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 few countries. The number of outbreaks in domestic poultry and wild bird populations shrank steadily from 2003 to mid-2008, rose progressively from mid-2008 to mid-2012 but has decreased since then (See Figure 2b).

During the reporting period, there were 98 domestic poultry outbreaks reported from six (6) countries/territories (Bangladesh, Cambodia, China (including Hong Kong), Egypt, India, Indonesia), nine (9) confirmed reports of human cases in four countries (Cambodia, China, Egypt, and Indonesia) and five (5) confirmed wild bird events in China (Hong Kong).

The period April to June generally signals the end of the H5N1 HPAI season when reports of outbreaks decrease globally. As expected, during the second quarter of 2012, there were reductions in the number of countries reporting outbreaks (from 11 to 6; see Figure 3a) as well as the number of outbreaks/cases reported globally (198 to 107 Figure 2a). In addition, the number of outbreaks recorded during this period represents a five-fold decrease in the number observed during the second quarter of 2011 (508 to 103 ;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 Republic of Korea as well as Vietnam.

Since 2003, 63 countries/territories have experienced outbreaks of H5N1 HPAI. The last newly infected country was Bhutan in February 2010, two years ago. 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 end of the H5N1 HPAI active periods (April to June) 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 H5N1 HPAI has remained constant implies a continued infection risk to humans. The H5N1 virus has infected 608 people since it first appeared in 2003, killing 359 of them, according to WHO figures. The countries reporting human deaths in during the period include Cambodia, China, Indonesia and Egypt.

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. Clinical signs can be masked by the use of regular vaccination in poultry populations. As a result, outbreaks are underreported. Active surveillance in poultry and wild bird species therefore needs to be maintained by governments in endemic countries and countries at risk globally.

WORLDWIDE SITUATION: OBSERVED TRENDS

Over the last three months (April to June 2012), 98 H5N1 HPAI outbreaks in poultry were reported officially from the following countries: Bangladesh, Cambodia, China (including Hong Kong), Egypt, India, Indonesia. Six wild bird cases were reported during the same period in People's Republic of China (Hong Kong)(Figure 1). Analysis and interpretation of the H5N1 HPAI data, as presented in this report, obtained through official reports is limited as the data on outbreaks in many endemic countries is incomplete. Different levels of surveillance intensity implemented by countries over space and time during the period can explain some of the gaps in disease reporting or lack of accuracy. 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. This lack of knowledge regarding the situation of H5N1 in the commercial i poultry sector makes assessment of the progress of H5N1 control difficult.

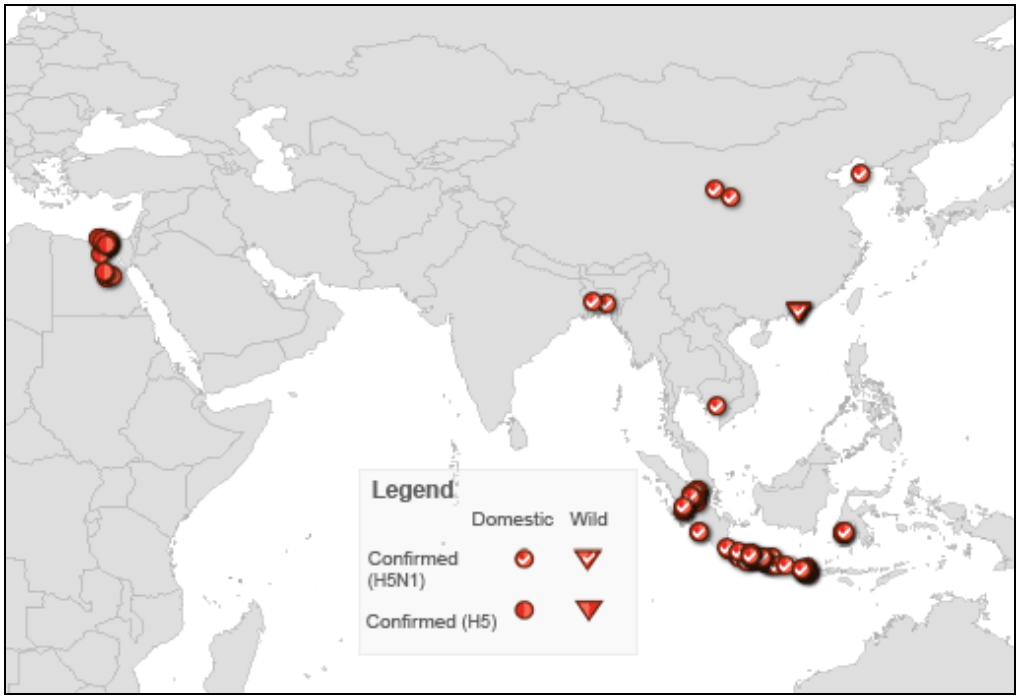
Since early 2011, a number of countries in Asia have experienced new introductions, particularly of virus clade 2.3.2.1, which in most cases wild birds were implicated. These include India, the Republic of Korea, Japan, Myanmar and Nepal. Bhutan has reported this clade 2.3.2.1 for the first time during 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 from poultry 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 clade introductions. Confirmation of clade 2.3.2 in Nepal during the last quarter of 2011, two years since the last outbreaks were reported from this country, indicates that Nepal and South Asia region are at risk of recurrent introductions of H5N1 HPAI virus. Clade 1.1 viruses, which evolved from Clade 1, continue to circulate in the lower Mekong. Clade 2.1 variants in Indonesia and 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 been eliminated. However, the available information on virus clade distribution should be interpreted carefully, since the lack of representative sampling may not reflect the true distribution of clades in poultry populations globally. This is also because affected countries send few samples to reference laboratories for virus clade identification.

