Ninth Meeting of the National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions

18-21 August 2015
Phnom Penh, Cambodia
MEETING REPORT

NINTH MEETING OF NATIONAL INFLUENZA CENTRES AND INFLUENZA SURVEILLANCE IN THE WESTERN PACIFIC AND SOUTH-EAST ASIA REGIONS

Convened by:

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NOTE

The views expressed in this report are those of the participants of the Ninth Meeting of National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions and do not necessarily reflect the policies of the conveners.

This report has been prepared by the World Health Organization Regional Offices for the South-East Asia and Western Pacific for Member States in the Regions and for those who participated in the Ninth Meeting of National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions in Phnom Penh, Cambodia from 18 to 21 August 2015.
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Keywords:

Communicable diseases, Emerging / Disease outbreaks – prevention and control / Influenza, Human – epidemiology / Influenza in birds / Sentinel surveillance / Zoonoses
SUMMARY

The Ninth Meeting of National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions took place in Phnom Penh, Cambodia from 18 to 21 August 2015.

The overall objective of the meeting was to further strengthen influenza surveillance, preparedness and response in the World Health Organization (WHO) South-East Asia and Western Pacific regions. The primary objectives were:

1. To provide updates on the global and regional status of seasonal and zoonotic influenza viruses;
2. To review and improve understanding of recent developments in the epidemiology and laboratory characterization of zoonotic influenza, including A(H7N9), A(H5N1) and other novel subtypes;
3. To introduce technical methods and share country experiences with estimating burden of influenza disease; and
4. To identify priorities to improve surveillance and response systems within the framework of the Asia Pacific Strategy for Emerging Diseases (APSED) for the coming year.

A total of 111 people were in attendance, including 46 participants from 22 Members States (16 from the Western Pacific Region and six from the South-East Asia Region), 11 temporary advisers, 31 observers, and 23 members of the WHO Secretariat representing headquarters, two regional offices and 11 country offices. The meeting was opened by the WHO Representative to Indonesia and the Secretary of State of Cambodia on behalf of the Ministry of Health.

The meeting consisted of four plenary sessions, one breakout session, one panel discussion and field visits to the Pasteur Institute of Cambodia (Cambodia National Influenza Centre) and the National Institute of Public Health. The specific topics for the plenary sessions and panel discussion were as follows: influenza and beyond; using influenza data for action; burden of disease estimates and application; avian and novel influenza viruses; and scientific forum on zoonotic and avian influenza.

Meeting recommendations suggested that Member States should: (1) further strengthen their influenza surveillance systems as a public health priority, including the function of National Influenza Centres (NICs), sentinel sites, event-based surveillance, influenza pandemic risk assessments, and interaction between human and animal health sectors; (2) improve and maintain laboratory capacities for the detection of influenza viruses and ensure laboratory quality through participation in external quality assurance (EQA) programmes; (3) ensure influenza viruses are shared with the relevant reference centres and WHO collaborating centres (CCs) for confirmation and further characterization; (4) further contribute to and support Global Influenza Surveillance and Response System (GISRS) activities, including regional information sharing and contribution to influenza publications; (5) utilize Pandemic Influenza Preparedness (PIP) support to further strengthen national surveillance systems and increase virus sharing; and (6) participate in updating the Biregional Plan for Further Strengthening National Influenza Surveillance.
Additional meeting recommendations suggested that WHO should: (1) provide support to strengthen the NICs and Member States’ event-based and sentinel site surveillance systems, incorporating disease burden studies, influenza pandemic preparedness, including risk assessments, severity assessments, identification of training needs, and interaction with the animal health sector; (2) enhance GISRS to ensure early and accurate detection and characterization of circulating and novel influenza viruses in the Asia-Pacific region; (3) facilitate the regional influenza surveillance data-sharing system, including regular reporting and publication of regional influenza surveillance data; (4) encourage Member States to work closely with WHO on PIP activities in order to strengthen influenza surveillance capacity and increase virus sharing; and (5) coordinate the review and update of the Biregional Plan for Further Strengthening National Influenza Surveillance.
1. INTRODUCTION

1.1 Meeting organization

The Ninth Meeting of the National Influenza Centres and Influenza Surveillance in the Western Pacific and South-East Asia Regions took place in Phnom Penh, Cambodia from 18 to 22 August 2015. The meeting was coordinated by the World Health Organization (WHO) Regional Office for the Western Pacific in collaboration with the WHO Regional Office for South-East Asia and the WHO Country Office in Cambodia. The aim of the meeting was to bring together Member States, National Influenza Centres (NICs) and WHO collaborating centres (CCs), as part of the Global Influenza Surveillance and Response System (GISRS), to discuss issues, challenges and solutions to epidemiological and laboratory surveillance of seasonal, avian and emerging influenza viruses. The list of participants and the meeting programme are given in Annexes 1 and 2, respectively.

1.2 Meeting objectives

The objectives of the meeting were:

1) to provide updates on the global and regional status of seasonal and zoonotic influenza viruses;

2) to review and improve understanding of recent developments in the epidemiology and laboratory characterization of zoonotic influenza including A(H7N9), A(H5N1) and other novel subtypes;

3) to introduce technical methods and share country experiences with estimating burden of influenza disease; and

4) to identify priorities to improve surveillance and response systems within the framework of the Asia Pacific Strategy for Emerging Diseases (APSED) for the coming year.

The main outcome of the ninth bi-regional meeting was the generation of recommendations for Member States and WHO. These are to be implemented over a period of 12 months or longer, if necessary, with a view to further strengthening influenza surveillance, preparedness and response in the Asia-Pacific region.
2. PROCEEDINGS

2.1 Opening session

The meeting was opened by the WHO Representative to Cambodia, Dr Dong Il Ahn, who spoke on behalf of the WHO Regional Director for the Western Pacific, Dr Shin Young-soo. His Excellency, Professor Eng Huot, Secretary of State, spoke for the Ministry of Health, Cambodia. Dr Erica Dueger, Medical Officer, Disease Surveillance and Epidemiology unit of the WHO Western Pacific Regional office, presented the objectives and expected outcomes of the meeting.

Dr Lance Jennings of New Zealand and Professor Mahmudur Rahman of Bangladesh were elected co-chairs of the meeting, while Dr Ian Barr of Australia and Dr Jaqueline Katz of the United States of America were chosen as rapporteurs

2.2 Plenary Session One: Influenza and beyond

Chair: Dr Lance Jennings, Canterbury Health Laboratories

2.2.1 Implementing International Health Regulations (IHR) through APSED: Influenza as a priority

Dr Li Ailan, WHO Regional Office for the Western Pacific

The world is not ready for emerging health security threats, as was seen during the recent outbreaks of Ebola virus disease and Middle East respiratory syndrome coronavirus (MERS-CoV) infection. Vulnerability is universal, and the unpredictability of influenza continues to make it a health security threat that requires our attention.

