Nam from 2007 to the first half of 2010); (3) Clade 7 (detected in poultry seized at the Chinese border and at markets near Hanoi in 2008); and (4) Clade 2.3.2 (detected in 2005 for the first time and reappeared in late 2009). Virus clade 2.3.2.1 has become predominant in the north Viet Nam since late 2010 until now. It was also detected in the south-central area of Viet Nam. In a vaccine efficacy trial, it was observed that the current vaccines in use in Viet Nam provided poor protection against one particular virus strain within virus clade 2.3.2.1. This virus strain forms a distinct cluster from most of the other virus strains of clade 2.3.2.1. in the Hemagglutinin (HA) gene phylogeny. This strain has been detected in seven northern provinces of Viet Nam in 2011-12.

Surveillance to assess the prevalence of sub-clinical infection of highly pathogenic avian influenza (HPAI) H5N1 in ducks was carried out from September 2011 to February 2012. Oropharyngeal swabs were taken monthly from ducks at 250 live bird markets in 30 high-risk provinces in the country. In total, 20,000 individual swab samples were collected. Preliminary results suggest that HPAI H5N1 is spatially and temporally distributed in ducks entering markets across the provinces sampled (13 out of 30) in southern Viet Nam. This further supports previous studies and provides more objective evidence of the endemic situation in the south of Viet Nam.

### **Middle East**

In **Israel**, two new outbreaks of H5N1 HPAI were reported during the period January to March 2012 in poultry and one isolation of the virus in eight cats. The poultry outbreaks and cases in cats were located in HaDarom district. The cats were seen eating H5N1 infected carcasses of turkeys on one of the two infected farms in the HaDarom district. The cats demonstrated clinical signs about one week after the H5N1 outbreak was identified. The last H5N1 HPAI outbreaks occurred in March 2011 in poultry and were associated with clade 2.2.1 virus isolates. The last positive H5N1 HPAI finding prior to this was in April 2010, when two emus at a mini-zoo of a kibbutz in HaDarom tested positive. Sequence data available within Genbank for a virus isolated from an earlier outbreak in breeder pullets in Haifa in January 2010 indicated that the virus was closely related to viruses of clade 2.2 from Egypt. This could indicate informal trade across borders of live poultry and products is an important means of HPAI incursion in Israel.

No new outbreaks of H5N1 HPAI were reported in **West Bank and Gaza Strip** in the January to March 2012 period. Previous HPAI events occurred in poultry and wild birds in March and April 2011, respectively. The previous outbreak in domestic poultry was associated with virus clade 2.2.1.

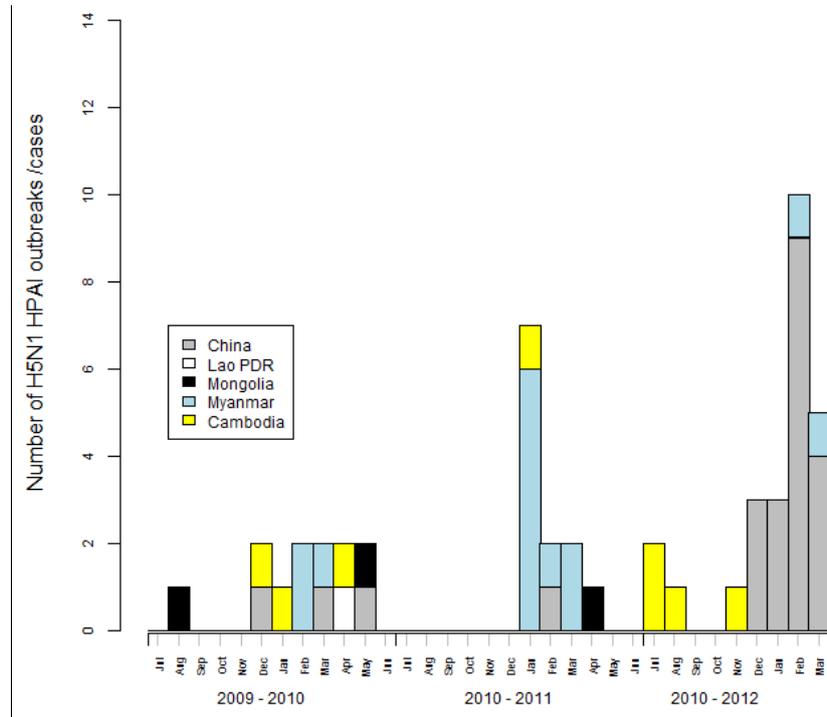
**Iran**, there were no new outbreaks reported during this period. The last outbreak of H5N1 HPAI was reported in poultry during October 2011 in the province of Bobol, identified as a result of Iranian passive surveillance. Previous to this, there were confirmed outbreaks in free-ranging duck flocks in the northernmost province of Iran (facing the Caspian sea) during September 2011, associated with virus clade 2.3.2.1. A stamping out policy was applied to control the outbreaks. The virus associated with the outbreak in October is currently unknown. Vaccination against H5N1 HPAI is prohibited in Iran.