FIGURE 1

(a) Map showing the location of H5N1 HPAI outbreaks/cases in poultry, H5 and H5N1infection in wild birds reported between April to June 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)

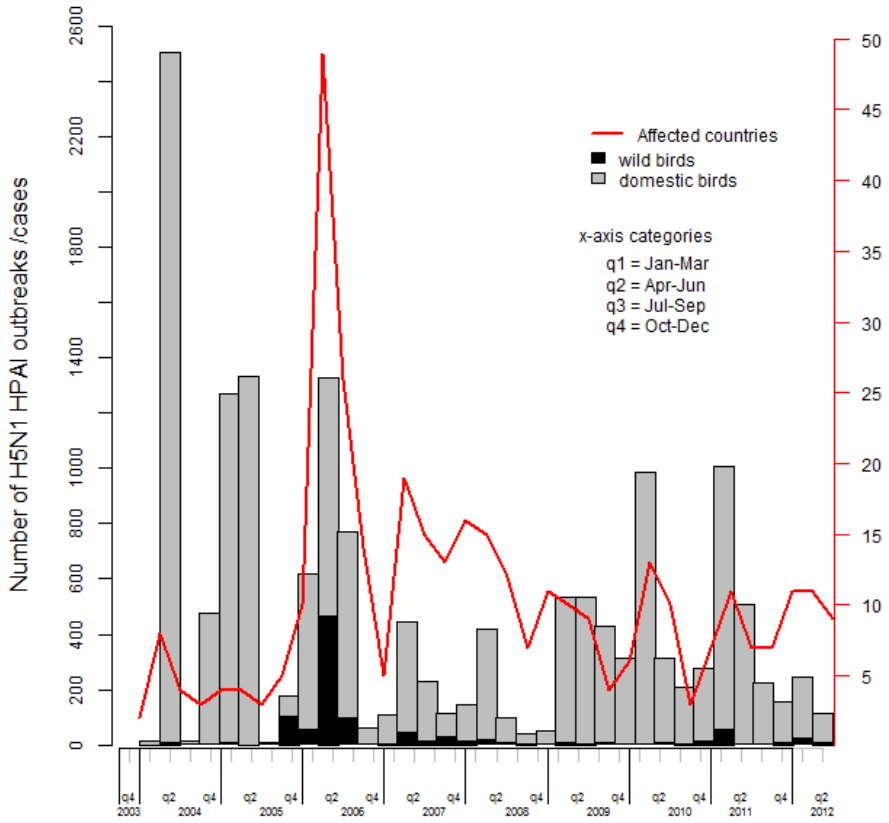
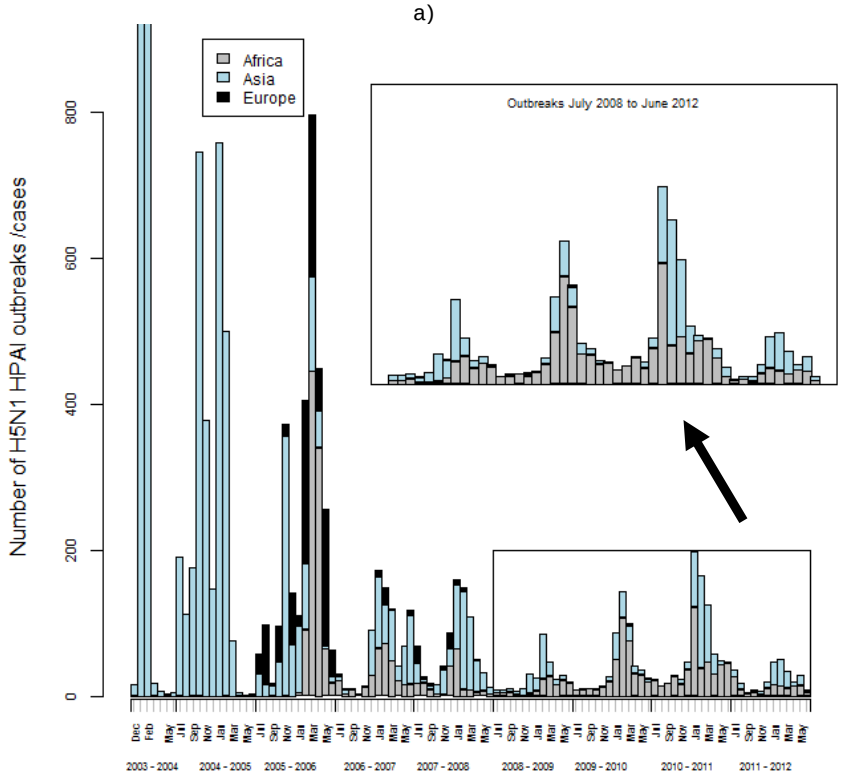


