FIFTEENTH BIREGIONAL MEETING OF NATIONAL INFLUENZA CENTRES AND INFLUENZA SURVEILLANCE IN WHO'S WESTERN PACIFIC AND SOUTH-EAST ASIA REGIONS

29–31 August 2022
Virtual meeting
MEETING REPORT

FIFTEENTH BIREGIONAL MEETING OF NATIONAL INFLUENZA CENTRES AND INFLUENZA SURVEILLANCE IN WHO’s SOUTH-EAST ASIA AND WESTERN PACIFIC REGIONS

Convened by:

WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

Virtual
29–31 August 2022
NOTE

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

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for Member States in the Region and for those who participated in the Fifteenth Biregional Meeting of National Influenza Centres and Influenza Surveillance in WHO’s South-East Asia and Western Pacific Regions virtually from 29 to 31 August 2021.
CONTENTS

ABBREVIATIONS ................................................................................................................................. 4
SUMMARY ........................................................................................................................................... 5
1. INTRODUCTION .............................................................................................................................. 6
  1.1 Meeting organization .................................................................................................................. 6
  1.2 Meeting objectives .................................................................................................................... 6
2. PROCEEDINGS ................................................................................................................................. 7
  2.1 Opening session .......................................................................................................................... 7
  2.2 Plenary 1: Review of influenza trends and update on influenza related activities .................... 8
  2.3 Plenary 2: Implementing sustainable surveillance system for seasonal, zoonotic and pandemic influenza and other epidemic respiratory diseases – challenges, experiences, and future direction in the context of COVID-19 ........................................................................................................ 12
  2.4 Plenary 3: Strengthening of laboratory systems and use of new diagnostic approaches for early detection of novel influenza and other respiratory pathogens ........................................................................ 16
  2.5 Breakout sessions ...................................................................................................................... 19
  2.6 Plenary 4: COVID-19 vaccination planning and reaching set targets – implications for future pandemic vaccination response ..................................................................................................................... 19
  2.7 Plenary 5: Outcomes of the breakout session and panel discussion on enhanced preparedness for future pandemics through strengthened surveillance .............................................................................. 22
  2.8 Conclusions and Recommendation ........................................................................................ 27
  2.9 Closing remarks ......................................................................................................................... 28
3. CONCLUSIONS AND RECOMMENDATIONS ............................................................................. 29
  3.1 Conclusions ............................................................................................................................... 29
  3.2 Recommendations ..................................................................................................................... 31
ANNEXES ........................................................................................................................................... 34
Annex 1. Programme of Activities ...................................................................................................... Error! Bookmark not defined.
Annex 2. List of participants, temporary advisers, observers/representatives and Secretariat members ........................................................................................................................................... 38
Annex 3. Opening address by Dr. Babatunde Olowokure, Regional Emergency Director, on behalf of Dr. Takeshi Kasai, Regional Director, WPRO ................................................................................................................ 62

KEYWORDS:
Influenza in birds / Influenza, Human - Epidemiology / Pandemics – Prevention and control / Public Health Surveillance / Regional health planning
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APSED</td>
<td>Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies</td>
</tr>
<tr>
<td>ARI</td>
<td>acute respiratory disease</td>
</tr>
<tr>
<td>COVID-19</td>
<td>coronavirus disease</td>
</tr>
<tr>
<td>EMPaCT</td>
<td>Emerging Molecular Pathogen Characterization Technologies</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunization</td>
</tr>
<tr>
<td>EQAP</td>
<td>external quality assessment programme</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>GISAID</td>
<td>Global Initiative on Sharing Avian Influenza Data</td>
</tr>
<tr>
<td>GISRS</td>
<td>Global Influenza Surveillance and Response System</td>
</tr>
<tr>
<td>IHR</td>
<td>International Health Regulations</td>
</tr>
<tr>
<td>ILI</td>
<td>influenza-like illness</td>
</tr>
<tr>
<td>NIC</td>
<td>national influenza centre</td>
</tr>
<tr>
<td>PCR</td>
<td>polymerase chain reaction</td>
</tr>
<tr>
<td>PIP</td>
<td>Pandemic Influenza Preparedness</td>
</tr>
<tr>
<td>RSV</td>
<td>respiratory syncytial virus</td>
</tr>
<tr>
<td>SARI</td>
<td>severe acute respiratory illness</td>
</tr>
<tr>
<td>SARS-CoV-2</td>
<td>severe acute respiratory syndrome coronavirus 2</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WOAH</td>
<td>World Organisation for Animal Health</td>
</tr>
</tbody>
</table>
SUMMARY

The Fifteenth Biregional Meeting of National Influenza Centres and Influenza Surveillance in WHO’s South-East Asia and Western Pacific Regions took place virtually on 29–31 August 2022.

Productive discussions on the status of influenza surveillance and pandemic preparedness in both regions were held between participants from Member States, temporary advisers, partners, observers and WHO. Successes in maintaining influenza surveillance, laboratory testing, building in-country genetic sequencing capability as part of multi-source surveillance, monitoring the re-emergence of influenza virus circulation, rapid adaption of data tools, and development of new standard operating procedures were acknowledged in the context of disruptions to regular activities caused by the coronavirus disease (COVID-19) pandemic. Key priorities moving forward were agreed upon and included building and sustaining end-to-end integrated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and influenza virus surveillance, facilitating multisectoral collaborations under a One Health approach and harnessing increased genomic sequencing capabilities gained during the COVID-19 pandemic to develop new generation surveillance systems. New generation surveillance systems that integrate new genomic sequencing capabilities with epidemiology and front-line investigations will support the detection and monitoring of existing and novel influenza viruses and other respiratory pathogens of pandemic potential.

Participants highlighted the continuing importance of using the Asia Pacific Strategy for Emerging Diseases and Public Health Events (APSED III) as the strategic framework to guide strengthening capacities for response to specific hazards such as influenza and building resilient health systems. To support this process, the Pandemic Influenza Preparedness (PIP) Framework has made important contributions to building core capacities and systems in both regions, contributing to global preparedness and the achievement of goals set forth in the Global Influenza Strategy 2030.
1. INTRODUCTION

1.1 Meeting organization
The Fifteenth Biregional Meeting of National Influenza Centres and Influenza Surveillance in WHO’s South-East Asia and Western Pacific Regions took place virtually on 29–31 August 2022.

The meeting was organized by the World Health Organization (WHO) Regional Office for the Western Pacific in collaboration with the WHO Regional Office for South-East Asia. A total of 221 participants attended, including 107 participants from 26 Members States (74 from the Western Pacific Region and 33 from the South-East Asia Region), 9 temporary advisers, 19 observers and 86 members of the WHO Secretariat representing headquarters, two regional offices and 16 country offices.

The meeting comprised five plenary sessions and one breakout session.

The meeting programme and list of participants are given in Annexes 1 and 2, respectively.

1.2 Meeting objectives
The general objective of the meeting was to review the status of preparedness for seasonal, zoonotic and pandemic influenza threats in the context of the coronavirus disease (COVID-19) pandemic and identify priority areas to further strengthen existing systems and move toward integrated surveillance of influenza virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and other respiratory viruses, where relevant.