Through APSED, significant progress has been made in achieving IHR core capacities within the South-East Asia and Western Pacific regions. A recent evaluation reconfirmed the relevance of APSED and its contributions to long-term capacity-building for preparation and response to emerging infectious diseases, including pandemic influenza.

Influenza surveillance is well established within the two regions, with six WHO CCs and 31 NICs in 23 countries. The number of laboratories and epidemiological surveillance sites has steadily increased, and the quality of work has improved. Generic capacities applicable to other emerging infectious diseases have been established, as was seen with MERS-CoV. It is important to continue to make influenza a public health priority and strengthen surveillance for rapid detection and response to new public health threats.

2.2.2 Update on influenza activities in the Asia-Pacific region

Dr Erica Dueger, WHO Regional Office for the Western Pacific

In 2011, the Biregional Plan for Further Strengthening National Influenza Surveillance was developed to guide regional activities under APSED.

In the South-East Asia Region, laboratory training on specimen collection and storage, virus detection and characterization, cell culture and quality control, drug resistance testing, and shipment of infectious substances was conducted. National influenza surveillance networks were strengthened in Bhutan and the Maldives. Technical assistance was provided for estimating the burden of influenza disease in Nepal and Indonesia and for setting up web-based reporting in Bhutan.
In the Western Pacific Region, laboratories assisted with the MERS-CoV response, conducted training in the shipment of infectious substances and participated in EQA programmes. Severe acute respiratory infection (SARI) surveillance was initiated in Fiji, animal surveillance was integrated into event-based surveillance in the Lao People’s Democratic Republic, and the early warning and response network was supported in Cambodia (CamEWARN). Burden of influenza disease training was carried out in Cambodia, the Lao People’s Democratic Republic and Mongolia, and a regional, web-based influenza reporting platform was designed.

Both regions worked to strengthen links with the animal sector, develop vaccine policy, and conduct education and awareness activities.

2.2.3 Seasonal influenza activity in the northern hemisphere

Dr Takato Odagiri, Influenza Virus Research Centre, National Institute of Infectious Diseases, WHO CC, Japan

Dr Odagiri presented an overview of influenza activity during the 2014-2015 flu season in the northern hemisphere, including countries in Europe, the United States of America and Japan. Phylogenetic analyses, haemagglutination inhibition (HI) assay results and antigenic cartography maps were presented for influenza A(H1N1)pdm09, A(H3N2) and B(Victoria and Yamagata) viruses. Influenza A(H3) viruses were predominant. With respect to the vaccine, the circulating A(H1N1)pdm09 strains closely matched, while the circulating A(H3N2) and B viruses did not match well. For the 2015-2016 trivalent vaccine, it was recommended that the A(H1N1)pdm09 strain remain the same (i.e. A/California/7/2009), the A(H3N2) strain be switched from A/Texas/50/2012 to A/Switzerland/9715293/2013, and the B virus be switched from B/Massachusetts/2/2012 to B/Phuket/2012. B/Brisbane/60/2008 was again recommended for the quadrivalent vaccine.

Since February 2014, influenza A(H3N2) viruses have shown antigenic drift in subclades 3C.3a and 3C.2a. Changes in the receptor binding characteristics of human H3N2 viruses have been evident from changes in the agglutination of different red blood cells and the reduced growth capacity of recently isolated viruses. This led to challenges with the H3N2 HI assay such as low homologous HI titres and potential false negatives with subclade 3C.2a viruses. Neuraminidase inhibitors are now recommended as components of H3N2 HI assays to overcome this issue.

2.2.4 Seasonal influenza activity in the southern hemisphere

Dr Ian Barr, Victorian Infectious Diseases Reference Laboratory, WHO CC, Australia

Dr Barr presented an overview of influenza activity in 2015 in the southern hemisphere, with country-specific data from Australia, New Zealand and South Africa. Of the subtyped influenza A viruses, 61 (2.7%) were influenza A(H1N1)pdm09 and 2232 (97.3%) were influenza A(H3N2). Of the characterized B viruses, 143 (91.1%) belonged to the B/Yamagata lineage and 14 (8.9%) to the B/Victoria lineage. The vaccine virus A/California/7/2009 was an excellent match for circulating A(H1N1) viruses, B/Massachusetts/2/2012 was a very good match for circulating B viruses, and A/Texas/50/2012 was a satisfactory match for circulating A(H3N2) viruses. There is some indication that the A(H3N2) vaccine effectiveness was reduced with egg-based vaccines and that the circulating virus was mainly clade 3C2a rather than clade 3C3a, which was used in the vaccine.
2.2.5 Global update on seasonal influenza

Dr Frank Konings, WHO Regional Office for the Western Pacific

The global circulation of seasonal influenza for the period July 2014–July 2015 was presented based on FluNet data. The influenza situation for each of the six WHO regions was also presented. Overall, compared to the previous two years, there was much less A(H1N1) activity, higher H3N2 activity and more B viruses (majority B/Yamagata) detected. A(H3N2) viruses predominated and caused a significant burden of disease in elderly people. Circulating viruses were not covered well by the 2014-2015 vaccine due to mismatched H3N2 viruses. The drifted H3N2 viruses were first detected during late March 2014, after the vaccine virus composition selection meeting in February 2014. Contributions of viruses and data by NICs are essential for obtaining a global picture of influenza and to demonstrate the good functioning of GISRS.

2.2.6 Influenza: Ecological and Agricultural Considerations

Professor George Fu Gao, Chinese Center for Disease Control and Prevention, NIC, China

Human cases of avian influenza continue to be reported. The H9N2 avian influenza virus has more than 100 genotypes and is endemic in many bird species in Asia and the Middle East. Through reassortment events, this virus may have contributed to the genesis of influenza A viruses (H5N1, H7N9 and H10N8), each of which resulted in human infections and poses a potential pandemic threat. A genetic analysis of the A(H6N1) case indicates the virus originated from poultry in Taiwan, China. Three laboratory-confirmed human cases of avian influenza A(H5N6) were detected in China. All three cases were exposed to poultry or wild birds, and two of the three cases died. We now know that H5N6 is a genetic reassortant derived from A(H5N1) and other avian influenza viruses. Human infections of A(H5N6) in China belong to the A(H5) HA genetic clade 2.3.4.4. Approximately 100 migratory birds were found dead in the Sanmenxia Reservoir Area of China in January 2015. Genetic and phylogenetic analyses revealed that this Sanmenxia H5N1 virus was a novel reassortant. Sanmenxia Clade 2.3.2.1c-like H5N1 viruses have the closest genetic identity to A/Alberta/01/2014 (H5N1). The continuous evolution of influenza viruses, reassortment and detections of non-seasonal viruses in humans emphasizes the importance of surveillance at the human–animal interface.