Figure 2

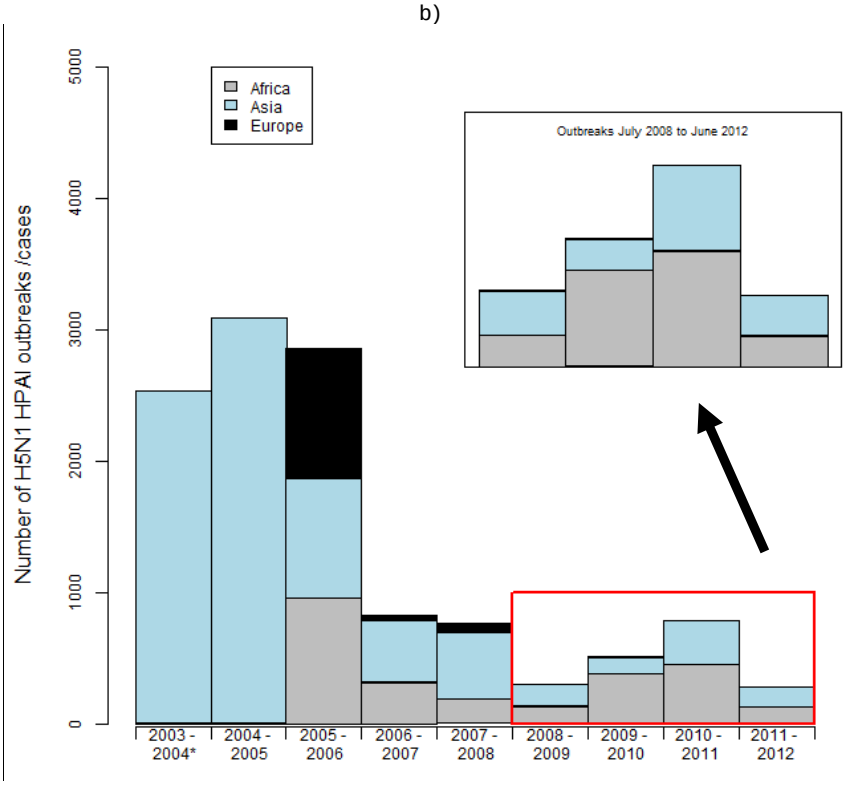
Epidemic curve showing: (a) the monthly and, (b) annual number of H5N1 HPAI outbreaks/cases reported between December 2003 and June 2012 classified by continent

*(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.)*

a)



b)



SITUATION BY CONTINENT/REGION

Africa

During this period, **Egypt** reported 19 outbreaks in poultry from eight (8) governorates, mostly from the household sector (15 out of 19; Figure 4). These occurred mostly in non-vaccinated flocks while 4 out of 19 outbreaks were confirmed in vaccinated commercial flocks. Of the 15 outbreaks reported in the household sector, 12 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 1448 samples collected as part of a regular pre-movement testing from commercial poultry farms, only one was confirmed positive.