### **Eastern Europe**

The last wild bird event in Europe was reported in the **Russian Federation** in June 2010, when 367 wild birds were found dead in Ubsu-Nur Lake, in Tyva Republic. Genetic analysis at the All-Russian Research Institute for Animal Health (ARRIAH) in Vladimir determined that the isolate belonged to Clade 2.3.2 of the Asian lineage A/Guangdong/1/96 and is 99% similar to the 2009-2010 H5N1 isolates from wild birds in Mongolia, Tyva and Qinghai.

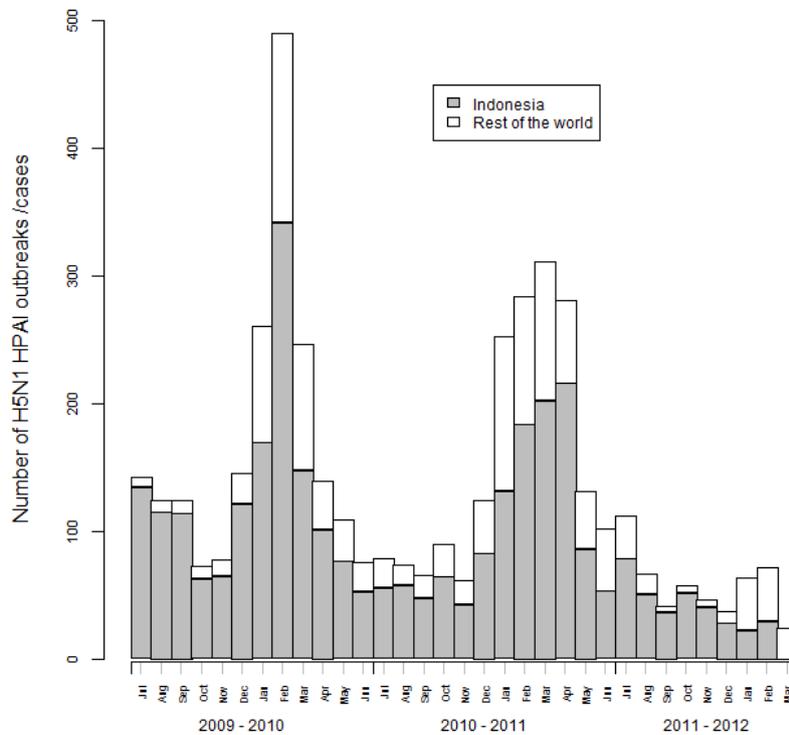
Prior to this, H5N1 activity was reported on the Black Sea coast, with two outbreaks in backyard poultry in **Romania** and one positive case in a common buzzard in **Bulgaria**. Isolates from both countries grouped in the 2010 virus Clade 2.3.2.1 and were 99.3% identical and 99.3% similar to viruses isolated recently from poultry in Nepal. Prior to April 2010, the last H5N1 HPAI event in poultry had been detected in October 2008 on a mixed poultry farm in Germany.

**Figure 6**  
 H5N1 HPAI outbreaks/cases in poultry, H5 and H5N1 infection in wild birds in East and South East Asia, by country (excluding Indonesia and Viet Nam), between June 2009 and March 2012  
 (Source: FAO EMPRES-i; \* 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)