2.3 Plenary Session Two: Improving the use of influenza data

Chair: Dr Pushpa Wijeshinghe, WHO Regional Office for South-East Asia

2.3.1 Pandemic Influenza Preparedness (PIP) Framework progress update

Dr Supriya Bezbaruah, WHO Regional Office for South-East Asia

The PIP Framework brings together WHO, Member States, industry and other stakeholders to implement a global approach to pandemic influenza preparedness and response. The goals are to improve and increase the sharing of circulating influenza virus isolates with human pandemic potential, and to increase the access of developing countries to vaccines. The PIP Framework obligates companies dependent upon influenza virus isolates collected through the GISRS network to provide annual payments to WHO (approximately US$ 28 million per year) to strengthen pandemic preparedness and response in Member States, including burden of disease estimation, strengthening laboratory skills and surveillance, building regulatory, risk communication, and deployment capacity, as well as antiviral and vaccine stockpiling. Several countries have been prioritized for PIP funds to
strengthen laboratory skills and surveillance in the Western Pacific Region (Cambodia, Lao People’s Democratic Republic, Mongolia and Viet Nam) and South-East Asia Region (Bangladesh, Democratic People’s Republic of Korea, Indonesia, Myanmar, and Nepal). In these priority countries, efforts will be stepped up to detect viruses as they emerge, to share virus isolates, and to report surveillance information rapidly and efficiently via global influenza information platforms (FluNET and FluID). Several challenges to progress were noted, including influenza being a low national priority, untimely data collection, validation and analysis, and human resource constraints. PIP could support NICs through funds for reagents, equipment, strengthening biosafety, improving data management, and general capacity-building. In return, NICs would be obligated to share viruses with pandemic potential and surveillance information, as well as continue to strengthen their capacity as per the framework indicators.

2.3.2 Regional influenza dashboards

Ms Sarah Hamid, WHO Regional Office for the Western Pacific

Two WHO global influenza information platforms, FluNet and FluID, can be used to collate and dynamically view data for real-time monitoring of influenza activity. NICs and other laboratories have been entering virological data into FluNet since the 1990s (www.who.int/flunet). FluID is a lesser-known epidemiological data platform that complements the FluNet virological data collection tool. The WHO Regional Office for the Western Pacific is developing a regional dashboard that compiles FluNet and FluID data, enabling Member States to compare influenza activity across years and transmission zones. Users can access an overview of seasonal influenza activity and avian influenza activity, country profiles, surveillance system descriptions including ILI, SARI and viral information, and archived references and links. Ms Hamid demonstrated the regional dashboard and explained how it could be used to benefit Member States. In developing the dashboard, a short survey was sent to Member States for their input. Thirty countries responded. Feedback was positive overall with Member States requesting additional charts to allow simultaneous viewing of multiple countries and supplementary antigenic and phylogenetic information. In order to facilitate data reporting to FluID, Member States were requested to identify focal points to submit weekly epidemiological data to the WHO Regional Office.

2.3.3 Updates on the WHO review of seasonal influenza vaccine in the tropics

Dr Philip Gould, WHO Regional Office for South-East Asia

Two recent WHO meetings reviewed influenza vaccination in tropical and subtropical regions. The first meeting concluded that there was no scientific evidence of unusual evolution or emergence of variant viruses in these areas. It recommended that influenza vaccination should be determined by country seasonality and virus evolution patterns, should occur before the peak of influenza activity, and should use the most recent WHO-recommended formulation. The second meeting examined ways to increase the use of influenza vaccination in tropical and subtropical areas, focusing on the steps countries should take to operationalize their considerations for vaccine composition and timing, and the actions WHO should take to support countries to gather the appropriate evidence to inform their policies. These included improving ILI, SARI and viral surveillance, increasing the sharing of information and viral isolates, conducting burden of disease estimates and programme evaluations, and advocating for evidence-informed policies.
2.3.4 Establishing influenza thresholds – preliminary findings

*Dr Ly Sovann, Ministry of Health, Cambodia*

Specific thresholds to detect the start and intensity of an influenza season are important to implement appropriate public health action. The Cambodian influenza season was previously described to be between June and December. Using the WHO threshold method (WHO Global Epidemiological Surveillance Standards for Influenza [2013]) with Cambodia’s historical ILI surveillance data from 2010–2014, the study established seasonal and alert thresholds for the first time in a tropical country. The usefulness of combining syndromic and laboratory surveillance data as an indicator for monitoring influenza activity was reconfirmed. The intensity level of the season was further categorized based on these thresholds. This categorization could also be applied directly to assess severity during a pandemic. With the present findings, the Cambodian Ministry of Health plans to alert and raise awareness among the medical community and general public, offering general knowledge of influenza and its seasonality, to implement preventive measures to reduce transmission and prevent misuse of antimicrobials.

2.4 Panel Discussion: Burden of disease estimates and application

*Facilitators:*

*Ms Ann Moen, United States Centers for Disease Control and Prevention (US CDC)*

*and Dr Sonja Olsen, US CDC*

2.4.1 Burden of disease overview and impact: health-care systems, economics and national vaccine policy

*Ms Ann Moen, US CDC, WHO CC, USA*

Influenza disease burden estimates, which take into account the number of influenza outpatients, influenza-associated hospitalizations and influenza-associated deaths, reveal the extent of influenza disease in different age groups and among high-risk populations, such as pregnant women. These estimates help prioritize national and global public health policies and programmes, including vaccine introduction and risk communications, and can be used to evaluate influenza prevention and control programmes. Some countries have started to publish influenza disease burden estimates, but only minimal data are available at the global level. In order to estimate influenza disease burden with some validity, one year of standardized, complete and representative SARI or ILI data with laboratory and population data are required. This information should be collected through targeted active surveillance such as SARI or ILI sentinel site surveillance. Estimates can be produced by following the methods outlined in the WHO Burden of Disease Manual. Several countries were selected as PIP priority countries to conduct burden of disease estimation studies. Several limitations were identified including unknown sentinel site catchment area, which can be determined through health-care utilization surveys or hospital admission surveys, poor representativeness of sentinel sites, and poor understanding of economic burden.

