Avian Influenza A(H7N9) Response:
AN INVESTMENT IN PUBLIC HEALTH PREPAREDNESS
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AN INVESTMENT IN PUBLIC
HEALTH PREPAREDNESS

A report prepared by the Division of Health Security and Emergencies (DSE)
World Health Organization – Regional Office for the Western Pacific
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The information contained in this publication is primarily based on the Avian Influenza A(H7N9) Situation Reports No. 1–24, issued from 1 April to 31 May 2013, by the WHO Western Pacific Regional Office, in collaboration with China Country Office and Headquarters. The contents of this publication were developed based on the most up-to-date information available at the time of reporting and mainly highlight the response of the Chinese Government as well as the WHO Western Pacific Regional Office. Some technical information was also based on publicly available journals, which have been indicated with proper citations.

It should be noted that the contents of the publication might be incomplete and not current given that the event is evolving.

Avian influenza A(H7N9) is a stark reminder that public health threats continue to put our Region and the global community at risk.

On 31 March 2013, China notified WHO of the existence of a new virus that is of global concern. Within 24 hours, the International Health Regulations (2005) mechanisms were activated, as China and WHO worked together to identify the virus and implement public health measures. China’s strong leadership and commitment translated into a swift and effective response, starting with immediate virus-sharing so researchers internationally could jump start efforts to classify and contain the threat.

The joint China–WHO mission epitomized collaboration in action. To inform public health actions, the mission’s joint risk assessment called for enhanced surveillance, epidemiological investigations, animal and human health collaboration and scientific research.

This publication tells the story of how the global community worked together to fight the shared risk. The information in this publication comes from the people who worked directly to control the threat of avian influenza A(H7N9) at all three levels of WHO: the WHO China Office, the Regional Office for the Western Pacific in Manila and WHO headquarters.

The lessons learnt described in this publication could serve as a guide to both Member States and the Region for future preparedness and response efforts to public health threats.

As of the date of this publication, the number of new cases of avian influenza A(H7N9) had dropped dramatically following various public health interventions. Still, many questions and less-understood issues linger.

But one lesson is clear above all else: we must maintain a high level of vigilance and focus on preparedness efforts as we move forward because regrettably this will not be our last battle with deadly viruses.

As always, WHO is committed to walk with you in our shared journey towards a Region better prepared for whatever health challenges the future brings.

Shin Young-soo, MD, Ph.D.
WHO Regional Director
Western Pacific Region
Avian influenza A(H7N9) timeline

“At the end of March this year, China reported the first-ever human infections with the H7N9 avian influenza virus. … Chinese officials have promptly traced, monitored, and tested thousands of patient contacts, including hundreds of health care workers.

“As a result, human-to-human transmission of the virus is negligible. However, influenza viruses constantly evolve themselves. No one can predict the future course of this outbreak.”

Dr Margaret Chan
WHO Director-General
Address to the 66th Session of the World Health Assembly
Geneva, Switzerland, 20 May 2013

AFP
Avian influenza A(H7N9) timeline

Photo credits: AFP except for Day 8 by WHO.
On Sunday, 31 March 2013, the World Health Organization (WHO) was notified by China of three laboratory-confirmed cases of human infection with avian influenza A(H7N9). Two cases were from Shanghai, both deceased; the other was from Anhui, in critical condition.

As human infection with this virus had never been reported before, this event was notifiable under the IHR (2005).

By 30 April 2013, within a month of the first IHR notification, the number of reported cases of laboratory-confirmed avian influenza A(H7N9) infections in humans had increased to 128 cases with 24 deaths.

Two municipalities (Shanghai and Beijing) and eight provinces (Anhui, Fujian, Jiangxi, Jiangsu, Henan, Hunan, Shandong and Zhejiang) in China were affected. An additional case, with recent travel history to Jiangsu, China was reported from Taipei’s Center for Disease Control, Taiwan, China.

By the end of May 2013, two months after the initial report, there was a decline in the number of laboratory-confirmed avian influenza A(H7N9) infections in humans. The last case was reported on 29 May 2013. The total number of cases reached 132, with 37 deaths, and covered the two municipalities and eight provinces in China. One case was reported from Taipei’s Center for Disease Control, Taiwan, China. See Figure 1.

Most of the cities and provinces that activated their emergency response integrated avian influenza A(H7N9) into their routine surveillance.

“China has experienced extraordinary diseases such as SARS and the 2009 influenza H1N1 pandemic. We are in new territory again with H7N9, but our experience has taught us how to face it.”

Dr Liang Wannian
Director-General of the Office of Health Emergency, National Health and Family Planning Commission, China
Statement to the media at the end of the China–WHO joint mission, 24 April 2013
Avian influenza A(H7N9) virus

Avian influenza A(H7N9) virus is one subgroup of influenza viruses that circulate among birds. Although avian influenza A(H7N9) had been detected in birds before, it had never been detected in humans.

Influenza viruses are sub-typed on the basis of haemagglutinin (designated as HA) and neuraminidase (designated as NA) glycoproteins that are present on the outer surface of the virus. The H7N9 virus is the result of a re-assortment of H7 viruses, N9 viruses and H9N2 viruses, meaning that it is a combination of at least three other influenza subtypes (Figure 2).

How avian influenza A(H7N9) was detected

On 24 March 2013, the Shanghai Center for Disease Control and Prevention (CDC) sent respiratory samples from an 87-year-old male and his two sons to China CDC in Beijing for testing. All three patients had a respiratory tract illness that progressed to pneumonia of unknown etiology (PUE). At Shanghai CDC, samples from these patients tested positive for influenza A, but they could not be subtyped further as pandemic H1, H3 or avian H5. No other pathogen was detected by routine laboratory examination (Figure 3).

On 25 March, Anhui CDC sent a sample from a 35-year-old female with severe lower respiratory tract infection with PUE to China CDC for testing.

On 26 March, at the China National Influenza Center in Beijing, real-time reverse-transcription polymerase chain reaction (RT-PCR) tests on one of the Shanghai specimens revealed that the HA protein belonged to the H7 subtype. On 28 March, the virus was isolated and using genetic sequencing was identified to be a novel virus. This particular strain of avian influenza A(H7N9) virus had not previously been detected in humans.

Epidemiology of avian influenza A(H7N9) virus

By 2 July 2013, there were 133 laboratory-confirmed avian influenza A(H7N9) virus infections, with 43 deaths reported. The cases were reported from two municipalities and eight provinces in China, with one case reported by Taipei CDC (Figure 4). The onset of illness of human avian influenza A(H7N9) cases peaked in early April and declined in mid- to late April (Figure 5). This decline occurred following a series...
of public health interventions including the closure of live bird markets and increasing public awareness about the disease.

The median age of cases was 62 years (range: 2–91 years). The majority of cases (73%, 97/133) were male and 54% (71/132) were aged 60 years or older. When stratified by age and sex, elderly males were the demographic group with the highest number of cases (Figure 6). Forty-three cases died, giving a case fatality proportion of 32%.

MODES OF TRANSMISSION

More than three-quarters of cases had recent exposure to animals (based on data available from 77 cases). Of these, 76% either had direct contact with chickens or had visited live bird markets. If poultry exposure were considered the source, then the incubation period of the disease was estimated to be 5 days (interquartile range: 2–8 days).

Analysing information: event- and indicator-based surveillance systems

Even before the first three human cases of influenza A(H7N9) were officially reported by China on 31 March 2013, Shanghai authorities reported an unusual event involving a family cluster of severe acute respiratory disease of unknown etiology.

This event was picked up through event-based surveillance, which is the organized and rapid capture of information about events that are a potential risk to public health. Event-based surveillance involves daily monitoring of acute public health events through media screening and is used to detect events that may not be reported in individual case-based surveillance systems, or through indicator-based surveillance.