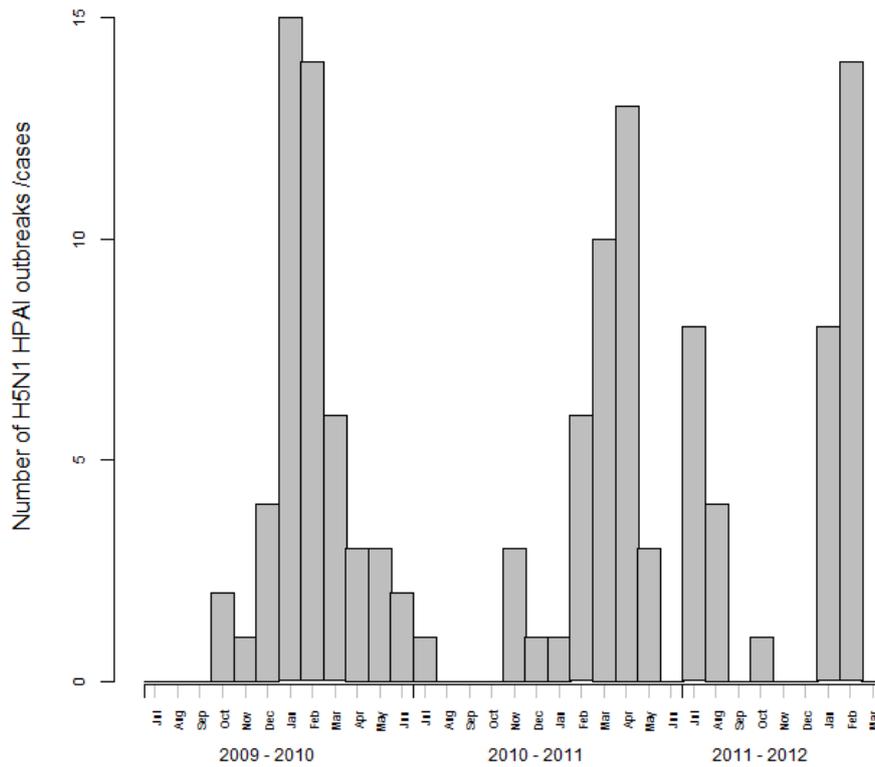


**Figure 7**

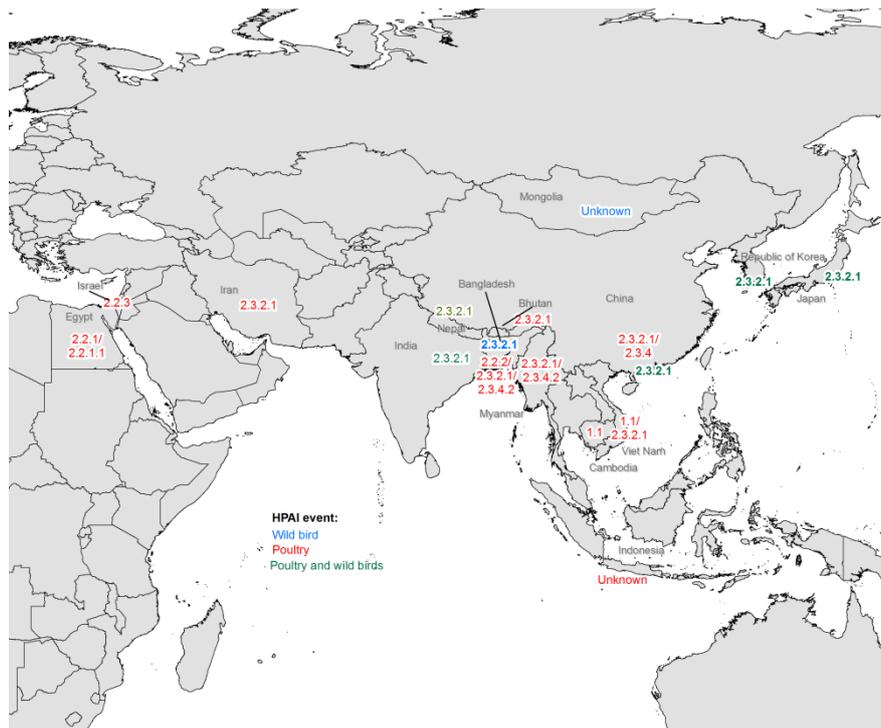
H5N1 HPAI outbreaks in poultry in Indonesia (compared to the rest of the world) between July 2009 and March 2012  
 NB. Data for the period is incomplete - (Source: GoI/ECTAD Indonesia and EMPRES-i; \* 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)



**Figure 8**  
 H5N1 HPAI outbreaks in poultry in Viet Nam, between June 2009 and March 2012  
 (Source: FAO EMPRES-i; \* 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)



**Figure 9**  
 Geographic distribution of circulating virus clades globally in poultry and wild birds reported between February 2011 and March 2012  
 (updated for Nepal and Bhutan).



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This overview is produced by the EMPRES/GLEWS team in FAO, which collects and analyses epidemiological data and information on animal disease outbreaks under the framework of the Global Early Warning System for Major Animal Diseases including Zoonoses.

EMPRES/GLEWS 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](mailto:glews@fao.org). Information will be treated confidentially if requested.