The specific objectives of the meeting were:

1) to determine progress and challenges for influenza and SARS-CoV-2 in WHO’s South-East Asia and Western Pacific region between August 2021 and July 2022, and potential implications for enhancing preparedness for future emergencies;
2) to obtain inputs from Member States for strengthening existing surveillance and laboratory systems and use of new surveillance and laboratory diagnostic approaches for early detection of novel influenza and other respiratory pathogens;
3) to discuss approaches for the implementation of sustainable surveillance systems for seasonal, zoonotic and pandemic influenza and other respiratory diseases in the two regions; and
4) to identify and discuss key priorities for 2023 and the coming biennium for pandemic influenza preparedness, taking into account lessons identified from the COVID-19 response, national deployment and vaccination, as well as COVID-19 recommendations from international bodies and organizations.
2. PROCEEDINGS

2.1 Opening session
The meeting was opened by Dr Babatunde Olowokure, Regional Emergency Director, WHO Regional Office for the Western Pacific, on behalf of Dr Takeshi Kasai, Regional Director. A transcript of Dr Olowokure’s opening address is available in Annex 3.

Dr Olowokure welcomed all participants to the Fifteenth Biregional Meeting of National Influenza Centres and Influenza Surveillance in WHO’s South-East Asia and Western Pacific Regions. Since 2006, these meetings have provided a forum for national influenza centres (NICs), ministries of health, partners and WHO to share the experiences and challenges of influenza surveillance. Moreover, they have facilitated multi-partner collaboration in developing and implementing evidence-based strategies across the two regions, which has strengthened the Global Influenza Surveillance and Response System (GISRS).

Dr Olowokure emphasized the importance of long-term investment in surveillance systems. Over the past decade, guided by the Asia Pacific Strategy for Emerging Diseases and Public Health Events (APSED III), Member States of both regions have significantly improved laboratory, surveillance, contact tracing and risk assessment capacities. These gains have been critical during the COVID-19 pandemic response. A further notable achievement during the COVID-19 pandemic was the strengthening of genomic sequencing capability in both regions, which has facilitated the detection of new SARS-CoV-2 variants.

Dr Olowokure described the remaining challenges. The Asia Pacific region continues to be a hotspot for influenza and other emerging respiratory pathogens. The COVID-19 pandemic has caused unprecedented challenges to public health systems across the region, including monitoring existing pathogens such as influenza. However, Dr Olowokure emphasized that these challenges have brought new opportunities. Many countries are taking step-by-step approaches to developing new systems that include genomic surveillance to support the detection and monitoring of future pathogens of pandemic potential. Collectively, strengthening responses to specific hazards, including influenza, and building resilient health systems are the key to responding to public health emergencies.

Dr Olowokure concluded his remarks by wishing participants a productive meeting with collaboration and support between partners.

Dr Pem Namgyal, Director of Programme Management, WHO Regional Office for South-East Asia, on behalf of Dr Poonam Khetrapal Singh, Regional Director, also welcomed the participants.

Dr Namgyal reiterated the critical importance of influenza surveillance amid the ongoing COVID-19 response. Since mid-2021, many countries have observed the re-emergence of influenza virus circulation. Co-circulation with SARS-CoV-2 is of particular concern given the increased health risks of co-infection and the additional burden on health systems.

Dr Namgyal thanked participants for their continued support to the COVID-19 response while simultaneously maintaining and enhancing influenza surveillance. He highlighted the
increase in influenza virus testing in 2021 and 2022 compared to 2020, which has exceeded pre-pandemic levels.

Dr Namgyal echoed Dr Olowokure’s concern that despite best efforts during the pandemic, some challenges remain. Of particular importance is sustaining effective influenza surveillance while conducting genomic surveillance and testing for COVID-19 and remaining vigilant of potential zoonotic pathogen spill-over events. He also emphasized the need to empower ministries of health to ensure public health policies are included in access and benefit-sharing legislation as per the Nagoya Framework.

Dr Namgyal concluded his remarks by wishing all participants productive discussions on progress and barriers for enhancing preparedness capacities, sharing of best practices to strengthen existing systems, sustainability of surveillance system, and key priorities for 2021.

Mr Nguyen Phuong Nam, WHO Regional Office for the Western Pacific, presented the meeting’s objectives, agenda and expected outcomes.

2.2 Plenary 1: Review of influenza trends and update on influenza-related activities
Moderator: Mr Chin Savuth, National Institute of Public Health, Cambodia

2.2.1 Update of influenza trends and implementation of Fourteenth National Influenza Centre Meeting recommendations

Mr Nguyen Phuong Nam, WHO Regional Office for the Western Pacific, described the recent influenza virus circulation patterns in the Western Pacific Region, with the re-emergence of influenza virus during 2021, and an increase in observations of A(H3N2) virus in 2022. He noted that ongoing vigilance is required to monitor influenza and other respiratory virus activity as countries ease public health and social measures.

Mr Nam stated that the COVID-19 pandemic has had an impact, albeit small, on the number of specimens processed for influenza and recorded on FluMart. The performance of NICs in laboratory external quality assurance programmes (EQAPs) has remained stable, and capacity-building activities for sampling, storage and transportation of samples have continued. Virus sharing with collaborating centres has continued but remains at a reduced level compared to pre-pandemic levels.

Other capacity-building activities in the Western Pacific Region have also continued, including PISA training at the subnational level, integration of influenza and SARS-CoV-2 surveillance, training for field investigation and contact tracing, and participation in both influenza and SARS-CoV-2 EQAPs. Of note, genomic sequencing capacity has been built in a step-by-step manner across the Region, with technical support and referral testing provided by collaborating centres.
Mr Francis Inbanathan, WHO South-East Asia Regional Office, provided an update on influenza trends and activities in the South-East Asia Region. Influenza virus recirculation began in late 2021, and cases increased in recent months (July–August 2022). Influenza A(H3N2) viruses have predominated, with B/Victoria and A(H1N1) co-circulating in smaller numbers. There has been no major influenza-like illness (ILI) activity in the Region during 2021–2022, but a proportionate increase in severe acute respiratory illness (SARI) was observed at the end of 2021 and into 2022. The number of specimens processed was greatly improved in 2021 compared to 2020.

Regional activities have continued in 2021 and 2022. These have included a regional consultation on sustainable integrated surveillance, implementation of the Pandemic Influenza Preparedness (PIP) Framework and the Global Influenza Strategy under WHO’s country support plan, technical assistance to update national influenza pandemic preparedness plans based on lessons identified during the COVID-19 pandemic, data management training, joint national–international surveillance reviews, and the development of a regional influenza status platform with real-time data uploaded from FluMart. The Region has also facilitated virus sharing with WHO collaborating centres, which is continuously monitored via a monthly update to Member States.

2.2.2 Influenza activity in the Northern Hemisphere

Dr Hideki Hasegawa, WHO Collaborating Centre, National Institute of Infectious Diseases, Japan, reported that following very low influenza virus circulation in 2020-2021, there has been an increase in the number of specimens processed during the 2021/22 Northern Hemisphere season, albeit still low relative to pre-pandemic levels. Influenza virus A(H3N2) has predominated, with influenza B viruses of the Victoria lineage the cause of all influenza B cases. Dr Hasegawa noted an overall biphasic peak of influenza circulation in the Northern Hemisphere but highlighted the differing circulation patterns by country, region and climatic zone. Dr Hasegawa also noted a recent increase in sentinel site cases reported.

Dr Hasegawa then described the genetic and antigenic characteristics of circulating viruses in the Northern Hemisphere. The majority of A(H1N1) viruses belonged to the 6B.1A subclades 5a.1 and 5a.2, with geographic segregation of these subclades. Overall, subclade 5a.1 predominated, and the majority of these viruses were well recognized by antisera raised against reference 5a.1 viruses but poorly by those raised against reference 5a.2 viruses, which represented the 2022 Southern Hemisphere and 2022/23 Northern Hemisphere vaccine viruses (A/Wisconsin/588/2019 cell and A/Victoria/2570/2019 egg).