Indicator-based surveillance is the traditional approach to surveillance of communicable diseases, and consists of routinely collected data about the occurrence of predefined diseases and syndromes from health-care providers. The Chinese National Influenza-Like Illness Surveillance Network includes 554 sentinel hospitals and 408 network laboratories in all 31 provinces of China. The sentinel hospitals report the number of outpatient visits by age group for influenza-like illness (ILI) and the total number of outpatients on a weekly basis. Each week, 5–15 nasopharyngeal swab samples are collected from these ILI patients and are tested by real-time RT-PCR.

The ILI surveillance system in China proved to be vital during the avian influenza A(H7N9) event, especially for ongoing risk assessments, as it provided baseline data for both recent trends (i.e. weekly notifications of ILI and virus type distribution) and historical comparisons (i.e. level of ILI at the same time of year in previous years and expected seasonal patterns).

As evident from the ILI surveillance data (Figure 7), there was no indication of unusual ILI activity during weeks 14–23, which corresponded with months April–June, providing additional evidence against sustained human-to-human transmission due to avian influenza A(H7N9).
Age and sex distribution of cases: An insight into an emerging infectious disease

Just like getting to know a person, getting to know a disease initially involves determining basic information. Age and sex data—often readily available in a timely manner—can offer important early insights in understanding an emerging disease like avian influenza A(H7N9) infection.

Early in the avian influenza A(H7N9) event, the age and sex distributions of human cases were rapidly assessed to better inform risk assessments and potential next steps (Figure 8). From this, a question arose: Why were so many elderly persons—and in particular, elderly men—among the cases of avian influenza A(H7N9) in China?

The event management team at the WHO Regional Office considered three main possibilities for this preponderance of elderly males among the cases:

1. particular gender-associated practices/norms that put elderly men at high risk;
2. a clinical course particular to elderly men, perhaps making them more susceptible to post exposure/infection; and
3. increased health-care-seeking/access behaviour of elderly men.

These suggestions, along with the age- and sex-stratified data, were rapidly communicated through the online Western Pacific Surveillance and Response Journal on 20 April 2013. The article encouraged public health practitioners to consider these possibilities for assessments and response; to China CDC. During the H7N9 event, the reporting mechanisms for PUE were simplified. A majority of the cases of avian influenza A(H7N9) were detected through surveillance, a febrile (axillary temperature ≥38°C) patient with radiological evidence of pneumonia and in whom no other pathogens is detected by routine clinical/laboratory examination is reported to China CDC. During the H7N9 event, the reporting mechanisms for PUE were simplified. A majority of the cases of avian influenza A(H7N9) were detected through the PUE surveillance.

Evidence so far is not sufficient to conclude there is person-to-person transmission. Moreover, no sustained person-to-person transmission has been found. Monitoring and testing of close contacts of all other confirmed cases did not detect any further infections.

SURVEILLANCE FOR PNEUMONIA WITH UNKNOWN ETIOLOGY

In China, nationwide surveillance for PUE has been ongoing since 2004. As a part of this surveillance, a febrile (axillary temperature >38°C) patient with radiological evidence of pneumonia and in whom no other pathogens is detected by routine clinical/laboratory examination is reported to China CDC. During the H7N9 event, the reporting mechanisms for PUE were simplified. A majority of the cases of avian influenza A(H7N9) were detected through the PUE surveillance.

ENHANCED SURVEILLANCE FOR INFLUENZA-LIKE ILLNESS IN CHINA

The Chinese National Influenza-Like Illness Surveillance Network (ICNIS) enhanced its ILI surveillance activities by increasing the number of samples tested per laboratory and retrospectively testing all specimens collected since 4 March 2013 for influenza A(H7N9) virus by real-time RT-PCR. From 4 March to 28 April, CNISN tested 46 807 nasopharyngeal swab samples, including 20 738 specimens from ILI patients at hospitals in the 10 provinces and municipalities with confirmed avian influenza A(H7N9) cases. Six samples from five affected provinces were positive for avian influenza A(H7N9) virus; two of these patients (aged two and four years) had not been hospitalized. This, as well as the fact that avian influenza A(H7N9) virus was not identified in any samples from unaffected provinces and municipalities, indicated that the virus was an uncommon cause of ILI. It also suggested that the virus caused milder disease in younger persons.

Virology

Avian influenza A(H7N9) is an avian virus containing genes from multiple avian origins. Unlike the avian influenza A(H5N1) virus, which caused high mortality among poultry, H7N9 is a low pathogenic strain in younger persons.

According to gene sequence analysis, most avian influenza A(H7N9) isolates from human cases are sensitive to the neuraminidase inhibitor (oseltamivir and zanamavir) class of antivirals. However, all the isolates were resistant to the adamantane group of antivirals.

Clinical presentation

Avian influenza A(H7N9) infection in humans generally caused severe acute respiratory illness, although a few mild cases were also reported. Most cases required hospitalization due to pneumonia, and 75% were admitted to intensive care. Symptoms included high fever, non-productive or productive cough, dyspnea and gastrointestinal symptoms (e.g. nausea and vomiting), whereas sore throat, rhinorrhea and conjunctivitis were not common.

Chest X-rays and computed tomography (CT) scans showed evidence of lower respiratory tract disease with opacities, consolidation and infiltrates. Bilateral ground-glass opacities and consolidation were the most common radiological findings. Haematological features were consistent with features of viral infection. Leukocyte counts were normal or low, with lymphocytopenia and moderate thrombocytopenia in some cases.

By 2 July, 43 (32%) cases had died, 87 had been discharged from hospitals and 3 were still hospitalized. All fatal cases experienced pneumonia and acute respiratory distress syndrome. The median time between onset of illness and death was 14 days (interquartile range: 8–24 days). Other complications included septic shock, respiratory failure, refractory hypoxemia, acute renal dysfunction, multiple organ

dysfunction, rhabdomyolysis, encephalopathy, and bacterial and fungal infections such as ventilator-associated pneumonia and bloodstream infection, sometimes by multidrug-resistant bacteria.1,2,3

**Treatment**

Treatment within 48 hours with antivirals was found to be effective for avian influenza A(H7N9) infection. The majority of avian influenza A(H7N9) patients were treated with antivirals; however, the median time from the onset of illness to initiation of antiviral therapy was seven days (range: 1–23 days).2 Corticosteroids were also used as adjunctive treatment in approximately 70% of avian influenza A(H7N9) patients. The role of steroids in patients with severe acute respiratory infection remains controversial, and WHO guidance does not support routine steroid use for influenza infection.10 A recent study on hospitalized patients with pneumonia suggested that systemic high-dose steroid use may result in increased risk of prolonged viral replication and shedding, which provides a favourable condition for antiviral resistance.11

**Infection prevention and control**

Current WHO recommendations for avian influenza infection control are: (1) standard precautions to avoid direct contact with patient’s blood, body fluids, secretions and non-intact skin; (2) droplet precautions such as use of personal protective equipment (e.g. medical mask for health staff working within 1 metre of the patient); and (3) contact precautions. In addition, airborne precautions are required to protect against airborne transmission of infectious agents during aerosol-generating procedures.

**Risk assessment**

During the H7N9 event, WHO published its first risk assessment on 13 April 2013. The initial reports showed that avian influenza A(H7N9) cases were widespread in heavily populated areas and that the source and transmission was unknown. Contact tracing indicated that almost all cases were sporadic with limited human-to-human transmission. Reported cases were severe and required advanced medical treatment. However, in-country response measures were rapid, including extensive contact tracing to identify possible human-to-human transmission, and prevention of potential human exposure including closing of live bird markets.

