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



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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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Foreword

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

SPECIAL NOTE ON THIS PUBLICATION

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 WH0 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) 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.

"At present, human-to-human transmission of the virus is negligible. However, influenza viruses constantly reinvent themselves. No one can predict the future course of this outbreak."

> Address to the sixty-sixth session of the World Health Assembly Geneva, Switzerland, 20 May 2013

Avian Influenza A(H7N9) Response: AN INVESTMENT IN PUBLIC HEALTH PREPAREDNESS 1



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 126 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.

FIGURE 1 Distribution of human infection with avian influenza A(H7N9) by province/municipality in China





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Map production: Public Health Information and Geographic Information Systems (GIS)



Understanding avian influenza A(H7N9)

"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).



Source: WHO

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



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FIGURE 4 Timeline of first notification of cases per province and municipality



Source: WHO

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