In addition, a total of 374 commercial poultry farms were subject to ongoing active surveillance activities and only 3 tested positive for H5 HPAI infection. Active surveillance was also carried out in 103 villages in the household poultry sector and 2 samples (from one governorate) confirmed positive for H5 HPAI. No samples out of 11 suspected outbreaks of H5 HPAI notified from commercial farms were confirmed positive. By contrast, there were two (2) suspected outbreaks notified from the household sector with only one of these confirmed positive. During the reporting period, no samples were collected from road check points and Live Bird Markets (LBMs). Seventy-six (30) samples tested from commercial farms in (11) governorates were confirmed positive for low pathogenic H9 influenza virus.

Two human avian influenza (AI) type A H5N1 cases were confirmed during the three-month period, of which one was fatal. This brings the total number of human confirmed cases in Egypt since 2006 to 168 with 60 fatalities (CFR=36%). While most cases 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%).

South Asia

During the period countries reporting events included Bangladesh and India. See Figure 4. **Bangladesh** experienced one outbreak of H5N1 HPAI in commercial poultry. As of 31 July 2012, a total of 525 outbreaks were recorded in 52 out of 64 districts and most outbreaks were in commercial poultry farms.

India confirmed one outbreak in the period in a state poultry farm in Tripura state. Anecdotal evidence indicated that infection was also occurring in backyard poultry though this was not confirmed.

The ongoing occurrence of disease in state and research farms indicates that biosecurity measures are insufficient. Although this outbreak appears to be an isolated incident, the frequency and widespread nature of outbreaks and the detection of infection in crows suggests that some areas of India may be endemically infected and continuing outbreaks of disease should be expected and identified if surveillance is effective. 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.

A revised 'Action Plan' has just been released which reduces the culling radius to 1km and shortens the destocking period to 30 days after provision of a 'sanitization' certificate. Compensation is paid for culled birds.

Since vaccination is not implemented in India, 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 for monitoring influenza virus. Laboratory results are pending.

South East and East Asia

Countries reporting outbreaks in the region included People's Republic of China and Cambodia.

In **Cambodia** during the three months reporting period there was one outbreak of H5N1 HPAI in Kampong Speu in poultry and two human cases in Kampong Speu and Kampong Chhnang. Both cases were children who had a history of contact with poultry. The previous 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 which indicates that the virus clade type 1 still circulating in poultry and since is the same virus clade which circulates predominantly in southern Viet Nam, active trade at borders for movement of poultry and animal products between these two countries is the main driver of this transboundary issue.

In People's Republic of **China**, three poultry outbreaks of H5N1 HPAI were reported in farms in Gansu Sheng, Liaoning Sheng and Ningxia whilst in **Hong Kong SAR**, five wild bird events were reported affecting crows, Oriental Magpie Robins and crested Munia in several locations. There was two human infections reported during the period in Guangdong Province, South China and Hong Kong.

PR of 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 second quarter of 2012.

The fight against HPAI is on-going and involves considerable effort by the government at all levels. Since 2011 there has been an apparent increase in outbreaks in several provinces in the north and in areas outside the identified high risk zones located in the south and east of China. Further in depth investigation is required to understand the reasons for this increase in outbreaks across the country.

Indonesia continues to report a high proportion of H5N1 HPAI outbreaks in poultry compared to the rest of the world (Figure 7) however reported outbreak numbers are lower compared with the same period in previous years. This decline in outbreak numbers may be due not only to the implementation of a control program (including improvement in coverage of vaccination campaigns) but also to a decline in intensity of 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 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 financial support and is operating in 385 of 496 (77%) districts through 32 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 over time and space. Larger and less densely-populated provinces report H5N1 HPAI outbreaks less often than more densely populated provinces.

During April 2012 PDSR officers visited 1,179 villages, of which 67 *(5.7%)* were infected. Of these, 64 were new infections. In May 2012, PDSR officers visited 1,078 villages, of which 62 *(5.8%)* were infected. Of these, 57 were new infections. During the previous 12 months (May 2011 to May 2012), 14 717 *(20.3%)* of 72,345 villages were visited in the 385 PDSR surveillance districts. Since May 2008, PDSR officers have visited approximately 60,1 % of villages under coverage. Approximately 5.5 % 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 **Vietnam**, during the reporting period, the Department of Animal Health officially reported no HPAI outbreaks. Surveillance and molecular genetics have indicated the presence of four H5N1 virus clades in Vietnam since 2003. These are: (1) Clade 1 (predominantly 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 clade 2.3.2.1 (detected d in late 2009). H5N1 virus clade 2.3.2.1 has been predominant in the north of Vietnam since late 2010 till present, and was also detected in the south-central area.