The majority of circulating influenza A(H3N2) belonged to clade 3C.2a1b, subclade 2a.2. Most viruses were well recognized by ferret antisera raised against reference viruses belonging to this subclade, which represent the 2022 and 2022/23 vaccine viruses (A/Darwin 6/2021 cell and A/Darwin/9/2021 egg).

Most circulating influenza viruses of the B/Victoria lineage belonged to the V1A clade (with triple amino acid deletion), with subclade 3a2 predominating and limited 3a1 circulation in China only. These viruses were well inhibited by ferret antisera raised against reference virus B/Austria/1359417/2021 (subclade 3a2).
No viruses of B/Yamagata lineage have been confirmed by WHO collaborating centres since March 2002.

2.2.3 Influenza activity in the Southern Hemisphere

Dr Ian Barr, Deputy Director, WHO Collaborating Centre for Reference and Research on Influenza, Victorian Infectious Diseases Reference Laboratory (VIDRL), Melbourne, Australia, described recent influenza activity in the Southern Hemisphere. He began by noting that, similar to the Northern Hemisphere, there were abnormalities in influenza seasonality in 2022.

Dr Barr described the heterogeneity in the seasonality and viruses circulating in the Southern Hemisphere by showing circulation patterns in eight countries. In South Africa, A(H1) viruses circulated in late 2021 and, following a break, circulated again during the 2022 winter. In Brazil, there was a summer outbreak of A(H3), while in Chile, there was a smaller summer epidemic of A(H3), which was followed by a larger winter A(H3) epidemic. Argentina observed a more typical winter peak where A(H3) viruses predominated. Australia and Fiji both observed A(H3) winter peaks in 2022 that occurred slightly earlier than usual. Timor-Leste experienced an A(H3) outbreak in early 2022, with some influenza B virus activity in winter. Finally, Indonesia observed very little influenza activity in 2022.

To assess the public health impact of influenza in 2022, Dr Barr showed data from Australia. In terms of case notification data, incidence in 2022 was much greater than the five-year average. However, Dr Barr noted that an increase in testing for influenza, especially through the use of multiplex testing, may bias comparisons to previous seasons. Younger age groups were most represented in notification data and, unusually, hospitalizations. The relatively low hospitalization rate among those aged over 65 years may be a result of residual COVID-19 public health measures at aged care facilities.

Dr Barr then commented on the relative circulation of SARS-CoV-2, influenza and other respiratory viruses. Recent incidence of respiratory syncytial virus, human metapneumovirus and adenovirus have all been greater than usual. In Australia, epidemic peaks of influenza virus and SARS-CoV-2 in 2022 have not occurred concurrently, indicating there may be some form of temporal relationship between the two. Dr Barr noted that while viral interference may be an underlying mechanism, changes to health behaviours throughout the year may also be associated with the different peaks and troughs of circulation of the two viruses. Co-detections of SARS-CoV-2 and influenza have also occurred, although at a low percentage of total cases.

Dr Barr described the genomic and antigenic characteristics of influenza viruses circulating in the Southern Hemisphere. He showed the intense bottleneck influenza viruses experienced in 2020–2021, which has resulted in significantly reduced diversity of each virus subtype and lineage. Most A(H3) viruses belonged to the 2a2 group, and most A(H1) viruses were of subclade 5a2, although co-circulation of 5a1 and 5a2 occurred in South Africa. The majority of viruses antigenically analysed at the WHO Collaborating Centre in Melbourne were inhibited by the relevant reference strain.
Dr Barr ended his presentation by reiterating the highly unpredictable nature of influenza seasons, which is influenced by many factors, including when they begin, which types and subtypes circulate, population immunity, climate and health behaviours.

2.2.4 Zoonotic influenza and relative co-circulation/co-infection of influenza and SARS-CoV-2 as monitored by GISRS

Dr Aspen Hammond, WHO headquarters, summarized recent zoonotic influenza activity globally. Since 2021, there has been broad geographic spread of avian influenza with zoonotic potential. The highly pathogenic avian influenza H5 virus continues to diversify genetically and spread geographically, with H5N1 comprising the majority of viruses detected.

Europe observed its largest-ever seasonal epidemic of avian influenza in 2021–2022, with H5N1 predominating after H5N8 predominated the previous season. In the Americas, H5N1 was detected for the first time since 2015, potentially introduced by migratory wild birds from Europe. In Africa, there was an H5 virus incursion in 2021–2022, and reassortment and persistent circulation has occurred since.

Dr Hammond then reported the incidence of human zoonotic influenza cases since 2020 in greater detail. During this period, the first human infections with H5N8, H3N8 and H10N3 occurred. Of variant virus infection in 2020–2022, the majority of cases reported exposure to swine, and viruses were generally genetically similar to those circulating in the local swine population.

The Global Influenza Programme continues to assess the risk of zoonotic viruses, with detailed antigenic and genetic data reviewed in terms of public health risk. Moreover, the development of candidate vaccine viruses for pandemic preparedness is discussed twice a year at the vaccine composition meetings.

Dr Hammond then described the relative global trends of influenza and SARS-CoV-2 co-circulation using data submitted by the GISRS network to FluNet. She noted that SARS-CoV-2 and influenza virus circulation have appeared to peak at opposing times. In terms of co-infections, WHO has completed a review of the evidence of the effect of co-infection with SARS-CoV-2, influenza virus and respiratory syncytial virus (RSV) on health outcomes. Co-infection is associated with a higher mortality rate compared to mono-infection, but the association with other health outcomes (hospitalization, ICU admission and mechanical ventilation) is less clear.

Dr Hammond concluded her presentation by describing key challenges and their necessary actions moving forward. Zoonotic viruses remain a constant threat, and ongoing exchange of information and risk assessment with the World Organisation for Animal Health (WOAH), Food and Agriculture Organization of the United Nations (FAO) and OFFLU is essential to mitigate risk. We require more knowledge of the distribution of influenza viruses in animals, which entails enhanced surveillance of poultry and wild birds. Remaining vigilant of zoonotic influenza and sharing un-subtypeable viruses with collaborating centres in a timely manner is essential for risk assessment and further characterization. The future trends of influenza and
SARS-CoV-2 co-circulation remain unknown, but there is a clear indication that co-infection is associated with a higher mortality rate. Continued capacity-building of multi-pathogen surveillance systems and timely reporting of data, including co-infections, to FluNet remains essential.

2.3 Plenary 2: Implementing sustainable surveillance system for seasonal, zoonotic and pandemic influenza and other epidemic respiratory diseases – challenges, experiences and future direction in the context of COVID-19

Moderator: Professor Kedar Prasad Baral, Patan Academy of Health Sciences, Nepal

2.3.1 Implementing influenza surveillance during COVID-19 – challenges, experiences and implications for future respiratory pathogens surveillance

Dr Zhang Wenqing, WHO headquarters, began her presentation by describing the complexities of respiratory virus surveillance during the COVID-19 pandemic – there has been extremely low seasonal influenza circulation, while zoonotic influenza viruses continue to reassort, evolve and infect humans. RSV epidemics have occurred in some countries. Overall, SARS-CoV-2 continues to predominate.

Dr Wenqing noted the many challenges to influenza surveillance during a non-influenza pandemic, including repurposing of resources, dispersed surveillance workforce, altered patient care-seeking pathways and stretched laboratory capacity. To address these challenges, WHO developed and implemented an integrated surveillance strategy. This strategy has enabled the GISRS network to use highly functional, existing influenza surveillance systems to simultaneously address COVID-19 and non-COVID-19 (e.g. influenza) public health needs.