Following these public health measures, the number of cases reported from China declined. Only six cases were reported in May and none in June 2013. Other avian influenza viruses such as H5N1 have demonstrated a seasonal pattern in which human cases have been less frequent in summer months and more frequent in winter months. It therefore remains a possibility that H7N9 may follow the same seasonal pattern.

A WHO risk assessment on 7 June 2013 concluded that further sporadic human cases of avian influenza A(H7N9) were possible and that sustained human-to-human transmission and international spread were not evident. WHO did not recommend any travel or trade restrictions but advised countries to continue surveillance and reporting as applicable under the IHR (2005) and other preparedness action.

**Avian Influenza A(H7N9) Response:**

**Immediate response:**

**China’s leadership and global solidarity against a shared threat**

“We are impressed with the response by the Government of China. China has responded to the serious outbreak with strong leadership and a high level of commitment, and sound and effective strategies such as health education, communication and closure of live poultry market.”

“Health authorities were well prepared and acted quickly, effectively and professionally. Information including genetic sequence data and virus were shared in a timely way within China and with the international community through WHO under the International Health Regulations.”

Dr Keiji Fukuda
WHO’s Assistant Director-General for Health Security and leader of the China-WHO joint mission on A(H7N9) assessment during a joint press conference in Beijing, China, 24 April 2013
International Health Regulations (2005): a regulation in action

The response to the avian influenza A(H7N9) event in China illustrated to the global community that investments made in the International Health Regulations, or IHR (2005), resulted in timely detection and reporting of, and response to this potential public health emergency of international concern (PHEIC).

Immediately after confirmation of the novel virus, the National IHR Focal Point (NFP) of China notified the new cases of avian influenza A(H7N9) to WHO on 31 March 2013. The rapid risk assessment undertaken by WHO concluded that the occurrence of these cases was an unusual or unexpected public health event, and that the cases were associated with severe health outcomes, and therefore constituted a potential PHEIC. As a result of this rapid risk assessment, NFPs from Member States around the world were notified of the event on 1 April 2013 through the WHO Event Information Site (EIS), a web-based database providing secure information for NFPs.

Throughout the event, the Chinese health authorities continued to use IHR (2005) reporting mechanisms to report new cases (Figure 9); these were followed by timely updates through WHO official communication channels to inform NFPs, the public and relevant stakeholders.

Swift reporting by the Chinese National IHR Focal Point (NFP) allowed for the timely sharing of information. Other NFPs were provided with secure internal information through the WHO Event Information Site (EIS), a web-based database. The public was informed with timely and regular updates about the event through the WHO Disease Outbreak News (DON) website.

By 31 May 2013, there had been 35 EIS postings and 28 DON updates related to avian influenza A(H7N9).

FIGURE 9  IHR notifications of A(H7N9) cases from China’s NFP to WHO

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Swift reporting by the Chinese National IHR Focal Point (NFP) allowed for the timely sharing of information. Other NFPs were provided with secure internal information through the WHO Event Information Site (EIS), a web-based database. The public was informed with timely and regular updates about the event through the WHO Disease Outbreak News (DON) website.

By 31 May 2013, there had been 35 EIS postings and 28 DON updates related to avian influenza A(H7N9).

Source: WHO

Members of the China–WHO joint mission discuss their findings and recommendations at the end of the field visits.

China’s collaboration with the global community: the joint mission

International collaboration for the avian influenza A(H7N9) event was exemplified by an invitation from China’s National Health and Family Planning Commission (NHFPC) to WHO and international influenza experts to participate in a joint mission in Beijing and Shanghai from 18 to 24 April 2013. The mission aimed to assess the outbreak and public health risks of avian influenza A(H7N9) infection, and to provide guidance on prevention, control and priority areas for research.

The joint mission was a concrete example of collective efforts and international cooperation in action. This mission gave an opportunity for international influenza experts to interact directly with Chinese experts involved in the outbreak investigation and response, and at the same time, it gave Chinese local experts a chance to discuss the event with world experts.

The joint mission comprised representatives from China’s NHFPC, China CDC, international influenza experts from Australia, Europe, Hong Kong (China) and the United States of America, and WHO staff from Headquarters, Regional Office and Country Office in China. The 14 members of the team were epidemiologists, laboratory specialists, clinicians and scientists, and were selected for their relevant expertise and experience in these areas.

The team met with senior officials from both human and animal health sectors as well as those directly involved in the outbreak investigation. In Shanghai, they also visited health care facilities and laboratories, affected communities and live bird markets.

In China, the outcomes of the mission were shared with the Vice-Premier, Health Minister, Vice-Minister and senior officials of NHFPC. Joint press conferences were also conducted in Shanghai and Beijing. The mission report was released and shared through WHO and NHFPC web sites. The recommendations covered ongoing surveillance and investigations, information sharing and collaboration, preparedness and response (see box on next page).
• Undertake intense and focused investigations to determine the source(s) of human H7N9 infections. Identification of the source will enable urgent action to prevent continuing virus spread, with its potentially severe consequences for human and animal health.

• Maintain a high level of alert, preparedness and response even though human cases might drop in the summer (as they do for many other avian influenza viruses) because of the seriousness of the risk posed by this virus and because much basic information remains unknown.

• Continue to conduct and strengthen both epidemiological and laboratory-based surveillance in humans and animals in all provinces of China to identify changes that might indicate the virus is spreading geographically and gaining the ability to infect people more easily or transmit efficiently from person to person.

• Ensure frequent mutual sharing of information, close and timely communication and, when appropriate, coordinated or joint investigations and research among ministries of health, agriculture and forestry because this threat requires the combined efforts of all these sectors.

• Continue high-level scientific collaboration, communication and sharing of sequence data and viruses with WHO and international partners because the threat of H7N9 is also an international shared risk and concern.

• Encourage and foster the scientific and epidemiological studies and research needed to close major gaps in critical knowledge and understanding.

• Continue preparedness planning and other IHR (2005) core capacity strengthening work because such investments make a major difference in readiness to address health security risks and emergencies, including H7N9.

• Continue preparedness planning and other IHR (2005) core capacity strengthening work because such investments make a major difference in readiness to address health security risks and emergencies, including H7N9.

Influenza A(H7N9) virus in pigeon samples from a market in Shanghai. Rapid action was taken upon the decision on 5 April 2013 to cull all birds at that market.

On 22 May 2013, the Ministry of Agriculture released a summary of the animal surveillance for avian influenza A(H7N9) infection:

- A total of 899,758 samples, including 702,369 blood samples and 197,389 swab samples, were collected from 42,250 different surveillance sites located in 31 provinces.
- A total of 53 specimens were found to be H7N9 positive. Among them, 51 were from either poultry or the environment of 18 live bird markets in nine municipalities and provinces, namely Shanghai, Anhui, Zhejiang, Jiangsu, Henan, Shandong, Guangdong, Jiangxi and Fujian. The other two positive specimens were from a wild pigeon from Nanjing, Jiangsu province, and a homing pigeon from a farm in Hai’an county, Nantong city, Jiangsu province.

- None of the positive samples was from poultry on farms.

Using existing nationwide animal surveillance systems, China’s Ministry of Agriculture also tested routinely collected pig samples for avian influenza A(H7N9) infection. A total of 2000 swabs and 2150 blood samples from 35 pig farms and 11 slaughterhouses were tested and none was positive.

**Curbing the source of infection by closure of live bird markets**

Based on the high proportion of human cases with exposure to poultry, and the detection of avian influenza A(H7N9) infection in samples from both poultry and the environment in live bird markets, Chinese provincial and municipal authorities initiated public health measures aimed at reducing human contact with live poultry. This included closing live bird markets; culling all live birds in wholesale markets; safely disposing of culled

**Synergies at the human and animal health interface**

The response to infectious diseases with animal origin requires active collaboration between human and animal health sectors. During the avian influenza A(H7N9) outbreak, these two sectors worked harmoniously, building upon previous efforts for collaboration and coordination.