2.4.2 Panel Discussion: Member States’ successes and challenges with burden of disease estimation

*Cambodia: Dr Kheng Sim*

To understand burden of influenza disease in Cambodia, a study was conducted to produce national estimates. Using ILI and SARI sentinel surveillance data, preliminary estimates showed that influenza incidence was higher at some sites but was generally consistent by site annually. The Svay Rieng site had the lowest incidence, and sites at Senmonorom and Trey Koh had the highest incidence. Among
influenza-associated ILI consultations, the greatest burden was among the 0–4 years age group. Among influenza-associated SARI inpatients, the greatest burden was among the 0–4 and 50+ years age groups. Several limitations were identified, including poor data quality, lack of data on catchment populations, and limited understanding of health-care seeking behaviour. The Cambodian Ministry of Health plans to further evaluate the sentinel sites’ catchment areas to address these issues and advocate for influenza prevention and control activities.

**Indonesia: Dr Vivi Setiawaty**

Indonesia’s influenza surveillance system has six SARI sentinel sites, 25 ILI sentinel sites and event-based surveillance. This study used the WHO Manual for Estimating Disease Burden Associated with Seasonal Influenza to calculate the incidence of influenza-associated SARI. A health admissions survey was conducted to ascertain the sentinel site catchment population. The crude incidence rate for influenza-associated SARI was 7.56 cases per 100 000 population. For children under 5 years of age, the incidence rate was 71.62 cases per 100 000 population. Limitations of the study included nonstandardized diagnosis and records among Indonesian hospitals. Moving forward, data from another two hospitals will be analysed and gaps will be identified to improve surveillance. In Indonesia, influenza disease burden estimates will be important for informing evidence-based policy for decision makers, the introduction of influenza vaccine into public health programs and planning surveillance activities.

**Lao People’s Democratic Republic: Dr Thongchanh**

The influenza surveillance system of the Lao People’s Democratic Republic includes eight ILI and five SARI sentinel sites. Data from 2012–2014 indicate that the influenza season is between August and November. The incidence of influenza-associated ILI ranged from 74 to 633 cases per 100 000 people across sentinel sites. For influenza-associated SARI, the incidence ranged from 12 to 94 cases per 100 000 people. The SARI incidence was similar among four of the sites (range: 12–35 per 100 000) but was markedly higher at the Champasack site (94 per 100 000).

Limitations of the study were the nonsystematic collection of samples and lack of clearly defined catchment areas. The Lao People’s Democratic Republic aims to improve data collection, conduct mapping exercises and carry out a hospital admission survey to understand catchment area populations. The country also aims to conduct an economic burden study to better understand the costs associated with influenza.

**Bangladesh: Professor Madmudur Rahman**

Bangladesh’s influenza surveillance system has several components, including hospitals, community sites, wet markets, event-based surveillance, web- and phone-based surveillance as well as high-risk group surveillance for avian influenza. A recent publication described a low-cost methodology used to estimate the incidence of influenza-associated mortality in Bangladesh between 2010 and 2012. The study estimated that 10 092 deaths in 22 administrative unions were attributed to influenza. The crude estimate of cumulative annual incidence of influenza-associated mortality was 8.3 per 100 000 population (95% confidence interval [CI]: 6.5–10.1). Age-specific incidence was also calculated with the highest incidence among the 60+, 20–59 and under 5 age groups, respectively. Among the remaining 20 administrative unions, it was estimated that 15 989 deaths (95% CI: 14 981–16 853) were attributed to influenza in 2011. Of these, 78% of deaths were attributed to persons aged 60 years and older.
Bangladesh's multipronged influenza surveillance system has been instrumental in decision-making. During the 2009 epidemic, the quick identification of A(H1N1)pdm09 cases led to early treatment and presumptive treatment strategies.

**Mongolia: Dr Bayar Oyun**

Influenza surveillance in Mongolia has evolved from a telephone-based surveillance system, which was costly and labour intensive, to a laboratory-supported, standardized and automated sentinel surveillance system that collects data from 152 selected sites online. Weekly epi-lab surveillance data are analyzed and the reports are posted on the public website of the NIC. Laboratory specimens are collected and tested on a weekly basis. Data from 2014–2015 reveal that AH3 virus predominated throughout the flu season followed by RSV. Influenza positivity was around 9% in all specimens tested.

During an influenza burden of disease workshop, which was organized with support from the WHO Regional Office for the Western Pacific in June 2015, various indicators of influenza disease burden were estimated using Mongolian sentinel surveillance data. The analysis showed that although children under 9 years of age are at most risk, SARI-associated deaths are much higher among the elderly. It also showed that ILI activity usually peaks during weeks 7–9 reaching 50–70 cases per 10 000 population.

Lesson learnt from the influenza burden of disease were used to improve the surveillance system including data management, risk assessment, sampling techniques and use of surveillance information for decision-making.

**Nepal: Dr Kedar Baral**

Patan Hospital started influenza surveillance in 2011. From January 2011 to December 2014, the percentage of ILI cases in the outpatient department ranged from 0.39% to 0.99%. Of 1341 laboratory samples, 33.31% were influenza positive. The lowest positivity rate (18.48%) was recorded in 2013, and the highest (38.37%) in 2011. The first of two influenza seasons started in December–February and went through March. The second ran from July to September–October. The predominant types each year were AH3 (73.55%), B (76.71%), AH3 (49.02%) and AH3 (36.26%). H1N1pdm09 had a positivity rate ranging from 2.58% to 39.22% during the four-year period.

SARI surveillance was started in January 2013. From January 2013 to December 2014, the percentage of SARI cases among admitted patients ranged from 4.36% to 9.07%. The highest rate was recorded in 2014, which coincided with A(H1N1)pdm09 outbreaks in India and Nepal. Of the 680 samples, 9.41% were influenza positive. The lowest positivity rate (8.36%) was recorded in 2014, and the highest (13.85%) in 2013. In 2013, the influenza seasons were from mid-January to mid-March and from the last week of June to mid-July. In 2014, they were from mid-February to mid-April and from August to October. The predominant types were influenza A(H1N1pdm09) (66.67%) and H3 (45.65%). H1N1pdm09 had a positivity rate ranging from 66.67% to 28.26% in the two-year period.
2.5 Plenary Session Three: Avian and novel influenza viruses

Chair: Dr N Janakan, WHO Country Office in Sri Lanka

2.5.1 Avian and novel influenza viruses

Dr Katelijn Vandemele, WHO headquarters

Human infections with non-seasonal influenza are monitored very closely because of their pandemic potential. From 2003 to 17 July 2015, 844 laboratory-confirmed human cases of A(H5N1) were reported to WHO by 16 countries. In addition, four human infections with influenza A(H5N6) were notified by China. During the last year, WHO received reports of an unprecedented increase in human cases of A(H5N1) infection in Egypt and of the rapid spread of avian influenza A(H5) outbreaks especially in areas that had never experienced outbreaks. From 2013 to 17 July 2015, 677 laboratory-confirmed human cases of avian influenza A(H7N9) were reported from three countries to WHO.