Dr Zhang described the intended outcomes of integrated surveillance. It will facilitate a better understanding of the relative co-circulation of different viruses locally and regionally, the evolution of viruses and their prevalence globally, and baseline activity to evaluate the relative impact and severity of disease. It will also enable the early detection of unusual activity associated with known or novel viruses. End-to-end integrated surveillance is a proof-of-concept for post-pandemic sustainable surveillance and the expansion of GISRS Plus.

Dr Zhang concluded by presenting a vision for the future of respiratory virus surveillance. Year-round influenza surveillance is required to address real public health needs. Routine surveillance and outbreak surveillance should be seen as complementary, with the relative scale of each surveillance mode dependent on the current status of disease incidence. Indeed, this is how the GISRS system has monitored seasonal and zoonotic/pandemic influenza concurrently for decades. The continued development of GISRS Plus is vital in the context of integrated surveillance. Looking ahead, global coordination and data sharing are key for efficient respiratory virus surveillance.
2.3.2 Multisectoral collaboration to advance zoonotic influenza surveillance – case study of the Republic of Korea

Dr Soon Bae, Korea Disease Control and Prevention Agency, Republic of Korea, discussed the successful multisectoral collaboration to enhance zoonotic influenza surveillance in the Republic of Korea, specifically, the Ministry of Agriculture, the Ministry of Food and Rural Affairs, and the Korea Disease Control and Prevention Agency (KCDA).

The KCDA has developed a surveillance system for avian influenza virus infection in humans that connects hospitals and health centres to the Agency. Symptomatic cases of patients are reported through this system, which forms the starting point of the surveillance chain. After a patient is registered in the system, the KCDA conducts epidemiological investigation to assess whether the suspected infection is avian influenza.

All aspects of course of infection can be registered within the system, including antiviral use and symptom monitoring. The system is linked to the Ministry of Agriculture, enabling a search for information on infections that have occurred on a specific farm, enabling epidemiological association of a patient’s infection to be determined.

Dr Bae concluded by highlighting the importance of using a One Health approach with multisectoral collaboration to address real public health threats. This approach allows rapid and secure sharing of data on potentially zoonotic influenza cases.

2.3.3 Using an influenza surveillance system to support SARS-CoV-2 response: country perspectives

2.3.3.1 Lao People’s Democratic Republic

Dr Phonepadith Xangsayarath presented the Lao People’s Democratic Republic’s experience of integrating influenza and SARS-CoV-2 surveillance. Sentinel sites monitor ILI and SARI case trends weekly and forward samples to the NIC for influenza and COVID-19 testing once per week. A key example of the successful surveillance integration was the timely detection of SARS-CoV-2 during the early stages of community transmission through the influenza sentinel surveillance system.

Dr Xangsayarath also noted that acute respiratory infection (ARI), ILI and SARI case data and influenza positivity rates are reported as part of the risk assessment of the COVID-19 situation in the Lao People’s Democratic Republic. For example, a cluster of ARI cases was reported to the provincial health office and the NIC by a village head through the event-based community channel. The resulting investigation identified cases of influenza and COVID-19. The provincial health office then provided ongoing support to monitor the situation and provide health education.

The Lao People’s Democratic Republic rolled out multiplex testing in August 2022 to maximize the capacity of existing laboratory equipment and supplies. COVID-19-positive samples that meet the criteria for sequencing are referred to the NIC to support genomic surveillance, while influenza-positive samples are referred to the NIC for subtyping and virus isolation.
Dr Xangsayarath then described the way forward for integrated surveillance in the Lao People’s Democratic Republic. He highlighted the need for investigations of ARI clusters to determine the causative pathogen, right-sizing of influenza sentinel surveillance to support sustainability, strengthening of genomic surveillance within the country towards the detection of novel SARS-CoV-2 strains and other emerging pathogens and strengthening event-based surveillance for timely detection and investigation of case clusters through engagement with communities and health-care workers.

2.3.3.2 Cambodia

Dr Seng Heng described the implementation of integrated surveillance systems in Cambodia. The country used a systems approach and leveraged many existing processes used for influenza surveillance to incorporate SARS-CoV-2, including case definitions, ILI forms, sample transportation systems, multiplex assays and data integration.

To meet the WHO recommendation of a minimum of 50 samples per week, Cambodia expanded its ILI surveillance system to incorporate new sentinel sites and improve geographic coverage. Cambodia used this opportunity to develop new partnerships, including with correctional institutions, which enabled the timely detection of outbreaks in two prisons and the rapid deployment of public health personnel to respond.

In Cambodia, influenza sequencing capacity existed at the NIC prior to the pandemic. As a result, the laboratory was able to rapidly implement SARS-CoV-2 sequencing assays, protocols and sequence analysis. This facilitated successful monitoring of the importation and circulation of variants.

Dr Heng described the successful use of multisource surveillance data to support decision-making. Data from ILI and SARI surveillance, hospital surveillance, death and all-cause mortality surveillance and event-based monitoring system were triangulated weekly to enable best-practice risk assessment and investigation of any case clusters. Consequently, public health decision-making to modify health and social measures was evidence-based.

Dr Heng identified some key lessons to be taken from Cambodia’s response to COVID-19. He highlighted the benefit of having an existing surveillance system with well established networks, which enables flexibility and agility. He also discussed the importance of multisectoral engagement to enhance surveillance in non-health sites. He stated that securing adequate human resources is necessary to prevent significant disruptions to workflow that occurred for influenza surveillance in 2021.

2.3.3.3 Timor-Leste

Dr Filipe de Neri Machado presented Timor-Leste’s experiences of integrating influenza and SARS-CoV-2 surveillance.

Early in the pandemic, the National Health Laboratory established in-country COVID-19 PCR testing, and capacity was rapidly scaled up from 0 to 2000 tests per day within three months. During this time, surveillance and rapid response teams were also trained for case investigation and contact tracing.
Dr Machado then described further successes from the Timor-Leste experience. These included an increased number of highly trained surveillance staff, increased quarantine bed capacity, scaled-up testing capacity and incorporation of technical support from WHO. Timor-Leste also developed a “situation room” under the Prime Minister’s Office, which involved intersectoral collaboration for public health decision-making. He highlighted the success of the Ministry of Health vaccine team, which previously immunized about 50 000 children per year, in vaccinating over 1 million adults in 2021.

To integrate SARS-CoV-2 and influenza surveillance, the Ministry of Health and WHO co-developed the operational protocol for sentinel sites. Timor-Leste also expanded the number of sentinel sites, and samples from cases meeting the WHO case definition are now tested for both SARS-CoV-2 and influenza. The transportation of samples from municipalities to Dili is now supported, viruses are shared with the WHO Collaborating Centre in Melbourne, and virologic and epidemiologic data are reported to FluNet and FluID.

Dr Machado summarized the lessons identified and the way forward. He highlighted that the PIP support of the influenza programme contributed significantly to the COVID-19 response. The PIP-supported laboratory served as the national COVID-19 testing facility. He also emphasized that continuous evaluation of surveillance sites and training for focal points will be important moving forward.

2.3.3.4 Thailand

Dr Pawinee Doung-ngern presented Thailand’s experiences of influenza surveillance during the COVID-19 pandemic. Thailand was able to sustain influenza testing throughout 2020 and 2021 and observed very low influenza circulation. Consistent monitoring enabled the detection of influenza re-emergence in late 2021 and 2022.

Dr Duong-ngern then described the disruptions to sentinel surveillance practices. Firstly, the number of samples received for influenza sentinel surveillance was significantly reduced, as samples from respiratory illness cases were sent to a different laboratory for COVID-19 testing. Secondly, many sentinel sites were redesignated as COVID-19 testing and treatment centres. Finally, there were changes in health-seeking behaviour during the pandemic.