Surveillance to assess the presence of sub-clinical infection of H5N1 HPAI in ducks at live bird markets was conducted from September 2011 to February 2012 and was described in the previous report (Jan to Mar 2012). Further analysis showed 23 out of 30 provinces had live bird markets with ducks positive for HPAI H5. Dien Bien (north west Vietnam) was the only province with no influenza A in markets. The provinces without H5 positive ducks in markets were mainly in the north (n=6), one in the central (Quang Ngai) and one in the south (Tien Giang). Apparently HPAI H5N1 outbreaks is occurring in some provinces mainly in the south?, ducks in live bird markets were less likely to be detected with influenza A and H5 in the north. H5N1 HPAI may be endemic in the south but sporadically introduced in the north and central provinces. Molecular analysis of H5N1 indicated the following distribution of the HA clade in Vietnam: Clade 1 remains in the south (extends north to Tay Ninh), Clade 2.3.2.1 is extending into the south (to Dong Thap). Live bird market surveillance will begin again in October 2012.

Middle East

There were no reports of H5N1 HPAI events in the region during this period. The last H5N1 HPAI events in the region occurred in **Israe**l during the first quarter of 2012 in poultry and domestic cats fed with poultry meat infected with H5N1 HPAI virus. The sequence information on these last events are not yet available, but previous outbreaks or cases were associated with clade 2.2 similar to that isolated from affected poultry in Egypt implicating the role of informal trade across borders of live poultry and products as an important means of H5N1 HPAI incursion into Israel as other TADs historically.

Eastern Europe

The last wild bird event for H5N1 HPAI 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 linage A/Guandong/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 3
H5N1 HPAI outbreaks in poultry in Egypt between June 2009 and June 2012
(Source: FAO EMPRES-i; 20010 – 2011 refers to the period 1 July 2010 to 30 June 2011)*

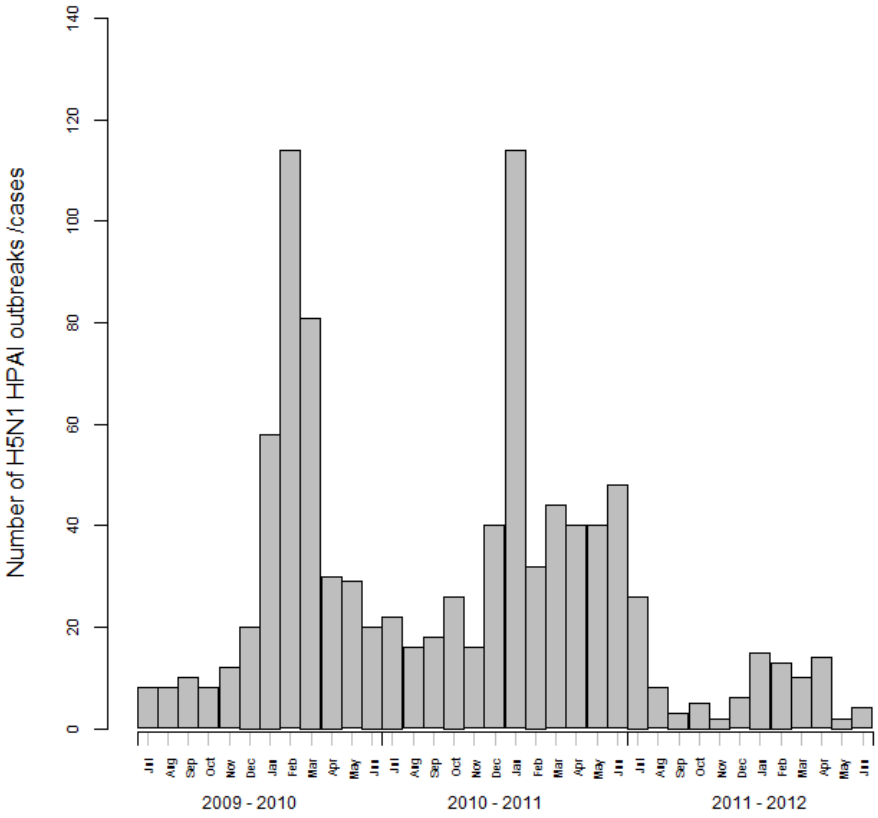


Figure 4
H5N1 HPAI outbreaks/cases reported in poultry, H5 and H5N1 infection in wild birds in South Asia, by country, between July 2009 and June 2012
(Source: FAO EMPRES-i; 2010 – 2011 refers to the period 1 July 20010 to 30 June 2011)*