Following the report of avian influenza A(H7N9) in humans, China’s Ministry of Agriculture commenced surveillance for influenza in the animal population. This included testing poultry, pigs and wild birds for avian influenza A(H7N9) infection in order to identify the source of the virus infection. On 4 April 2013, the National Avian Influenza Reference Laboratory of China detected avian
The role of the WHO Global Influenza Surveillance and Response System (GISRS) in laboratory diagnosis of novel viruses

Timely and accurate laboratory diagnosis is the cornerstone of any surveillance, diagnosis and response system for emerging diseases. GISRS serves this function on a global level for novel strains of influenza virus.

In the Western Pacific Region, GISRS currently comprises 21 National Influenza Centres across 15 countries and is supported by three WHO Collaborating Centres for Reference and Research on Influenza in the Western Pacific Region; one each in Australia, China and Japan.

Virus sharing and vaccine development

Existing regional laboratory networks in the Western Pacific Region, as supported by the Asia Pacific Strategy for Emerging Diseases, provided essential mechanisms for sharing laboratory information and providing diagnostic resources for avian influenza A(H7N9) cases in China.

The Chinese National Influenza Center in Beijing, which is also a WHO collaborating centre, shared virus isolates from the initial three cases with other WHO collaborating centres and related laboratories to facilitate development of diagnostic protocols for avian influenza A(H7N9) detection as well as for identification of candidate vaccine virus.

The detection of avian influenza A(H7N9) in samples from live bird markets resulted in public health measures that included closure of live bird markets in cities and municipalities affected by the virus.

Avian Influenza A(H7N9) Response: AN INVESTMENT IN PUBLIC HEALTH PREPAREDNESS

Adapted from: Murhekar M et al. Avian influenza A(H7N9) and the closure of live bird markets. Western Pacific Surveillance and Response Journal 2013, 4(2). doi:10.5365/wpsar.2013.4.2.008
Sharing the avian influenza A(H7N9) virus: how the Pandemic Influenza Preparedness framework made it happen

The Pandemic Influenza Preparedness framework came into effect in 2011 and has two fundamental purposes:

• to increase access to pandemic influenza vaccines and other pandemic influenza-related benefits for countries in need during an influenza pandemic; and

• to ensure the continued sharing of viruses necessary for the development of safe and effective influenza vaccines and the ongoing global monitoring and risk assessment for influenza pandemics.

Soon after the H7N9 event became an international concern, many of the Member States made an effort to set up the diagnostic protocol. Reagents and materials vital for real-time RT-PCR methods specific for H7N9 virus detection were provided through the existing laboratory network.

As a result of the timely sharing of the avian influenza A(H7N9) virus by China, a candidate vaccine virus was identified in a timely manner. This process was facilitated through the Pandemic Influenza Preparedness framework. Based on the experience of previous influenza viruses, production of the first batch vaccine for avian influenza A(H7N9) would take between four and six months.

"WHO at the forefront of public health action"

"WHO takes H7N9 very seriously. "We have activated our organizational-wide mechanism involving the three levels of WHO – the WHO Country Office in China, the Western Pacific Regional Office in Manila and the Headquarters in Geneva, to coordinate our global response. "Influenza A(H7N9) is no doubt a public health concern in China. Meanwhile, it is also a truly global public health issue that we are managing together."

Dr Shin Young-soo
WHO Regional Director for the Western Pacific
Meeting with the Health Minister of China
Beijing, China, 10 May 2013
WHO activates emergency operations for avian influenza A(H7N9)

Within 24 hours of China’s National IHR Focal Point notifying WHO of the three human infections with avian influenza A(H7N9), the Division of Health Security and Emergencies at the WHO Regional Office for the Western Pacific activated its newly upgraded Emergency Operations Centre (EOC).

The Regional Office immediately shifted its focus from daily monitoring and surveillance of events to round-the-clock monitoring and proactive response. As with all unfolding emergency public health events, surveillance and epidemiology data were continuously updated as they became available. Laboratory testing was in the very early stages of disease identification. Over time, clinical profiles of patients began to emerge from hospitals and epidemiology data were continuously updated as they became available.

An event management team, with a designated event manager, was brought together on 1 April 2013 (Figure 12). The team comprised four multifaceted teams to coordinate the regional-level response.

- **Team 1** was responsible for managing surveillance and epidemiology data that included consolidation of reports received through IHR (2005) and the compilation and dissemination of situation reports.
- **Team 2** was responsible for technical areas such as clinical management, zoonoses and laboratory and for leading risk assessments.
- **Team 3** was responsible for risk communication, including preparing and disseminating information to the public, generating feedback from its audiences and partners and liaising with the media.
- **Team 4** managed the core services, including administration, logistics, finance and management of EOC.

The EOC at the WHO Regional Office for the Western Pacific served as a common operational platform for command, control and coordination. Timely information collection, risk assessment and information dissemination were vital to enable decision-making during the avian influenza A(H7N9) response. The EOC was also a mechanism to link the right people with the right expertise to the right roles to ensure an effective coordinated response.

The upgraded EOC in the Regional Office was inaugurated by the Regional Director on 8 March 2013. Besides upgrading of the infrastructure and facilities, the scope of EOC was expanded from communicable disease outbreak to cover all acute events of public health importance. The EOC is also used for daily operations including daily surveillance meetings, risk assessments and continuing emergency preparedness planning.

Delivering WHO’s core commitments in emergencies through application of its Emergency Response Framework

An effective response to the avian influenza A(H7N9) event required an Organization-wide effort. The Emergency Response Framework (ERF) is an internal mechanism used by WHO to manage its resources as it responds to emergencies. The ERF uses a grading system to determine the most appropriate response. The ERF requires WHO to act with urgency and predictability to best serve and be accountable to the people affected by a public health emergency.

On 17 April 2013, the Global Emergency Management Team for Response (GEMT-R) convened a three-level WHO teleconference (China Country Office, Western Pacific Regional Office and Headquarters) to grade the avian influenza A(H7N9) event under ERF. GEMT-R concluded that the event met the requirements for Grade 2 classification. On 18 April, the WHO Regional Director made a formal announcement within WHO.

The designation of Grade 2 indicated that WHO capacities at the country level had been surpassed and that the Country Office needed international support. International support would include sending staff and/or

[FIGURE 12] Organizational structure of the event management team at the WHO Regional Office

<table>
<thead>
<tr>
<th>Team 1</th>
<th>Team 2</th>
<th>Team 3</th>
<th>Team 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information and Epidemiology</td>
<td>Technical Expertise</td>
<td>Communications</td>
<td>Core Services</td>
</tr>
<tr>
<td>Coordinates information management and dissemination</td>
<td>Facilitates risk assessment across all levels of the Organization</td>
<td>Coordinates emergency communications across all levels of the Organization</td>
<td>Ensures technical, financial and material support to the Emergency Operations Centre</td>
</tr>
<tr>
<td>Leads data analysis</td>
<td>Provides technical input in areas of:</td>
<td>Facilitates the development and circulation of communications products</td>
<td>Ensures communications support to the overall WHO response</td>
</tr>
<tr>
<td>Epidemiology leads IHR reporting and information sharing</td>
<td>- public health intervention</td>
<td>- Overall Event Coordinator</td>
<td></td>
</tr>
<tr>
<td>Develops and circulates situation reports</td>
<td>- clinical management</td>
<td>- Event Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- human and animal interface</td>
<td>- Team 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- laboratory</td>
<td>- Core Services</td>
<td></td>
</tr>
</tbody>
</table>


Source: WHO

Dr. Shin Young-soo (left), Regional Director, and Dr. Li Ailan, Director of the Division of Health Security and Emergencies, led the inauguration of the Emergency Operations Centre in the WHO Regional Office for the Western Pacific.
The situation reports included information from collaboration with the China Country Office and Office produced 24 internal situation reports, in During the two-month response period, the Regional ¼ of the International Health Regulations (IHR, 2005), WHO must adapt its organizational commitments and procedures to respond to public health emergencies. The WHO Emergency Response Framework (ERF) describes the Organization’s core commitments, the role of the Global Emergency Management Team, the process for grading events, its performance standards, essential policies for optimizing its response, critical functions and emergency response procedures. The core functions of WHO during the avian influenza A(H7N9) emergency response were leadership, information sharing and assessment, technical expertise, and core services.