There is evidence of further diversity among the H7N9 genotypes. The overall risk assessment remains the same; whenever these avian viruses are circulating in poultry, sporadic human infections would be not unexpected. However, the rapid spread of H5, the continuous evolution of influenza viruses, unprecedented reassortment events and increasing human infections emphasize the importance of continued surveillance at the human–animal interface, the need for detailed epidemiological and clinical investigation, and quick virus characterization to understand better their pandemic risk. In addition, WHO received reports of several human infections with other non-seasonal influenza viruses (H9N2, H3N2v, H1N2, H1N1v), emphasizing the importance of continued surveillance at the human–animal interface.

2.5.2 Updates and recent findings on H7N9 in China

Dr Shu Yuelong, National Institute for Viral Disease Control and Prevention, WHO CC, China

In the last three years, China has reported 656 influenza A(H7N9) cases, mostly among adult males, from distinct provinces. Annual peaks of activity follow the northern hemisphere seasonal patterns. The overall case fatality rate was 41%, which increased with age, and many cases had comorbidities. Most cases (84%) reported exposure to poultry or live bird markets. Although family clusters have been reported, sustained human-to-human transmission has not been observed. Recent serology studies have shown higher seropositivity among poultry workers compared to the general public. Influenza A(H7N9) viruses are continually evolving and have many different genotypes due to ongoing reassortments of internal genes with other avian influenza viruses. This virus poses questions on how best to conduct surveillance among human and animal populations.

The plenary was interested in why influenza A(H7N9) viruses have not spread throughout the region similarly to influenza A(H5N1) viruses. It was suggested that A(H7N9) strains appear to be spread by the poultry industry and that each locality has different A(H7N9) genotypes; a large study in wild bird populations in 2013 did not detect H7N9, except for in one sparrow.

2.5.3 Preparedness and response to cross-border avian and novel influenza viruses

Dr Gyanendra Gongal, WHO Regional Office for South-East Asia and
Dr Filip Claes, Food and Agriculture Organization of the United Nations, Bangkok

Gangetic and Mekong basins are considered hotspots for trans-boundary animal diseases and emerging infectious diseases such as avian influenza. The poultry market chain analysis in South and South-East Asian countries clearly demonstrated a link between illegal and informal movement of
poultry through trans-boundary route and geo-phylogenetic distribution of different clads of avian influenza A(H5N1).

Development of core capacities at ground crossings for managing cross-border travel and trade is necessary for successful implementation of the IHR (2005). The Mekong Basin Disease Surveillance network, which was initiated in 2001, is one of a few successful cross-border surveillance networks in Asia.

New zoonotic influenza viruses periodically emerge at the human–animal interface, and cross-border trade of animals and animal products sometimes spread zoonotic influenza. It is necessary to establish cross-border collaboration and promote trust and partnership-based relationships and networks to sustain cross-border collaboration.

2.5.4 Conducting a risk assessment for non-seasonal influenza: Methods, best practices, application of results

*Dr Katelijn Vandemele, WHO headquarters*

Each risk assessment should have the following steps: defining the team, formulating the risk questions, undertaking the risk assessment, quantifying or characterizing the risk and assigning a confidence level in the risk assessment. Two approaches to risk assessment were presented. The first approach, which is an ad hoc risk assessment based on the WHO Rapid Risk Assessment of Acute Public Health Events, involves gathering and analysing all available epidemiological, virological, clinical and context information; assigning a level of risk of low, moderate or high; and assigning a confidence level from low to high. The second method, known as the TIPRA method, is more effective in quantifying and systematically evaluating the risk of a specific non-seasonal influenza virus. The tool is based on the US CDC’s influenza risk assessment tool (IRAT). This tool allows a standardized approach to generate comparable risk assessments using the most up-to-date, relevant information. It allows for the identification of knowledge gaps and prompt further investigation.

2.6 Breakout Session

2.6.1 Group A: Looking into the future: the 2016 Asia-Pacific influenza plan

*Chair: Dr Ly Sovann
Rapporteur: Dr Susana Delai*

Participants reflected on how well they implemented the last plan and identified three successes within the last five years. Reflecting on these successes, participants identified priorities for the upcoming 2016 plan. Successes incorporated the general themes of (1) epidemiology and burden of influenza disease, e.g. well-established ILI and SARI surveillance, improved linkage between the epidemiological and virological components of the surveillance system, and influenza disease burden assessments in priority countries; (2) virological testing capacity, e.g. improved biosafety and quality assurance, strengthened laboratory capacity, and improved access to reagents; and (3) surveillance, e.g. strengthened regional networks, improved weekly reporting, communication and preparedness. Based on these discussions, participants agreed on the following priorities for the next plan:

1. Focus on improving human surveillance using a robust, flexible and scalable approach, including ensuring national governments recognise the value of ILI and/or SARI sentinel surveillance, improving surveillance links between human and animal sectors and laboratory and epidemiological groups, and right-sizing surveillance systems.
(2) Strengthen event-based surveillance for detecting events with pandemic potential by reaffirming the role of clinicians and HCWs in detection and early reporting of unusual events, ensuring all HCWs are trained and aware of their responsibilities under event-based surveillance, understanding the complementary nature of indicator-based and event-based surveillance, strengthening the investigation of and reporting of events, and improving timeliness of reporting.

(3) Build laboratory capacity by establishing NICs in countries where none exist, improving collaboration among laboratories, ensuring basic techniques are performed well, and ensuring effective communication and support from reference laboratories to NICs.

(4) Strengthen the system to enable use of data for public health action at a national, regional, and GISRS network level.

2.6.2 Group B: Reflecting on the past to inform the future of influenza laboratory detection

Chair: Professor Madmudur Rahman
Rapporteur: Dr Mai Le

The aim of this session was to determine the context of NICs in national public health systems, the achievements of laboratories in the last five years, and, building on these successes, the priority areas for laboratories in the next plan. Group B participants were predominantly laboratory staff working in an NIC.

NICs are institutions designated by ministries of health and recognized by WHO. While most NICs are part of the national public health virology laboratory, some are not depending on the country. Participants described how their NICs are organized, equipped, staffed, funded and linked with other existing institutions as well as how much of their time is dedicated to NIC-related activities. A broad diversity was observed among the NICs. For example, in one country, laboratory staff dedicate 5% of their time to NIC activities, while in another, the NIC has up to 40 dedicated staff. While NICs focus on influenza, their institutions are also involved in testing for a range of emerging infectious diseases, often using the influenza platform and lessons learnt. Funding of the NICs varied. Some are fully funded by their governments, while others receive project-based funds or staff salaries. Participants agreed that it would be useful to describe the context of NICs in different countries and to consider preparing a summary publication.