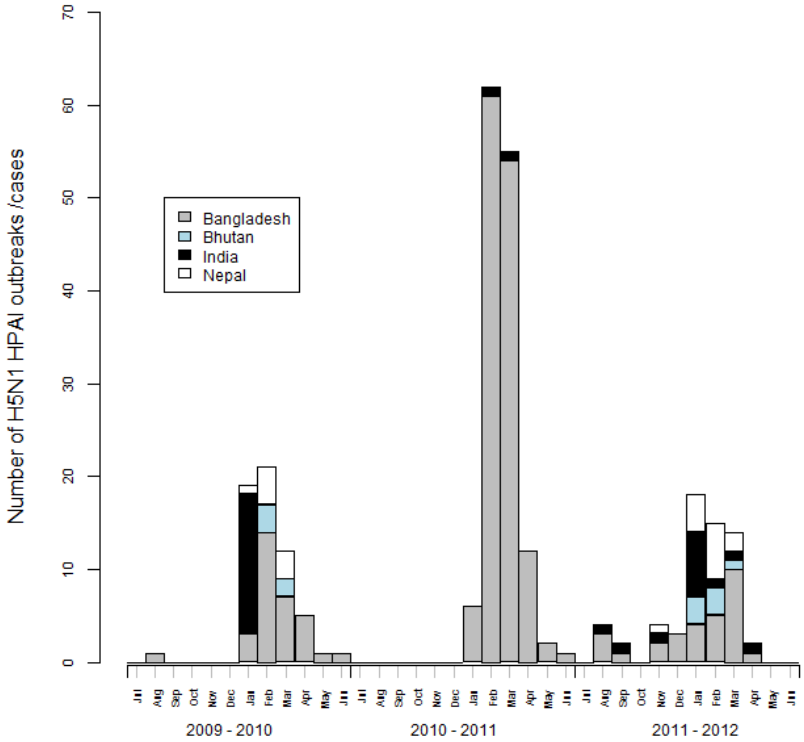


Figure 5
H5N1 HPAI outbreaks/cases in poultry, H5 and H5N1 infection in wild birds in East and South East Asia, by country (excluding Indonesia and Viet Nam), between June 2009 and June 2012.
(Source: FAO EMPRES-i; 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)*