In response, Thailand incorporated integrated surveillance of the two viruses in February 2021. Since August 2021, laboratory capacity for diagnosis of influenza and other respiratory pathogens has been strengthened through implementation of on-location multiplex testing at six sentinel sites. This has greatly improved testing numbers.

Finally, Dr Duong-ngern summarized the outcomes of capacity-building exercises during the pandemic. Influenza surveillance system accuracy and reliability have been greatly improved, and the system has been strengthened toward early identification of abnormal events. The national disease surveillance system has also been strengthened to improve the detection of other respiratory infections.
2.4 Plenary 3: Strengthening of laboratory systems and use of new diagnostic approaches for early detection of novel influenza and other respiratory pathogens

Moderator: Dr Ian Barr, Deputy Director, WHO Collaborating Centre for Reference and Research on Influenza, Australia

2.4.1 An update on the diagnostic landscape for influenza and COVID-19 in the Western Pacific and South-East Asia regions

Mr Francis Inbanathan, WHO Regional Office for South-East Asia, provided an update on laboratory capacity in the Western Pacific and South-East Asia regions. Both regions have systematically scaled up their testing capacities since the onset of the pandemic, with investments in rRT-PCR, antigenic rapid detection tests and genomic sequencing platforms. Mr Inbanathan emphasized that moving beyond the COVID-19 pandemic, it will be essential to ensure this increased capacity continues to be used optimally.

In the South-East Asia Region, all but one country completed EQAP, but there was a decrease in correct results in 2020 and 2021 compared to 2019. This was linked to a high turnover of staff due to surge capacity and transcriptional errors, which highlights the need for periodic training. In both regions, virus sharing with collaborating centres has improved with increasing influenza circulation, although the number of samples shared is yet to return to pre-pandemic levels.

Mr Inbanathan underscored the essential role played by influenza pandemic preparedness in the response to the COVID-19 pandemic. Countries were able to rapidly scale up testing, and national efforts and existing partnerships with WHO collaborating centres and other key partners were essential drivers of success. Many Member States in both regions are now using multiplex testing and reporting both influenza and SARS-COV-2 data to FluNet. Many Member States also plan to leverage their SARS-CoV-2 sequencing capacities for use in influenza surveillance. He noted that country capacities for SARS-CoV-2 surveillance were built on the foundation of highly functional existing influenza surveillance systems. In turn, the integrated surveillance of both viruses is being built on the lessons identified during the COVID-19 pandemic.

Mr Inbanathan concluded his presentation by discussing the requirements to build resilient surveillance systems. Laboratory capacity must continue to develop sustainably, and continuous evaluation of testing quality is also essential. Both human resources and infrastructure for laboratory surveillance must be secured to mitigate workflow disruptions, as occurred for influenza surveillance during the early stages of the COVID-19 pandemic.

2.4.2 Genomic surveillance system development in the Western Pacific Region and South-East Asia Region genomic surveillance strategy

Dr Satoshi Shimada, WHO Regional Office for the Western Pacific, described two key recommendations made by the APSED Technical Advisory Group: 1) support strengthened information systems, including use of multisource surveillance, all-cause mortality and genomic surveillance, and 2) work with partners to establish a regional supporting
mechanism to strengthen genomic surveillance systems and support Member States to
determine appropriate investments in sequencing techniques and information systems. The
step-by-step approach directed by the EMPaCT surveillance network begins with building
sequencing capability for known SARS-CoV-2 variants of concern/interest, followed by the
detection of unknown SARS-CoV-2 variants of concern/interest, with a final goal to detect
any emerging infectious disease pathogen of pandemic potential.

The inaugural Western Pacific Region EMPacT surveillance network meeting determined
that gene sequencing capacity is not equally distributed throughout the Region. Building
sequencing capacity requires regional support mechanisms and an in-country systematic
approach that coordinates laboratory, clinical and epidemiological sectors. Currently, in the
Western Pacific Region, the capability to detect known variants has been established.

Dr Shimada then described the challenges in the Region. These include insufficient samples
available for gene sequencing, as testing rates decrease and rapid diagnostic tests are used
preferentially. Furthermore, bioinformatics capabilities must be strengthened to improve the
quality of genomic sequencing, and genomic surveillance should be embedded within the
public health system to facilitate information sharing between central and subnational levels.

In the South-East Asia Region, the major objectives are: 1) to enhance sequencing and
surveillance to monitor SARS-CoV-2 evolution; 2) to build sustainable genomic sequencing
and surveillance systems for emerging pathogens of endemic and pandemic potential, and 3)
to facilitate timely sharing across the countries of information from genomic surveillance to
inform risk assessment and response.

Currently, in the South-East Asia Region, Member States can forward samples for
sequencing to two countries, while capacity is available in eight countries. A scoping survey
of laboratories in the Region found that there is a need to increase whole genome sequencing
capacity to meet national objectives. A key area for improvement is ensuring sufficient
bioinformatics personnel for analysis of sequencing data. Also required are reagent supply,
facilitation of intra-country data sharing and information exchange, and protocols for SARS-
CoV-2 sequencing. To date, regional consultation, supply and logistics, online and onsite
trainings, and technical assistance have occurred. The next steps in the Region are country
visits, establishment of an advisory group and context-specific trainings.

2.4.2 Countries and partners experience and panel discussion

2.4.2.1 Nepal

Dr Jyoti Acharya described Nepal’s experiences of adapting existing influenza surveillance
systems and partnerships to best respond to the COVID-19 pandemic.

Nepal was able to rapidly scale up from one laboratory with COVID-19 RT-PCR capabilities
in February 2020 to 105 laboratories (including private and veterinary laboratories) in March
2022. Some factors that enabled this were: a promptly adopted surge plan, staff rapidly
trained in sample collection and packing, and strong engagement with the private sector.
Dr Acharya also credited Nepal’s successful COVID-19 response to the rapid development of a national guiding document for SARS-CoV-2 laboratory testing, which was enabled by technical assistance from WHO, and the development or update of 25 standard operating procedures in line with WHO technical documents.

Dr Acharya then described Nepal’s approach to integrated SARS-CoV-2 and influenza surveillance. As part of the process, a new sentinel site structure was adopted in 2021 to ensure geographical representation as well as incorporation of new sites. The sampling strategy for cases was determined in consultation with epidemiologists to ensure consistency and representativeness. The country also began using multiplex test kits and plan to begin RSV sentinel surveillance at two sites soon. As a result of these activities, influenza testing greatly improved in 2022, and a consistent number of samples have been tested each week.

2.4.2.2 Mongolia

Dr Burmaa Alyeksandr presented the laboratory capacity-building activities undertaken in Mongolia.

She began by describing the expansion of sentinel sites and decentralization of RT-PCR capacity. There are now 30 subnational laboratories with RT-PCR capability, strengthening Mongolia’s laboratory surveillance system.

Mongolia has undertaken whole genome sequencing since 2020. In total, 518 specimens have been sequenced, of which 295 sequences were uploaded to the Global Initiative on Sharing Avian Influenza Data (GISAID). Rapid sequencing capacity-building has enabled the detection of SARS-CoV-2 BA.4 and BA.5 variants in the country for the first time. Importantly, this enabled immediate public health messaging ahead of the Naadam festival and prepared testing centres for an increased level of testing. Furthermore, it facilitated the Ministry of Health to direct provinces to prepare additional hospital beds and increased testing capacity.