As the United Nations agency for health, a member of the Inter-Agency Standing Committee (IASC), the lead agency of the Global Health Cluster, and the guardian of the International Health Regulations (IHR, 2005), WHO must adapt its organizational commitments and procedures to respond to public health emergencies. The WHO Emergency Response Framework (ERF) describes the Organization’s core commitments, the role of the Global Emergency Management Team, the process for grading events, its performance standards, essential policies for optimizing its response, critical functions and emergency response procedures. The core functions of WHO during the avian influenza A(H7N9) emergency response were leadership, information sharing and assessment, technical expertise, and core services.

ERF Grade 2 Emergency: What it means

The avian influenza A(H7N9) outbreak was the first event in the Western Pacific Region to be given a Grade 2 designation under ERF. A Grade 2 emergency is defined as a single- or multiple-country event with moderate public health consequences that requires a moderate WHO country office and/or moderate international WHO response. Organizational and/or external support required by the WHO country office is moderate. An emergency support team at the relevant WHO regional office coordinates the provision of support to the WHO country office.

Emergency Operations Centre (EOC): Platform to coordinate WHO’s response to avian influenza A(H7N9)

The event management team at the WHO Regional Office, using EOC as the operational platform, coordinated WHO’s response to the avian influenza A(H7N9) event. The team generated 24 situation reports, 32 talking points, 45 updates on the WHO Regional Office web site and three articles in the online journal, Western Pacific Surveillance and Response. The line list of cases was also periodically updated on the WHO Regional Office web site.

Flowchart of situation report production and dissemination

<table>
<thead>
<tr>
<th>INPUT</th>
<th>ACTION</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information sources</td>
<td>WHO Regional Office event management team collated and assessed the information for timely dissemination</td>
<td>Situation reports distributed to WHO Headquarters, Regional Office and country offices within the Region for timely information sharing, to inform risk assessment for action, to provide advice and guidance, and to prepare responses to the evolving situation.</td>
</tr>
<tr>
<td>RF notifications</td>
<td>WHO</td>
<td>WHO</td>
</tr>
<tr>
<td>Government information (Ministry of Health, Ministry of Agriculture web sites)</td>
<td>Event management team</td>
<td>Situation reports</td>
</tr>
<tr>
<td>Information shared during WHO teleconferences and teleconferences with other international organizations (FAO, OIE, ECDC, WHO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing surveillance systems (ILI and event-based surveillance)</td>
<td></td>
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<tr>
<td>WHO collaborating centres</td>
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<td>Media monitoring</td>
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<td>Scientific journal publications</td>
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Rapid risk assessment: the cornerstone of public health action

Risk assessment and evidence-based response are vital during public health emergencies. The risk assessments undertaken by WHO provided information to Member States and the public about the risk of the avian influenza A(H7N9) infection. They also helped identify key issues for further investigation and communication, including the establishment of event operations teams within WHO and the China–WHO joint mission to assess the outbreak and provide guidance on its management. WHO conducted its first formal three-level risk assessment on 4 April, and its

or resources from other WHO regions, clusters and/or departments. The ERF facilitated a strong WHO-wide response to avian influenza A(H7N9) and ensured adequate human resource surge capacity for monitoring and assessment of the event for a prolonged period.

WHO internal situation reports: timely updates for decision-makers and partners

One of the main roles of the WHO Regional Office’s emergency management team was to produce and disseminate timely situation reports on the avian influenza A(H7N9) event (Figure 13). These internal situation reports allowed for timely information sharing within the Regional Office and with other levels of WHO, including Headquarters and country offices within the Region. During the two-month response period, the Regional Office produced 24 internal situation reports, in collaboration with the China Country Office and Headquarters.

The situation reports included information from IHR (2005) notifications and from other routine ILI surveillance systems in China; notes from teleconferences involving the three levels of WHO and existing international networks, e.g. laboratory networks; media monitoring (including rumour surveillance); references to journal publications; and the web site addresses of government and international organizations (e.g. Food and Agriculture Organization [FAO] and World Organisation for Animal Health [OIE]).

FIGURE 13 Flowchart of situation report production and dissemination

Source: WHO

Emergency Operations Centre (EOC): Platform to coordinate WHO’s response to avian influenza A(H7N9)

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Field epidemiology in action: reflections of a surveillance officer from China

Dr Zu Rongqiang (far left) worked with colleagues at the WHO Regional Office as part of his field epidemiology fellowship. Also in this photo, from left to right, Dr Yuzo Arima, Surveillance Officer; Ms Joy Rivaca Caminade, Risk Communications Officer; Dr Chin-Kei Lee, Emerging Disease Surveillance and Response Team Leader and Dr Karl Schenkel, Epidemiologist; and Dr Manoj Murhekar, Epidemiologist.

The WHO Regional Office for the Western Pacific oversees a fellowship programme for Field Epidemiology Training Programme trainees and graduates from the Region. The fellows spend four to eight weeks at the Regional Office in Manila to gain hands-on experience as regional-level surveillance officers. Some of the duties include event- and indicator-based surveillance and risk assessment. From 2010 to 2013, 33 fellows from 12 countries participated in the fellowship programme.

When the first cases of avian influenza A(H7N9) were reported to WHO, Dr Zu Rongqiang from China was on his second week of a field epidemiology fellowship at the WHO Regional Office. Coincidentally, the areas affected by avian influenza A(H7N9) were near his place of work in China. His language skills and knowledge of the local context were tremendous assets to the event management team.

Dr Zu shared his knowledge of the geographical and sociological background of the affected areas; the existing influenza-like illness (ILI) and pneumonia surveillance systems; the popularity of live bird markets, especially for elderly people; and medical-seeking behaviour. Besides providing a local perspective, Dr Zu quickly translated important news and information available only in Chinese language, which enabled the event management team to verify and share information in a timely manner. This timely information collection was useful for the conduct of risk assessments, which was a critical part of Dr Zu’s learning under the fellowship programme.

Dr Zu also provided a rare opportunity to participate in the regional-level response to a public health emergency. By applying his skills in real-time, Dr Zu made a significant contribution to the global response to avian influenza A(H7N9).

Outcomes were published on the WHO web site on 13 April. The risk assessment focused on three questions: (1) What is the risk of the occurrence of further cases in the affected areas of China? (2) What is the risk of human-to-human transmission? and (3) What is the risk of international spread?

Based on available information about avian influenza A(H7N9) at that time, it was concluded that further cases were expected in China as the main reservoirs of infection among animals and the extent of geographic spread were yet to be established. It was also concluded that there was no evidence of sustained human-to-human transmission. There remained the possibility of international spread through travel; however, as the ability for sustained human-to-human transmission of the virus was not demonstrated, extensive community spread was thought to be unlikely.

With additional data available about the epidemiology of the disease, WHO conducted two more risk assessments; these were published online on 10 May and 7 June, respectively. Though the number of new cases of avian influenza A(H7N9) reported from China had declined, like other avian influenza viruses such as H5N1, there was still a possibility of increased transmission during winter months. WHO therefore recommended that Member States strengthen their surveillance and reporting, and other preparedness actions, as applicable under IHR (2005).