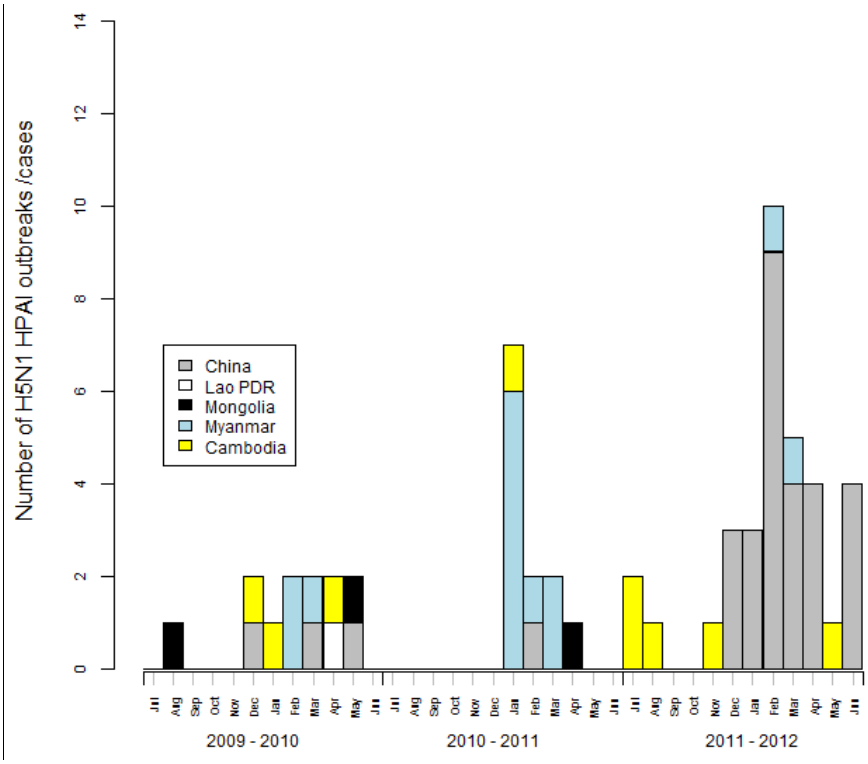


Figure 6
H5N1 HPAI outbreaks in poultry in Indonesia (compared to the rest of the world) between July 2009 and June 2012.NB. Data for the period is incomplete.
(Source: GoI/ECTAD Indonesia and EMPRES-i; 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)*

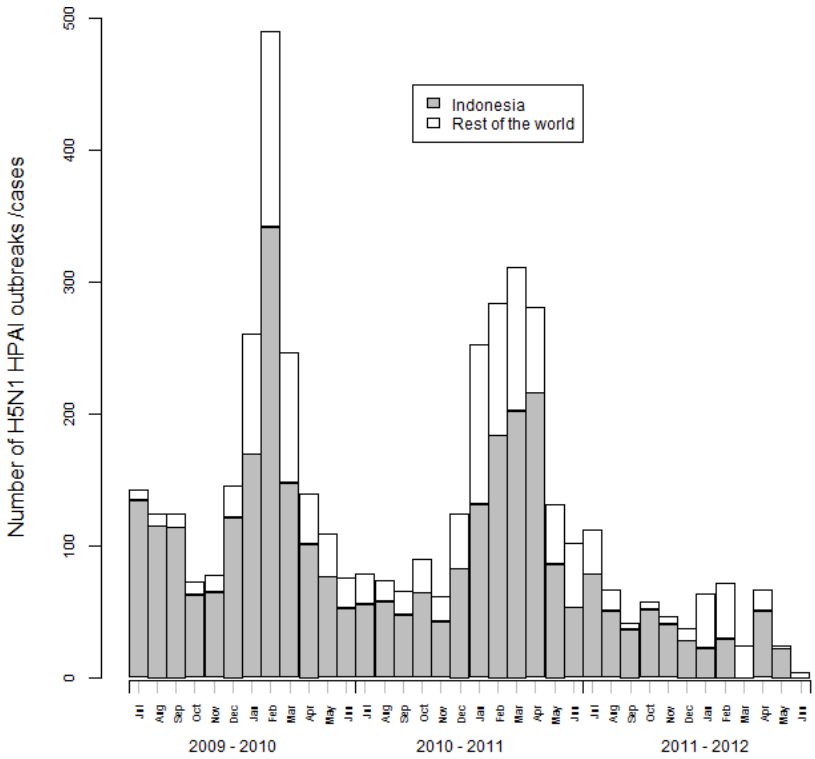


Figure 7
H5N1 HPAI outbreaks in poultry in Viet Nam, between June 2009 and June 2012
(Source: FAO EMPRES-i; 2010 – 2011 refers to the period 1 July 2010 to 30 June 2011)*