Participants were asked to write three successes and three challenges in the influenza laboratory field in their country over the past five years. Four main themes emerged for both successes and challenges: (1) infrastructure and logistics; (2) staffing; (3) technology and quality; and (4) coordination.

Successes: For staffing, laboratory trainings provided by WHO and others were recognized. For technology and quality, rapid developments in technology and wider availability were observed due to reduced costs. For quality, all agreed on the importance of the global EQA programme for influenza to assess proficiency of testing and to identify areas for improvement. For coordination, meeting annually during the NIC meetings and being part of GISRS were mentioned. It needs to be noted that areas of success for one country could be a challenge for others. For example, while some countries are enjoying new or upgraded laboratory facilities, others are struggling with laboratory maintenance and upkeep.
Challenges: For infrastructure and logistics, some participants indicated limited access to electricity and running water; inadequate sample collection, transportation and storage; difficulties with procurement and meeting biosafety standards. For staffing, high turnover of staff was recognized. For technology and quality, participants mentioned insufficient good quality samples and difficulty to rapidly characterize non-seasonal influenza A viruses. For coordination, communication between laboratory and epidemiology sectors could be further improved. Several of the challenges identified could be addressed through training and on-site technical support, e.g. specimen collection, transportation and storage, and biosafety. While such trainings have been provided in the past, these should be continued to maintain adequate levels of performance. Further interactions between laboratory and epidemiology units should be encouraged. A large majority of the participants indicated poor awareness of the value of laboratory surveillance among policy-makers. Participants agreed that more discussion among NIC staff is needed to further describe the challenges and come up with solutions.

2.6.3 Group C: Right-sizing influenza surveillance
Chair: Dr Yuelong Shu
Rapporteur: Dr Q Sue Huang

Participants discussed the current set-up of Member States’ sentinel site surveillance systems, the selection criteria for determining sites, and the importance of evaluating sentinel site surveillance. Ms Ann Moen from US CDC briefed participants on the formulas being used in the United States to “right-size” a surveillance system, i.e. to calculate the number of specimens that would need to be collected for specific purposes, such as detecting novel influenza viruses. Participants noted that evaluation of surveillance systems was critical to ensure quality, but that guidelines were not yet available for sentinel site evaluation. Most countries agreed to remove or improve their current functioning sites, but they stressed that right-sizing guidelines were needed. Participants also agreed that right-sizing a system would depend upon the purpose of surveillance. They recommended that global guidelines should be developed for right-sizing influenza sentinel sites and surveillance systems, and that the number of specimens collected would depend upon the goal of the system, such as providing strains for vaccine selection or being able to detect novel influenza viruses. This information would then inform the number of sentinel sites required. Participants recommended that Member States should review the goal of their surveillance system to determine appropriate right-sizing, and that WHO should evaluate the GISRS network as a whole to see if it fulfils its function and to what level of quality.

2.6.4 Group D: Information sharing and application of laboratory and epidemiological surveillance data
Chair: Dr Kedar Baral
Rapporteur: Mr Alvin Tan

Participants discussed the global influenza surveillance information sharing platforms managed by WHO headquarters, i.e. FluNET and FluID; the weekly avian influenza and biweekly seasonal influenza reports currently circulated by the WHO regional offices; and the proposed Western Pacific Region influenza dashboard. Participants determined that the dashboard would be a more interactive way to share influenza surveillance data and that it would enable Member States to obtain regular situation updates. The group deliberated on the current challenges to submitting data and identified several issues, including: difficulties collating laboratory and epidemiological data, as they are generally managed in two parallel systems; difficulties collecting epidemiological data as health-care workers have many other responsibilities; poor data quality and completeness, which should be
strengthened through training; and the time-lag between data collection and data entry. Participants thought interactive data sharing, such as through the proposed regional dashboard, would be better than the current system of emailing a report. They thought the dashboard was user friendly, that the figures and interface were helpful, and that it was important to compare data among countries. They suggested the dashboard could be improved by having all influenza surveillance information on one website and wondered if another regional website was necessary. Ideally they would want all influenza-relevant websites (FAO, OIE and WHO) to be linked and South-East Asia Region countries included. Participants thought it was important to remember that having good quality data was essential and that support for system strengthening should be available. They also highlighted the need to connect human surveillance with the animal sector and emphasized the importance of timelines and consistency across platforms with these reports.

2.6.5 Group E: Opportunities and challenges for multi-country publications

Chair: Dr Sheena Sullivan
Rapporteur: Ms Fatimah Hassan

Group E determined Member State interest in multi-country publications, identified potential challenges to participation, and discussed the operational aspects of producing such publications. The group felt that multi-country publications, and the data included in them, could provide a regional snapshot of influenza surveillance. They could be used to advocate to donors, to provide input for regional dashboards, to track influenza trends over time, to track changes or progress in the influenza surveillance system, and to inform policy-makers where language is not a barrier. The group identified four main challenges to participation: (1) identifying a focal person (possibly WHO country office) for collating the necessary data, which may be held by multiple institutes; (2) overcoming delays in data collection due to multiple data sources; (3) obtaining permission for data use; and (4) correct referencing of data. Member States suggested developing templates for data collection and for the final paper structure to control what data are submitted and how they are presented. Most Member States stated that they could contribute both epidemiological and virological data for multi-country publications. Participants discussed how best to structure the paper, e.g. by climatic zones or by country similarities. They agreed that a timeline of three months for data collection would be acceptable. They suggested that it would be useful to set the context of the countries to help understand differences between surveillance systems and suggested joint biregional manuscripts could be beneficial as neighbouring countries are often in separate WHO regions. The group proposed multi-country publications that examined differences in surveillance systems for non-seasonal influenza, the impact of differences in surveillance methodology on data and findings, variations in seasonality across the Asia-Pacific region, and antibiotic prescribing patterns for ILI.