Keeping the world informed: communicating about avian influenza A(H7N9)

Responsible risk communication is vital for managing acute public health emergencies. Rapid dissemination of information to target audiences is essential, as it can

WHO revises interim guidelines on pandemic influenza risk management


The revised guidelines emphasize the use of a risk-based approach and provide Member States with flexibility in their pandemic plans. The revised guidelines uncoupled national actions from global phases. Member States can use the global information to feed into national risk assessments dependent upon their specific situation.

The guidelines also simplify the pandemic phases (Figure 14). The avian influenza A(H7N9) outbreak corresponded to the alert phase, which required increased vigilance and careful risk assessment at local, national and global levels. If a risk assessment indicates that the new virus is not developing into a pandemic strain, then a de-escalation of phase and activities can occur.

FIGURE 14 Phases of the pandemic influenza

<table>
<thead>
<tr>
<th>Pandemic Phase</th>
<th>Alert Phase</th>
<th>Transition Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpandemic Phase</td>
<td>Interpandemic Phase</td>
<td>Interpandemic Phase</td>
</tr>
<tr>
<td>Preparedness</td>
<td>Response</td>
<td>Recovery</td>
</tr>
</tbody>
</table>

Senior management of the WHO Regional Office for the Western Pacific led by Dr Shin Young-soo, Regional Director, tested the functionality of the Emergency Operations Centre during its inauguration.

Left photo: Dr Lu Hongzhou of the Shanghai Public Health Clinical Centre, Huashan Hospital of Fudan University, provided an update on the avian influenza A/H7N9 cases in Shanghai during the China–WHO joint mission.

Right photo: Dr Liang Wannian (left), former Director-General of the Office of Health Emergency Response, National Health and Family Planning Commission of China, and Dr Keiji Fukuda, Assistant Director-General for Health Security of WHO, responded to media questions at the end of the China–WHO joint mission. Dr Liang and Dr Fukuda were team leaders of the mission.

Members of the China–WHO joint mission included experts on epidemiology, clinical management and laboratory and were selected for their relevant expertise and experiences.

A news conference was held in Beijing at the end of the China–WHO joint mission to present the findings and recommendations.

Dr Ren Minghui, Director-General of the Department of International Cooperation, National Health and Family Planning Commission of China, spoke during a technical briefing in Shanghai for the China–WHO joint mission.

Dr Michael O’Leary, WHO Representative in China and official spokesperson for the H7N9 event, provided regular updates to the media to ensure transparent and timely communication to the public.

Dr Li Ailan (centre), Director of Health Security and Emergencies, WHO Regional Office for the Western Pacific, at a technical briefing during the China–WHO joint mission.
reduce confusion and enable the adoption of relevant protective measures.

Many international news media reported the avian influenza A(H7N9) cases around the same time as WHO received official notification of the first cases from China on 31 March. Initial media questions centred on how the virus infected humans, the possibility of human-to-human transmission and how WHO would address this outbreak.

Communications as critical component of H7N9

When the event management team was activated at the WHO Regional Office, the communications function was recognized as a critical element of the response structure. A focal point was identified to coordinate communications across the three levels of the Organization. Clearance mechanisms were established. Talking points and procedures for communications products were agreed, across the three levels of the Organization. Clearance was one of the few places where case-based data were made available, media monitoring was conducted at the three levels of the Organization. Clearance procedures for communications products were agreed, and coordination mechanisms were established. Talking points and responses to media questions were developed on a daily basis for use by the appointed spokespersons.

Media communication was an integral component of the response. A number of news conferences were held to make major announcements, and media inquiries were responded to in a timely manner.

The first WHO media conference was conducted on 1 April 2013 by the WHO Representative in China, Dr Michael O’Leary (official spokesperson for this event). He confirmed China’s notification of the avian influenza A(H7N9) cases to WHO through IHR (2005) and stated that the investigation was ongoing. He also commended the Chinese Government’s transparency in information sharing and announced that WHO was working closely with them.

On 8 April 2013, WHO and China’s NHFPC held a joint news conference to announce the China–WHO joint mission to conduct a field investigation and risk assessment.

Following the notification of the first case in Beijing on 13 April 2013, an informal media interview was held by the WHO China Country Office to clarify the case and the results of the most recent risk assessment.

Two major news conferences were held after the joint China–WHO mission: one in Shanghai on 22 April and another in Beijing on 24 April. These conferences, hosted by the Chinese Government and WHO, provided an opportunity to present the findings and recommendations of the joint mission.

MAXIMIZING WHO WEB SITES FOR AVIAN INFLUENZA A(H7N9) COMMUNICATION

Key information was posted publicly on the Disease Outbreak News page of the WHO web site. Information was also made public on the Outbreaks and Emergencies page of the WHO Regional Office web site, with updates on case numbers, a map showing where the cases were located and links to Disease Outbreak News. Updates were also provided on the WHO China Country Office web site. These online avenues of information-sharing were all regularly updated – almost daily during the initial weeks of the event.

MEDIA MONITORING AS A “LISTENING TOOL”

Media monitoring was conducted at the three levels of WHO to identify the public’s concerns related to avian influenza A(H7N9) and for obtaining feedback on response activities. As media interest escalated, so too did WHO media surveillance. Media monitoring reports, which were generated at the national, regional and international levels, included not only traditional media but also blogs and social media postings.

WESTERN PACIFIC SURVEILLANCE AND RESPONSE: INFORMATION SHARING THROUGH AN ONLINE JOURNAL

The Western Pacific Surveillance and Response Journal (WPSAR) is a peer-reviewed online journal dedicated to the surveillance of and response to public health events and emergencies. WPSAR was used in the avian influenza A(H7N9) response as a mechanism for rapid information sharing.

At the beginning of the response, when case-based data were made available, WPSAR was one of the few places where a full line list of cases was published. Presenting the information in this way aided others in analysing and interpreting the data without having to construct their own line list from text-based case reports.

WPSAR also facilitated the rapid publication of three peer-reviewed articles on the avian influenza A(H7N9) event. These articles comprised a discussion of potential risk factors based on the age and sex distribution, a discussion on the timeline of live bird market closures and the cessation of cases, and an assessment of the risk communication efforts being made by national governments on their web sites. These articles can be accessed on the WPSAR web site at www.wpro.who.int/wpsar/.

The time between submission and publication of these articles, which included assessment by two peer-reviewers, was less than three weeks and as short as
Seventeen agencies from 12 countries and areas provided information regarding the official notification of the avian influenza A(H7N9) event, the actions taken and links to further detailed information on their web sites. Epidemiological updates of reported cases of avian influenza A(H7N9) infection, along with information such as numbers of cases identified, sex, age or occupation, were using the Internet as a means to communicate with their public about the avian influenza A(H7N9) event. There were 13 countries and areas with dedicated and functioning avian influenza A(H7N9)-related pages on 22 government agency web sites: Australia, China, Guam (USA), Hong Kong (China), Japan, Macao (China), Malaysia, Mongolia, New Zealand, Palau, the Philippines, the Republic of Korea and Singapore.

Seventeen agencies from 12 countries and areas provided information regarding the official notification of the avian influenza A(H7N9) event, the actions taken and links to further detailed information on their web sites. Epidemiological updates of reported cases of avian influenza A(H7N9) infection, along with information such as numbers of cases identified, sex, age or occupation, were provided by 10 agencies from seven countries and areas. The Singapore Government also uploaded case reports on its consular services web site aimed at foreign residents and incoming travelers (Table 1).