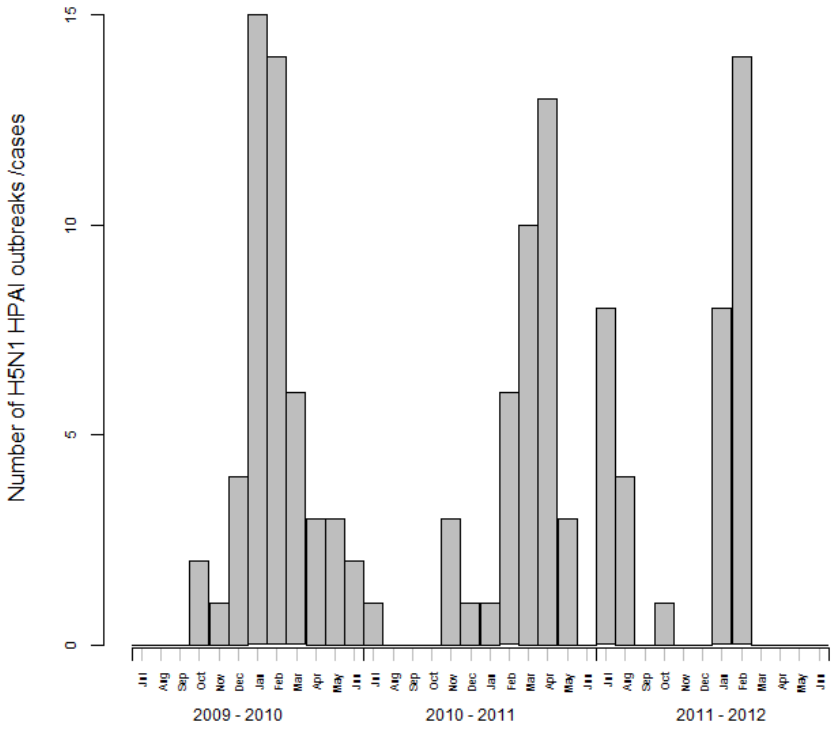
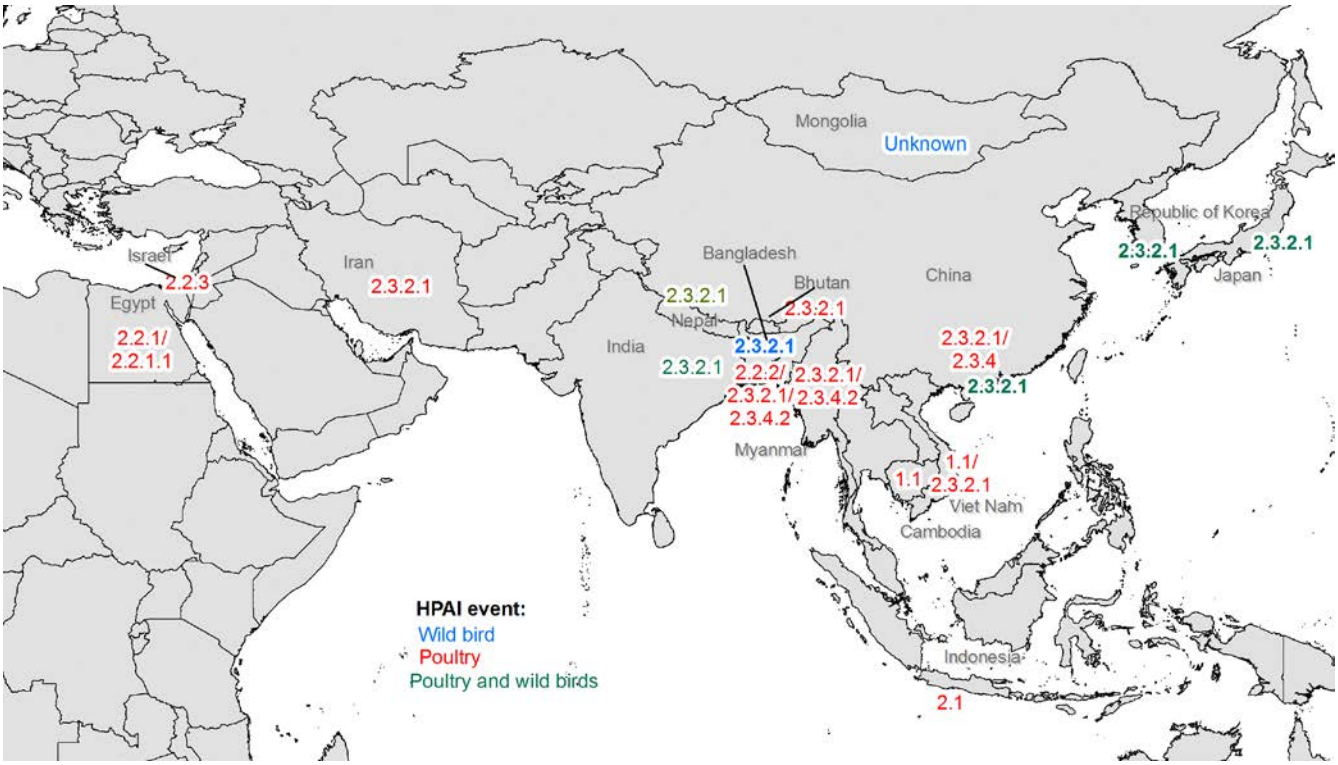


Figure 8
Geographic distribution of circulating virus clades globally in poultry and wild birds reported between February 2011 and June 2012
(updated for Myanmar).



DISCLAIMER

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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. Information will be treated confidentially if requested.