2.7 Plenary Session Four: Scientific forum on zoonotic and avian influenza

Chair: Dr Stacy Schultz-Cherry, St Jude Children’s Research Hospital, WHO CC, USA

2.7.1 Zoonotic influenza: virus detection, characterization and pandemic potential

Dr Jacqueline Katz, US CDC, WHO CC, USA

Highly pathogenic avian influenza A(H5) viruses with Eurasian origin clade 2.3.4.4 have recently been identified in North America for the first time. Reassortment of A(H5N1) strains with North American low pathogenic avian influenza viruses has created novel virus genotypes, e.g. A(H5N2) viruses, which have caused extensive outbreaks in domestic poultry. The current influenza A/H5 testing kit will detect these novel Asian-lineage HPAI H5 viruses; however, additional primer/probe sets have been developed that should detect possible future variants of North American H5Nx viruses.
The US CDC’s influenza risk assessment tool (IRAT) could be used to objectively evaluate the potential emergence and severity of novel strains. The novel A(H5N2) and A(H5N8) viruses display avian-like receptor binding properties, which were found to be moderately pathogenic in co-housed ferrets but lacked the ability to transmit between them. Although the risk for human infection with these novel strains is considered to be low, human infections could occur. As such, it is important to continue close monitoring of persons exposed to infected birds. The ability of influenza A(H5Nx) viruses to spread and reassort in wild bird populations underscores the need for continued risk assessment of these novel pathogens.

2.7.2 Next generation sequencing to investigate avian and zoonotic influenza viruses

*Dr Yi-Mo Deng, Victorian Infectious Disease Reference Laboratory, WHO CC, Australia*

Next generation sequencing (NGS) is a powerful tool for new influenza virus discovery in a timely manner, without prior knowledge of the subtype. Various platforms of NGS have been developed over the years, including Illumina, PacBio, Roche 454, Ion Torrent, and MinION. NGS technology provides a high throughput for routine sequencing that is cheaper than Sanger sequencing. It has the capability of identifying mixed infections, can quantify SNPs, and can be tailored to produce more or less data for a single virus, such as the ability to zoom in with high resolution on particular regions of the genome or provide a more expansive view with lower resolution. However, reconstructing the viral genome from the fragmented reads is time-consuming and often requires bioinformatics expertise. Other challenges include specimen type and quality, defective interfering virus particles, and biases in sequence coverage.

2.7.3 Intense circulation of A(H5N1) and low pathogenic avian influenza viruses in Cambodian live bird markets

*Dr Paul Horwood, Pasteur Institute of Cambodia, NIC, Cambodia*

In collaboration with the Cambodian Government and international partners, the Pasteur Institute of Cambodia has conducted human and animal surveillance for avian influenza viruses since the emergence of influenza A(H5N1). Through ongoing live bird market surveillance, the Pasteur Institute established the seasonality of A(H5N1) circulation in poultry, which closely corresponded with months in which human cases and poultry outbreaks were more commonly reported. The intense co-circulation of influenza A(H5N1) with low pathogenic avian influenza viruses is a risk for the emergence of novel reassortant strains. In addition, seroprevalence studies show that there is a high rate of human infections in the live bird markets. There is a need for interventions in Cambodian live bird markets to interrupt the persistence of A(H5N1) and other avian influenza viruses.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

1) Significant progress has been made over the past five years in strengthening national influenza surveillance systems, including NICs as part of the GISRS with support from WHO CCs, other laboratories and partners.

2) Influenza surveillance remains critical to generate information for decision-making.

3) Sentinel surveillance, including ILI and SARI sentinel surveillance, is important to establish baselines for disease severity and identify changes in seasonal patterns.
4) Event-based surveillance plays a vital role in detecting events with pandemic potential.

5) Influenza surveillance provides an opportunity to engage the animal health sector.

6) Influenza surveillance informs systematic risk assessments.

7) Routine sharing of influenza surveillance data at the regional level is needed.

8) Influenza remains a priority in the Asia-Pacific region due to the disease burden associated with seasonal influenza and the ongoing threat of pandemic influenza.

9) The PIP framework is a new initiative that provides Member States with opportunities to coordinate and strengthen their influenza surveillance systems.

10) Influenza surveillance provides a foundation for strengthening surveillance and response capacities for other emerging infectious diseases.

11) It is important to begin discussions on right-sizing surveillance, taking into consideration each country's priorities, capacities and objectives.

12) Research continues to be an important part of influenza pandemic preparedness, enabling improved understanding of the epidemiology, and genetic and biological properties of emerging influenza viruses.

13) The five-year *Biregional Plan for Further Strengthening National Influenza Surveillance: Guiding the Way towards Influenza Control Policy and Regional Surveillance* has provided direction to countries in the South-East Asia and Western Pacific regions. Reviewing and updating the plan would benefit both regions.

### 3.2 Recommendations

#### 3.2.1 Recommendations for Member States

1) Further strengthen influenza surveillance systems as a public health priority, including the function of NICs, sentinel sites, event-based surveillance, influenza pandemic risk assessments, and interaction between human and animal health sectors.

2) Improve and maintain laboratory capacities for the detection of influenza viruses and ensure laboratory quality through participation in EQA programmes.

3) Ensure influenza viruses are shared with the relevant reference centres and WHO CCs for confirmation and further characterization.

4) Further contribute to and support GISRS activities, including regional information sharing and contribution to influenza publications.

5) Utilize PIP support to further strengthen national surveillance systems and increase virus sharing.

6) Participate in updating the *Biregional Plan for Further Strengthening National Influenza Surveillance*. 
3.2.2 Recommendations for WHO

1) Provide support to strengthen the NICs and Member States’ event-based and sentinel site surveillance systems, incorporating disease burden studies, influenza pandemic preparedness, including risk assessments, severity assessments, identification of training needs, and interaction with the animal health sector.

2) Enhance GISRS to ensure early and accurate detection and characterization of circulating and novel influenza viruses in the Asia-Pacific region.

3) Facilitate the regional influenza surveillance data-sharing system, including regular reporting and publication of regional influenza surveillance data.

4) Encourage Member States to work closely with WHO on PIP activities in order to strengthen influenza surveillance capacity and increase virus sharing.

5) Coordinate the review and update of the *Biregional Plan for Further Strengthening National Influenza Surveillance*. 
NINTH MEETING OF THE NATIONAL INFLUENZA CENTRES AND INFLUENZA SURVEILLANCE IN THE WESTERN PACIFIC AND SOUTH-EAST ASIA REGIONS

Phnom Penh, Cambodia
18 – 21 August 2015

PROGRAMME OF ACTIVITIES

Day 1 – Tuesday, 18 August 2015

08:30– 09:00 Registration

09:00 – 10:00 Opening session

Remarks of the Regional Director
- Dr Shin Young-soo, WHO Regional Director, Western Pacific Region

Remarks from the Ministry of Health, Cambodia
- His Excellency Professor Eng Huot, Secretary of State

Introduction of objectives and expected outcomes of the meeting
- Dr Erica Dueger, WHO Regional Office for the Western Pacific Region (WPRO)

Introduction of participants
Nomination of meeting chair, co-chair, and rapporteurs
Administrative announcements
Group photo