### Table 1: Avian influenza A(H7N9) information provided on web sites by country and area, Western Pacific Region, 30 April–2 May 2013

<table>
<thead>
<tr>
<th>Countries and areas</th>
<th>Agency</th>
<th>Number of pages in English</th>
<th>Number of pages in own language(s)</th>
<th>General information</th>
<th>Epidemiological information</th>
<th>Prevention</th>
<th>Food preparation</th>
<th>Vaccination</th>
<th>WHO link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>MOH</td>
<td>12</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>China</td>
<td>NHFPC</td>
<td>3</td>
<td>✔</td>
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#### WHEN THE H7N9 VIRUS WENT ‘VIRAL’ IN THE SOCIAL MEDIA

Discussion on avian influenza A/H7N9 in the social media started almost at the same time as traditional media reported the avian influenza A(H7N9) cases in China. WHO used Facebook, Twitter and Sina Weibo (the most visited social media site in China) for messaging and to highlight WHO actions.

#### KEEPING THE COMMUNICATION LINES OPEN FOR INFORMATION SHARING WITH PARTNERS

While the Chinese health and agriculture authorities were conducting the avian influenza A(H7N9) investigations, the international community wanted to be kept abreast of the evolving situation. They wanted the results of investigations and answers to several unanswered questions.

WHO played an important role in this event by sharing information about the investigation of avian influenza A/H7N9 in China with Member States and other key stakeholders. Teleconferences were instrumental in information sharing, including:

- Daily three-level teleconferences between WHO Headquarters, Regional Office and China Country Office during the peak of the outbreak;
- Two teleconferences with the Chinese Center for Disease Control and Prevention (China CDC) and the Global Outbreak and Response Network (GOARN) partner institutes facilitated by WHO Headquarters;
- Teleconferences with clinicians from China and international experts to share and learn from the experience of Chinese physicians treating the avian influenza A/H7N9 patients; and
- Regular teleconferences with other partners e.g. FAO and OIE.

#### Neighbours prepare for avian influenza A(H7N9) with proactive web-based information sharing

Government web sites of 32 of the 37 countries and areas in the Western Pacific Region were searched to identify whether they were using the Internet as a means to communicate with their public about the avian influenza A(H7N9) event. There were 13 countries and areas with dedicated and functioning avian influenza A(H7N9)-related pages on 22 government agency web sites: Australia, China, Guam (USA), Hong Kong (China), Japan, Macao (China), Malaysia, Mongolia, New Zealand, Palau, the Philippines, the Republic of Korea and Singapore.

Adapted from: Harada N et al. Avian influenza A(H7N9): information-sharing through government web sites in the Western Pacific Region, 30 April–2 May 2013.

### Table 1: Avian influenza A(H7N9) information provided on web sites by country and area, Western Pacific Region, 30 April–2 May 2013

<table>
<thead>
<tr>
<th>Countries and areas</th>
<th>Agency</th>
<th>Number of pages in English</th>
<th>Number of pages in own language(s)</th>
<th>General information</th>
<th>Epidemiological information</th>
<th>Prevention</th>
<th>Food preparation</th>
<th>Vaccination</th>
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Lessons learnt and the way forward

"Rapid and coordinated response to the avian influenza A(H7N9) event demonstrated the value of investing in core capacity development under IHR (2005) through the implementation of APSED (2010) in the Region."

Dr Shin Young-soo WHO Regional Director for the Western Pacific

"Going forward, we must maintain a high level of vigilance and continue to enhance our preparedness measures."

Dr Shin Young-soo WHO Regional Director for the Western Pacific

Avian Influenza A(H7N9) Response: AN INVESTMENT IN PUBLIC HEALTH PREPAREDNESS

and communicating a wealth of information on the avian influenza A(H7N9) cases and for collaborating so closely with WHO. "Chinese officials have promptly traced, monitored, and tested thousands of patient contacts, including hundreds of health care workers," Dr Chan said in her address.

A special presentation on the response to the avian influenza A(H7N9) outbreak in China was also held as a side event during the Assembly. The WHO Regional Director for the Western Pacific, Dr Shin Young-soo, commended China’s quick response, professionalism and transparency in handling the H7N9 event. He stated that the China-WHO joint mission served as a good model of sharing responsibility for managing shared risk.

More than 300 delegates attended the side event on 21 May 2013 to hear how China implemented avian influenza A(H7N9) prevention and control measures following the first reported cases in March 2013. They were also told of the important collaboration China had undertaken with WHO, other United Nations agencies and global flu experts as part of the investigation.

China’s Minister of the National Health and Family Planning Commission, Li Bin, also participated in the side event.

Dr Margaret Chan, WHO Director-General, acknowledged China’s collaboration with WHO in managing the avian influenza A(H7N9) outbreak at the sixty-sixth session of the World Health Assembly in Geneva.
Lessons from avian influenza A(H7N9)

The response to the avian influenza A(H7N9) outbreak in China demonstrated the effectiveness of good preparation to deal with an emerging infectious disease. It reconfirmed the importance of developing and enhancing core capacities including public health preparedness efforts.

Some of the key lessons from avian influenza A(H7N9) response are highlighted below.

1. Emerging infectious diseases continue to threaten our health security. New diseases emerge in an unexpected way. The Western Pacific Region has been the epicentre for many emerging diseases, including avian influenza H5N1, severe acute respiratory syndrome (SARS) and now H7N9. Avian influenza A(H7N9) was a great reminder to the world that emerging infectious diseases remain a serious public health threat and, if not managed well, may result in huge health, economic and, social impacts. H7N9 is not only a public health concern in China, but also a global public health issue.

2. As the world confronts unpredictable and borderless health threats, it is imperative to work together. The public health world is one with few boundaries, as diseases can emerge in any country, and do not respect national borders. We do not know when a new disease will strike, but it will happen. We need to prepare for and manage the risk through collective efforts by the affected country and the global community. Regular situation updates and transparent sharing of information demonstrated the openness of authorities. In addition, China CDC shared genetic sequence data, diagnostic test protocols and viruses with the global public health and research communities. These actions contributed greatly to the global risk assessment and response, including the selection and development of candidate human influenza A(H7N9) vaccine.

3. Investment in public health preparedness is vital. The Chinese Government’s swift response to avian influenza A(H7N9) demonstrated that China’s health system following SARS has stronger disease surveillance and response systems. As an important Member State of the Western Pacific Region, China has shown that investments in strengthening core capacities under IHR (2005) pay off with greater public health benefits. Some of the notable initiatives undertaken by China included enhancing public health emergency planning, establishing a web-based reporting system and strengthening the National Influenza Centre as one of the six WHO collaborating centres.

4. Transparent and open channels of communication keep uncertainties at bay. The Chinese Government recognized its vital role in contributing to global public health through open channels of communication with global influenza partners and the international community. Regular situation updates and transparent sharing of information demonstrated the openness of authorities. In addition, China CDC shared genetic sequence data, diagnostic test protocols and viruses with the global public health and research communities. Since rumours spread faster than viruses, timely communication was necessary. When avian influenza A(H7N9) became popular in the social media (almost at the same time as it got significant coverage in the traditional media), WHO maximized the use of Facebook, Twitter and Sina Weibo (the most popular social media in China) in providing update and public health advice. Social media were also used for sharing updates and photos about the WHO response.

5. Collaboration between human health and animal health sectors enhanced response measures. The combined efforts of the human and animal health sectors through mutual sharing of information, close and timely communication and coordinated response were critical in the response to avian influenza A(H7N9). Collaboration between these sectors resulted in public health measures that curbed the source of infection, such as closing of live bird markets, culling of some poultry and disinfection of the market environment.

6. Modern communications technology and social media increased the public’s demand for timely and transparent communication. Since rumours spread faster than viruses, timely communication was necessary. When avian influenza A(H7N9) became popular in the social media (almost at the same time as it got significant coverage in the traditional media), WHO maximized the use of Facebook, Twitter and Sina Weibo (the most popular social media in China) in providing update and public health advice. Social media were also used for sharing updates and photos about the WHO response.