Dr Alyeksandr ended her talk by describing the next steps for surveillance in Mongolia. After donor support assisted with next-generation sequencing-related procurements in 2022, the country will seek sustainable funding from the Government going forward. In the future, there are plans to link surveillance, clinical and laboratory information to enhance the monitoring of transmissibility, severity and impact of detected pathogens.

2.4.2.3 Cambodia

Dr Erik Karlsson, Institut Pasteur du Cambodge, gave a presentation on the technical and financial considerations for adding more pathogens to sentinel surveillance systems.

Dr Karlsson’s talk focused on multiplex RT-PCR as an important method for increasing the number of pathogens that surveillance systems are able to detect. Duplex testing for SARS-CoV-2 and influenza generally has good sensitivity and specificity for different influenza subtypes and SARS-CoV-2 variants at varying dilutions. Many countries have adopted this approach over the past year.
He then described an evaluation of triplex assays for the detection of human influenza virus, zoonotic influenza virus and SARS-CoV-2. All assays had a generally good limit of detection and high positive predictive value when used on clinical specimens. Triplex assays are time- and cost-saving, but some require specialist equipment and software, which may not suit all countries’ objectives.

Dr Karlsson then briefly described “massively multiplex” assays, which can detect a wide range of pathogens. However, these require further evaluation and are generally more expensive and complex to run. Furthermore, the assay will detect pathogens that may not necessarily be the causative agent of disease.

Dr Karlsson stated that, overall, triplex assays represent a viable solution to maintain and expand public health surveillance for multiple viral pathogens among cases that meet the ILI, SARI or ARI definition if they fit into current technical and financial capacities.

### 2.5 Breakout sessions

There were four breakout groups:

1. Laboratory (moderated by Dr Raymond Lin, National Centre for Infectious Diseases, Singapore)
2. Surveillance (moderated by Dr Pham Quang Thai)
3. Data management (moderated by Dr Stefano Tempia)
4. PIP Framework implementation in the Western Pacific Region (moderated by Mr Nguyen Phuong Nam).

The groups aimed to discuss current challenges and opportunities for building capacity in these areas, particularly in the context of integrated surveillance moving forward. The experiences shared by Member State representatives, with input from technical experts, WHO (headquarters and regional offices) and collaborating centres, informed these discussions.

The breakout session discussions are summarized in [Section 2.7 Plenary Session 5: Breakout session feedback](#).

### 2.6 Plenary 4: COVID-19 vaccination planning and reaching set targets – implications for future pandemic vaccination response

**Moderator: Dr Duong Huu Thai, Institute of Vaccines and Biological Medicals, Viet Nam**

#### 2.6.1 Western Pacific Region

Dr Yoshihiro Takashima, WHO Regional Office for the Western Pacific, described the experiences of COVID-19 vaccine deployment in the Western Pacific Region, and how they will be applied to future pandemic vaccine deployment and routine immunization programmes.
He presented the *Regional Strategic Framework for Vaccine-Preventable Diseases and Immunization in the Western Pacific 2021–2030*, which aims to eliminate vaccine-preventable morbidity, mortality and disability caused by 20 vaccine-preventable diseases in the Western Pacific Region. The Framework is based on four pillars: 1) access and availability, 2) vaccine deployment and immunization, 3) vaccine and immunization safety, and 4) management of information, monitoring and evaluation. Dr Takashima then described how the strategies outlined in this document can be applied during the COVID-19 pandemic, which is outlined in the *Western Pacific Regional Road Map for COVID-19 Vaccination Response 2021–2022*.

The Western Pacific Region has made considerable progress in the COVID-19 vaccination campaigns so far:

- All 37 Member States have introduced the third booster dose;
- 24 are vaccinating adolescents and 19 are vaccinating children;
- 32 have vaccinated >90% of health-care workers with all recommended doses;
- 23 have vaccinated >90% of elderly adults with all recommended doses; and
- 20 have vaccinated >80% of the entire eligible population with all recommended doses.

Additionally, many operational aspects have been enhanced, including human resources, regulatory capacity, cold chain capacity, laboratory surveillance networks, vaccine safety monitoring and response capability, data management and real-time monitoring capacity.

However, Dr Takashima noted that an emerging challenge during the COVID-19 vaccine roll-out is the decline in routinely scheduled immunizations.

Looking ahead to 2022–2023, the WHO Regional Office for the Western Pacific plans to support Member States to review vaccine programme implementation, evaluate vaccine effectiveness and duration of protection, and prepare for COVID-19 resurgence by increasing vaccination coverage for high-risk populations.

Dr Takashima finished his presentation by noting that COVID-19 cases increased from mid-2021 to mid-2022, but case fatality decreased, demonstrating the success of vaccination in preventing severe morbidity and mortality. He stated that the collective experiences gained during the vaccine roll-out in the Western Pacific would strengthen routine immunization programmes in the Region.

### 2.6.2 South-East Asia Region

Dr Pankaj Bhatnagar, WHO Regional Office for South-East Asia, began by summarizing the successes of the COVID-19 vaccine campaign in the South-East Asia Region:

- 10 Member States have vaccinated >40% of the eligible population with the primary vaccine course (5 have achieved >70%);
- 10 are vaccinating adolescents and 6 are vaccinating children;
- 10 are providing a third dose and 4 are providing a fourth dose; and
- in total, 3.14 billion doses have been administered.
Dr Bhatnagar noted that a key driver of success in the South-East Asia Region was the introduction of four or five different vaccines in each country, which allowed flexibility when shortages occurred.

He then described what the Region had learnt from the COVID-19 vaccine campaign. Firstly, political ownership and multisectoral collaboration is important for driving progress. Secondly, COVAX is essential in ensuring equitable access to vaccines. Finally, National Deployment and Vaccination Plans, which were developed by each Member State, ensure tailored, country-specific approaches to vaccination of high-risk populations (e.g. health-care workers, elderly adults), allow for potential shortcomings of the system (e.g. cold-chain capacity, supply chain and logistics), strengthen communication planning, and include monitoring and evaluation (which enabled midcourse corrections). Dr Bhatnagar highlighted the first-time experience many South-East Asia Member States gained in vaccinating adults on a large scale at an unprecedented pace.

Like the Western Pacific Region, the South-East Asia Region experienced declines in routine immunization coverage after reaching an all-time high in 2019. Dr Bhatnagar emphasized the need to combine COVID-19 and EPI programmes to mitigate this issue and stated that COVID-19 investments should be used to strengthen broader immunization programmes and health systems. Looking to the future, Dr Bhatnagar stated lessons identified during the COVID-19 vaccine roll-out will benefit new vaccine introductions, including influenza, under the Immunization Agenda 2030.

2.6.3 Bhutan

Dr Tashi Dawa summarized the successful COVID-19 vaccination campaign in Bhutan, which incorporated two phases: preparation and implementation. The preparation phase involved repeated coordination meetings with stakeholders and health sectors to develop vaccination strategies and guidelines, assessment of cold chain storage capacity, human resource management, development of the Bhutan Vaccine System, capacity-building of health-care workers, communication and social mobilization, and a mock drill.

Dr Dawa stated that the very thorough preparation phase facilitated a successful implementation phase. To date, Bhutan has:

- completed the primary series for the entire population aged 5 years and older;
- implemented a nationwide first booster dose campaign;
- vaccinated elderly people with the second booster dose; and
- implemented an online system for adverse events following immunization reporting, vaccine inventory, and individual registration and downloading of online vaccination certificates.