10:00 – 10:30 Coffee break

10:30 – 12:00 Plenary Session 1: Influenza and Beyond
- Session chair: Dr Lance Jennings, Canterbury Health Laboratories, New Zealand

10:30 – 10:45 Implementing IHR through APSED: Influenza as a priority
- Dr Li Ailan, WHO Regional Office for the Western Pacific

10:45 – 11:00 Asia-Pacific Regional Influenza Activities Update
- Dr Erica Dueger, WHO Regional Office for the Western Pacific

11:00 – 11:15 Seasonal Influenza activity in the Northern Hemisphere
- Dr Takato Odagiri, Influenza Virus Research Centre, National Institute of Infectious Diseases, WHO CC, Japan

11:15 – 11:30 Seasonal Influenza activity in the Southern Hemisphere
- Dr Ian Barr, Victorian Infectious Diseases Reference Laboratory, WHO CC, Australia
11:30 – 11:45 Global update on seasonal influenza
   - Dr Frank Konings, WHO Regional Office for the Western Pacific, on behalf of WHO Headquarters

11:45 – 12:00 Flu: Ecological and Agricultural considerations
   - Prof George Fu Gao, China Center for Disease Control and Prevention, NIC, China

12:00 – 13:00 Lunch break

13:00 – 14:15 Plenary Session 2: Using Influenza Data for Action
   - Session chair: Dr Pushpa Wijesinghe, WHO Regional Office for South-East Asia

13:00 – 13:15 PIP Progress update
   - Dr Supriya Bezbaruah, WHO Regional Office for South-East Asia

13:15 – 13:30 Regional influenza dashboards
   - Ms Sarah Hamid, WHO Regional Office for the Western Pacific

13:30 – 13:45 Updates on the WHO review of seasonal influenza vaccine in the tropics
   - Dr Philip Gould, WHO Regional Office for South-East Asia

13:45 – 14:00 Establishing Influenza Thresholds – Preliminary Findings
   - Dr Ly Sovann, Ministry of Health, Cambodia

14:00 – 14:15 Questions and Answers

14:15 – 17:00 Panel Discussion 1: Burden of Disease Estimates and Application
   - Facilitators: Ms Ann Moen US CDC, Dr Sonja Olsen US CDC

14:15 – 14:30 Burden of Disease Overview and Impact: Health Care Systems, Economics, and National Vaccine Policy
   - Ms Ann Moen, U.S. Centers for Disease Control and Prevention, WHO CC, USA

14:30 – 15:00 Coffee break

15:00 – 17:00 Facilitated Panel Discussion:
   Member State Successes and Challenges with Burden of Disease Estimation
   - Cambodia, Dr Kheng Sim, MOH
   - Indonesia, Dr Vivi Setiawatay, MOH
   - Lao PDR, Dr Thongchanh Sisouk, MOH
   - Bangladesh, Prof Mahmudur Rahman, Institute of Epidemiology, Disease Control and Research (IEDCR)
   - Mongolia, Dr Bayar Oyun, MOH
   - Nepal, Dr Kedar Baral, Patan Academy of Health Sciences

18:30 – 20:00 Reception
Day 2 – Wednesday, 19 August 2015

08:45 – 09:00 Recap of Day 1

09:00 – 12:00 Plenary Session 3: Avian and Novel Influenza Viruses
- Session chair: Dr N Janakan, WHO Country Office Sri Lanka

09:00 – 09:15 Global avian and novel influenza update
- Dr Katelijn Vandemaele, WHO Headquarters

09:15 – 09:45 Updates and recent findings on H7N9 in China
- Dr Shu Yuelong, National Institute for Viral Disease Control and Prevention, WHO CC, China

09:45 – 10:15 Questions and Answers

10:15 – 10:45 Coffee break

10:45 – 11:00 Preparedness and Response to Cross-border Avian and Novel Influenza Viruses
- Dr Gyanendra Gongal, WHO Regional Office for South-East Asia and
- Dr Filip Claes, Food and Agriculture Organization of the United Nations, Bangkok

11:00 – 11:30 Conducting a Risk Assessment: Methods, Best Practices, Application of Results
- Dr Katelijn Vandemaele, WHO Headquarters

11:30 – 11:50 Questions and Answers

11:50 – 12:00 Introduction to the Breakout Session
- Dr Lucy Breakwell, WHO Regional Office for South-East Asia

12:00 – 13:00 Lunch break

13:00 – 15:00 Breakout Session

- Group A: Looking into the future: the 2016 Asia-Pacific influenza plan
- Group B: Reflecting on the past to inform the future of influenza laboratory detection
- Group C: Right-sizing influenza surveillance: sentinel site selection criteria
- Group D: Information sharing and application of laboratory and epidemiological surveillance data
- Group E: Opportunities and challenges for multi-country publications

15:00 – 15:30 Coffee break

15:30 – 16:30 Finalize presentations for feedback to plenary
Day 3 – Thursday, 20 August 2015

08:00 – 08:30  Presentation on Cambodia Influenza Surveillance

08:30 – 12:30  Field Visit
(See Attached Field Visit Schedule to Pasteur Institute Cambodia (NIC) and National Institute of Public Health)

12:30 – 14:00  Lunch break

14:00 – 16:00  Feedback from breakout session
(Each group has 10 minute presentation followed by a 10 minute discussion)

16:00 – 16:30  Coffee break

Day 4 – Friday, 21 August 2015

08:45 – 09:00  Recap of Day 2 and Day 3

09:00 – 12:00  Plenary Session 4: Scientific Forum on Zoonotic and Avian Influenza
- Session Chair: Dr Stacy Schultz-Cherry, St. Jude Children’s Research Hospital, WHO CC, USA

09:00 – 09:30  Zoonotic influenza: virus detection, characterization and pandemic potential
- Dr Jacqueline Katz, U.S. Centers for Disease Control and Prevention, WHO CC, USA

09:30 – 10:00  Next generation sequencing to investigate avian and zoonotic influenza viruses
- Dr Yi-Mo Deng, Victorian Infectious Diseases Reference Laboratory, WHO CC, Australia

10:00 – 10:30  Coffee break

10:30 – 11:00  Intense circulation of A/H5N1 and low pathogenic avian influenza viruses in Cambodian live bird markets
- Dr Paul Horwood, Pasteur Institute of Cambodia, NIC, Cambodia

11:00 – 12:00  Questions and Answers

12:00 – 13:00  Lunch

13:00 – 15:00  Conclusions and recommendations

15:00 – 15:30  Closing session
## INFORMATION BULLETIN NO 2

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DEVELOPMENTS IN COMMUNICABLE DISEASE CONTROL: A REGIONAL OUTLOOK

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