7. WHO delivers its commitments to managing public health threats through coordinated Organization-wide response. As a guardian of IHR (2005), WHO has the mandate and legal instrument to coordinate the global response to avian influenza A(H7N9). It activated an Organization-wide mechanism involving the three levels of WHO—China County Office, Western Pacific Regional Office and Headquarters—to support the H7N9 response. The newly developed ERF provided overall guidance in line with the emergency management system and ensured adequate human resource surge capacity for monitoring and assessment of the event. The EOC at the Regional Office was the common platform used to coordinate the response.

8. IHR (2005) is critical in managing public health emergencies. This legally binding document provides a framework for the collective responsibility of countries, WHO and other partners to uphold global public health security. The avian influenza A(H7N9) outbreak provided a real world event to test IHR (2005) functioning. The collective efforts of China and...
the international community, in line with IHR (2005) and other international and regional frameworks such as APSED (2010), have greatly contributed to the current understanding about the nature of the avian influenza A(H7N9) virus, public health risk assessments and actions required to manage the shared risk. International collaborative efforts, especially transparent and timely sharing of information and viruses, as well as technical-level discussions and consultations, were highly recognized as critical elements in the swift global response. WHO’s response to H7N9 also demonstrated the importance and value of having a functional alert and response system and IHR (2005).

9. The Western Pacific Region remains vulnerable; it is not yet prepared for a severe public health emergency. Despite the investment in health security, 14 of the 27 Member States in the Western Pacific Region have not yet achieved the minimum core capacity requirements under IHR (2005). Sustainable investment in human resources and increased allocation of funding on health sector is essential for effective risk management and making the Region better prepared for any future emerging diseases.

Gearing for global preparedness: framework for action for national health authorities

To further support preparedness, the Western Pacific Regional Office developed a framework for action for national health authorities to highlight areas of public health emergency response that may need specific action for avian influenza A(H7N9).

The framework considered three possible scenarios for countries:

- **Scenario 1**: No locally acquired case(s) of human infection with avian influenza A(H7N9) in country,
- **Scenario 2**: Sporadic case(s) of human avian influenza A(H7N9) infection in country; and
- **Scenario 3**: Sustained human-to-human transmission of avian influenza A(H7N9) in country.

The framework for action is based on APSED (2010) and covers the key technical areas outlined in the box below. The framework provides examples of key responses for each technical area, key trigger points and an overarching strategy for each of the three possible scenarios.

Table 2 provides the framework for response and action for the scenario in which most countries would currently fit, i.e. Scenario 1: no locally acquired human case of avian influenza A(H7N9) in country.

### Key technical areas for action and response

- **Command and control**
- **Surveillance, risk assessment and response**
- **Laboratory**
- **Clinical management and infection prevention and control**
- **Zoonoses (human–animal interface)**
- **Public health interventions and emergency preparedness**
- **Risk communication**

Table 2: Framework for response and action for Scenario 1

**Scenario 1: No locally acquired human case of avian influenza A(H7N9) in country**

**Key trigger points for the scenario:**

- No evidence of locally acquired human infection with H7N9
- Detection of H7N9 infection with a recent history of travel to an affected area
- No evidence of H7N9 in animals

**Overarching strategy for the response:**

- Ensure systems are in place to detect, report, manage and prevent infections from animal or environmental sources.
- Ensure systems are in place to undertake epidemiological and virological investigations.
- Ensure systems are in place to recognize and manage clinical cases and implement infection prevention and control in health-care facilities.
- Ensure systems are in place for timely and full reporting to WHO in line with IHR (2005).
- Regularly reassess and communicate the public health risk of human cases of H7N9 in country.
- Review preparedness and readiness for a change in risk.

**Table 2 Framework for response and action for Scenario 1**

<table>
<thead>
<tr>
<th>Key technical areas</th>
<th>Response measures for country</th>
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</thead>
<tbody>
<tr>
<td>Command and control</td>
<td>• Review all response systems including event management systems, EOC, logistics, equipment and standard operating procedures.</td>
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<td>• Review pandemic plan, including how to operationalize it, e.g. activating an event management system.</td>
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<tr>
<td>Surveillance, risk assessment and response</td>
<td>• Monitor and strengthen existing IILI and severe acute respiratory infection surveillance including raising awareness of health-care workers and points of entry.</td>
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<td>• Monitor and strengthen event-based surveillance and reporting mechanisms.</td>
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<td>• Ensure risk assessment mechanism is in place to assess incoming information and ensure a proportionate response.</td>
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<td>• Review rapid response team field investigation mechanism/guidelines.</td>
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<tr>
<td>Laboratory</td>
<td>• Ensure mechanisms are in place for laboratory diagnostics, shipping of specimens and reporting for surveillance.</td>
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<tr>
<td>Human-animal interface/zoonoses</td>
<td>• Establish a multisectoral joint working mechanism.</td>
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<td>• Establish close cooperation with agriculture/animal authorities to share details of each other’s investigations, particularly about the potential of human exposure from animals.</td>
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<tr>
<td>Clinical management and infection prevention and control</td>
<td>• Alert hospitals and community medical practitioners to symptoms, diagnosis, clinical management and infection prevention and control procedures.</td>
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<tr>
<td>Public health interventions</td>
<td>• Review the status of oseltamivir and personal protective equipment stocks and examine mechanisms for distribution.</td>
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<td>• Investigate the status of vaccine preparedness and policies for vaccine distribution.</td>
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<td>• Review public health intervention guidelines.</td>
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<tr>
<td>Risk communication</td>
<td>• Ensure a risk communication strategy is set up for H7N9 with a system for developing messages and clearance procedures established, coordination arrangements agreed and communication equipment and trained.</td>
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<td>• Agree on a mechanism for timely development, release and updating of information on H7N9 to the public and ensure appropriate distribution arrangements are in place (talking points, FAQs, web pages, press releases, etc.).</td>
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<tr>
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<td>• Ensure roles and responsibilities are agreed for mutual communication and cooperation including timely reporting in line with IHR (2005).</td>
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</table>

Source: WHO
References


Partners

KEY APSED (2010) PARTNERS

Asia-Europe Foundation
Asian Development Bank
Australian Agency for International Development
Canadian International Development Agency
European Commission
Food and Agriculture Organization of the United Nations
Japan International Cooperation Agency
Japan International Cooperation System
Ministry of Foreign Affairs – Official Development Assistance, Japan
Ministry of Health, Labour and Welfare, Japan
National Institute of Infectious Diseases, Japan
National Red Cross and Red Crescent Societies
International Federation of Red Cross and Red Crescent Societies
Institut Pasteur, Paris, France
Public Health Agency of Canada
Regional Emerging Diseases Intervention Centre
Secretariat of the Pacific Community
United Nations Children's Fund
United States Agency for International Development
United States Centers for Disease Control and Prevention
World Bank
World Organisation for Animal Health

PARTNERS FOR AVIAN INFLUENZA A(H7N9) RESPONSE

Asia-Europe Foundation
Australian Agency for International Development
European Commission
Ministry of Health, Labour and Welfare, Japan
United States Agency for International Development
United States Centers for Disease Control and Prevention
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Special thanks are extended to colleagues from WHO headquarters and Country Offices, especially WHO China.

We also thank our partners and donors who provided technical and financial support to WHO for the avian influenza A(H7N9) response, and for the overall implementation of APSED (2010).

Lastly we express our sincerest gratitude for the valuable contributions of WHO technical staff, experts and consultants who shared their time and expertise as members of the WHO Regional Office event management team for avian influenza A(H7N9).

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