Dr Dawa also noted a unique success of the Bhutan vaccination campaign: the development of a detailed distribution network plan to enable vaccine transportation to primary health centres in mountainous regions with difficult terrain.
In summary, Bhutan’s successful COVID-19 vaccine campaign leveraged their well-established immunization programme and was bolstered by political commitment, multisectoral collaboration, thorough planning and coordination. Dr Dawa emphasized that this programme is sustainable for future routine immunization initiatives.

2.7 Plenary 5: Outcomes of the breakout session and panel discussion on enhanced preparedness for future pandemics through strengthened surveillance

*Moderator: Dr Varsha Potdar, Ministry of Health and Family Welfare, India*

2.7.1 Laboratory

Dr Jyoti Acharya presented the outcomes of the laboratory session.

Firstly, participants discussed what they would like to see their country and region achieve by 2025. This generated good discussion about what countries have achieved so far and what they would like to improve moving forward.

Currently, in most Member States, genomic testing capability has expanded to detect SARS-CoV-2 variants causing local epidemics. Participants agreed that these capabilities should be further strengthened to enable the identification of emerging influenza clades and subclades. It was agreed that the establishment of reliable and robust next-generation sequencing (NGS) and bioinformatics capacity across both regions should be an attainable goal by 2025. Participants expressed a desire to see a broad representation of South-East Asia and Western Pacific Member States in the genomic data shared with GISAID. Looking beyond 2025, the aim is to identify novel pathogens and potentially incorporate metagenomics in surveillance systems.

A common theme that arose was the need to build laboratory capacity beyond sequencing capability. For example, there was discussion around improving virus isolation, use of pan-PCR detection methodology, electron microscopy and multiplex test kits.

Participants then discussed their concerns regarding the sustainability of surveillance systems for pandemic preparedness. WHO support, particularly with respect to bioinformatics, was requested. It was agreed that continued collaboration among countries, regions and WHO collaborating centres is essential.

Participants discussed the benefits of increased funding and partnerships during the COVID-19 pandemic in terms of expanded capacity in both regions for SARS-CoV-2 sequencing. Many countries reported that they had not yet implemented NGS for influenza, though they intend to do so. It was agreed that this should be a priority when there are sufficient influenza-positive samples.

Participants then discussed the incorporation of further pathogens into multiplex testing. Caution was encouraged in doing so as adding additional pathogens can be costly and laborious, so it must be balanced by a positive impact on public health surveillance or clinical management of cases. It also requires a careful review of the case definition used at sentinel
sites. Consideration of the Member State’s public health situation and objectives before incorporating additional pathogens was urged.

In summary, participants agreed on some feasible short-term goals to support early detection of novel pathogens:

- Apply new sequencing capabilities to influenza specimens collected by sentinel surveillance systems.
- Strengthen laboratory capacity in areas other than sequencing, including virus isolation and multiplex testing.
- During times of surge capacity, focus on maintaining effective and quality influenza testing.

Finally, it was emphasized by all involved that utilizing metagenomics to detect new pathogens is not feasible in the short term and should be considered a long-term goal.

2.7.2 Surveillance

Dr Santhi Subramani presented the outcomes of the surveillance session.

The key role of surveillance systems is to detect and verify any potential public health threat using both indicator- and event-based surveillance. The current goal for most Member States is integration of influenza virus and SARS-CoV-2 sentinel surveillance, with a five-year view to achieving capability for early detection of novel pathogens to guide decision-making.

Participants discussed how they utilized integrated and additional surveillance to guide decision-making during the pandemic response in their country. The success of scaling up well established surveillance systems, networks, infrastructure and capacity was noted. Participants acknowledged the benefits of widely expanded genomic surveillance. Participants also agreed that “no one data source is a silver bullet”; data from multiple sources was crucial in understanding the full picture of the pandemic situation and for strengthening evidence for decision-making.

Participants then identified new approaches and key priorities for the next generation of surveillance systems. Most Member States reported that their key priority was sustainability of surveillance system capacity beyond the pandemic, in terms of networking and multisectoral collaboration, communication, trained personnel and political commitments. Another priority was establishing partnerships beyond human health through adoption of a One Health approach and sharing surveillance data with such partners. Improved information management for public health decision-making was identified as a priority to enable the triangulation of laboratory, clinical and genomic surveillance data. Finally, it was agreed that incorporation of multi-respiratory pathogen testing for early detection is an ideal approach but should be dictated by country-level priorities, as it may be a resource-intensive approach.

2.7.3 Data management

Dr Mahtab Singh presented the outcomes of the data management session.

The session began with a brief overview of the current status and rationale for influenza data reporting, which highlighted the number of external studies published globally that used
FluNet and FluID data. The importance of integrated sentinel surveillance for multiple pathogens was emphasized, to inform policy and adjust the national public health response to epidemic and pandemic viruses.

Participants of the data management breakout session began by discussing the key challenges and reviewing gaps for the complete and timely collection of data. Specifically, the group reviewed:

- the structure and organization of the surveillance system, including involvement of stakeholders;
- levels of data reporting, including data flow from sentinel sites to the central level and to WHO;
- tools used for data collection and reporting;
- the use of sentinel and non-sentinel data;
- integrated surveillance for multiple pathogens; and
- the WHO FluNet and FluID reporting structure.

Then there was discussion around the modality of data collection at sentinel sites, including the potential for piloting new electronic tools (e.g. software, mobile phones). It was agreed that regular monitoring at the central level was essential for the self-sufficiency and sustainability of integrated surveillance systems. Member States were encouraged to consider extending data collection to incorporate case-based data where feasible to improve the assessment of influenza transmissibility and severity, aid the identification of risk factors for severe illness, and estimate vaccine effectiveness.

Challenges in collecting ILI data from sentinel sites were raised by a number of participants. Collection of non-sentinel ILI data will remain an option for future pandemics to increase testing numbers and enable the generation of additional data. However, at present, influenza reporting should focus on sentinel surveillance reporting.

Participants then discussed practical and sustainable improvements to address the key identified challenges. It was agreed that using a standardized case definition is important as more pathogens are added to integrated surveillance systems. Similarly, provision of resources that enable and sustain multi-pathogen surveillance is essential.

Areas identified as needing support from WHO and agencies to improve and sustain data completeness and timeliness were: electronic data collection, introduction of case-based data collection, and sharing of quality epidemiological data.

2.7.4 PIP Framework implementation in the Western Pacific Region

Dr Kathleen Ryan presented the outcomes of the Pandemic Influenza Preparedness session. The discussion began with an overview of the PIP Framework and the Partnership Contribution delivered by the WHO headquarters team. The primary objective of the PIP Framework is to support countries to be prepared for the next pandemic, including improving access to vaccines and other therapeutic products. A summary of the 2014–2021 Partnership
Contribution outcomes revealed that 12 new NICs had been established and 48 countries had produced burden-of-disease estimates for the first time.

A running theme of this session was the collateral benefits of the PIP Partnership Contribution to the COVID-19 influenza response. Specifically, 76 countries integrated COVID-19 into their existing influenza surveillance systems, and most NICs served as national COVID-19 reference laboratories.

The PIP High-Level Implementation Plan III will be finalized by the end of 2022, with the key expected outcome to be strengthened pandemic influenza preparedness through a whole-of-society approach, ensuring equitability and resilience.

A presentation on Fiji’s experience with strengthening influenza surveillance systems to support the COVID-19 response was given. Fiji was able to successfully integrate PISA indicators with COVID-19 and use ILI/ARI data as proxy indicators for COVID-19 influenza. They continued to monitor and test cases of SARI and pneumonia among children and adults through hospital surveillance. Sustainability of their expanded network of testing centres was noted as a key challenge, and the need to support remote regions to ensure equitable access to any advances occurring in country was highlighted.

Next, Viet Nam gave a presentation on the use of the National Deployment and Vaccination Plan to support the COVID-19 vaccine roll-out. Viet Nam integrated COVID-19 vaccination into their approved influenza deployment plan, which included identification of target populations and selection criteria for vaccines and vaccine deployment. Decisions on the distribution, transportation and storage of COVID-19 vaccines were informed by their existing PIP plan and routine EPI. Implementation of the vaccination campaign leveraged the existing EPI system and mobilized other organizations and the private health-care system.

The two country presentations were followed by a discussion about the energy and motivation for seasonal influenza vaccination programmes. Representatives from Fiji noted that understanding country context is key. Representatives from Viet Nam emphasized that the development of a steering committee with members from the national to grassroots levels, as well as a whole-of-government approach that involved both public and private sectors, led to the decision to introduce a seasonal influenza vaccination programme in 2030.

PIP capacity-building continued in the Western Pacific Region during the pandemic. PISA training occurred at the subnational level, laboratory capacity remained consistent, and there was continued support for laboratory safety, sampling and referral. Some countries have conducted intra-action reviews to update their pandemic preparedness plans, while others have adopted active digital listening capabilities to monitor ARIs.

Overall, it was agreed that readiness means having routine and consistently functional systems, i.e. laboratory and epidemiological surveillance and social digital listening or digital platforms that enable decision-making and operationalize actions. The collateral benefits of the PIP Framework during the COVID-19 pandemic prove that consolidating systems in country can contribute to overall improvements in core capacity.
2.7.5 Panel discussion: Sustainable pandemic respiratory pathogens surveillance, influenza virus sharing, and pandemic influenza preparedness.

The panel discussion was hosted by Dr Varsha Potdar and featured panel members Dr Kanta Subbarao, Dr Gina Samman, Dr Crinthana Perera and Dr Wenqing Zhang.

Dr Samman began by discussing how the current PIP Framework and other stakeholder investments have contributed to the operationalized response to broader respiratory pathogens of pandemic potential. During the pandemic, existing capacities prepared for influenza were rapidly adapted and expanded to work for COVID-19, including EQAP systems and sample sharing and shipment chains. The Open WHO platform, which was developed through PIP Framework investments, was used to drive rapid information uptake and exchange. This was particularly essential in building capacity in areas with more limited workforces, including risk communication and community engagement.

Dr Perera and Dr Zhang discussed the sustainability of integrating other respiratory viruses into existing influenza surveillance systems. Dr Perera stated that this cost-effective protocol is suitable for low-resource countries. However, countries must evaluate disease epidemiology in their country to prioritize important pathogens before integrating them: the public health benefit must outweigh the surveillance system burden. Dr Zhang reiterated that seasonal influenza, which causes repeating epidemics, presents a continuous need for surveillance. This need will drive the sustainability of current surveillance strategies. She agreed with Dr Perera that pathogen integration built on existing systems with scalable capacities is a practical and sustainable way forward, particularly in low-resource settings, but that pathogens should be added on a needs basis only.

Dr Zhang then discussed the potential technical, administrative and financial implications for influenza systems when other respiratory pathogens were added. The technical implications occur at all levels (i.e. national, regional and global) and include consideration of case definitions moving forward. From an administrative perspective, we must consider that influenza, SARS-CoV-2 and RSV laboratories may currently exist separately. Moreover, some WHO collaborating centres may not be specialized for other respiratory viruses. From a financial perspective, more support from partners will be required globally. However, systems are most sustainable when they are country owned and driven, so countries must see the benefits of pathogen integration and build this financial capacity.

Dr Subbarao then examined the specific activities NICs or influenza laboratories need to focus on to enhance virus sharing with WHO collaborating centres. With the re-emergence of influenza virus, Dr Subbarao reminded countries to ensure people are currently trained in IATA requirements for shipping. She also emphasized the importance of shipment timing, at a minimum of four weeks ahead of vaccine composition meetings to ensure sufficient time for analysis. Dr Subbarao requested sharing sequence data for samples with WHO collaborating centres when available to allow prioritization of certain samples. She also emphasized the importance of timely data sharing to the FluMart platform to produce the best picture of what is circulating regionally. Finally, Dr Subbarao asked laboratories for vigilance around which transport medium is used. For influenza samples forwarded to WHO
collaborating centres, the preference is for no inactivation to enable the isolation of viruses for inclusion in egg-based vaccines.

Dr Samman was asked to identify priorities for Member States to enable the establishment of a sustainable archetype for pandemic preparedness. She stated that building functional capacities was the key priority. Functional capacities are multisectoral and multilevel, with the agility to adapt when required. Routine operation of systems and platforms (e.g. during seasonal influenza epidemics) is the bedrock for sustainable surveillance that can switch to novel or pandemic pathogens when required.

Dr Zhang then provided an overview of the One Health programme implementation from the headquarters perspective. She emphasized that One Health is a broad term that encompasses animal and human health, as well as the environment. Collaborations with these partners must be built now as they will be key players in the next health emergencies. The continuous need to monitor zoonotic influenza in the Western Pacific and South-East Asia regions is the foundation on which multisectoral collaboration can be built.

Next, Dr Perera was asked to describe how Sri Lanka prepared for the current pandemic and their readiness for future pandemics. He emphasized the importance of contingency plans that identify the specific responsibilities and capacities of different stakeholders prior to pandemics. This may be aided by a high-level committee that coordinates all stakeholders. An existing funding source is also essential.

The panel discussion session ended with Dr Subbarao describing differences in the influenza virus strains currently circulating and those circulating prior to the pandemic. All four pre-pandemic viruses – A(H1N1), A(H3N2), B/Victoria and B/Yamagata – underwent a significant bottleneck event. As a result, after very little circulation during the first one to two years of the pandemic, influenza is now recirculating with significantly reduced heterogeneity. Moreover, B/Yamagata has not been isolated from a clinical specimen since March 2020. Dr Subbarao then discussed the implications of the reduction in circulation and associated reduction in viruses shared with WHO collaborating centres. It hinders our understanding of how the virus is evolving, which impacts the representativeness of chosen vaccine strains. She added that there are also implications for antiviral resistance surveillance and the development of primer sequences for diagnostic purposes. Dr Subbarao extended her gratitude to all NICs and laboratories for their best efforts in sending samples during the COVID-19 pandemic and period of reduced influenza virus circulation.

Dr Potdar ended the session by thanking the four panellists for sharing their time and expertise.

2.8 Conclusions and recommendations
In the final session moderated by Dr Kanta Subbarao, the draft conclusions and recommendations were tabled to meeting participants for their input. The many achievements of all Member States despite disruptions caused by the COVID-19 pandemic were prominent among the conclusions. The recommendations focused on strengthening influenza surveillance and integrating information from multiple sources to support decision-making.
2.9 Closing remarks

*Dr Edwin Ceniza Salvador, Regional Emergency Director, SEARO*

Dr Salvador thanked the participants for their active participation throughout the meeting. He believed productive deliberations held over the past three days were helpful in facilitating ongoing WHO support to Member States, with a view to ensuring the Asia Pacific region is best prepared to address the health security threat of multiple respiratory pathogens. Dr Salvador reiterated that efforts to build laboratory capacity in the Asia Pacific region as part of GISRS have been the foundation for the prompt COVID-19 response in the Asia Pacific region. He highlighted that the country presentations demonstrated that the many lessons learned during the COVID-19 pandemic have quickly been incorporated into ongoing influenza control and preventive activities. He noted that they also provided insight into best practices for operationalizing integrated surveillance of influenza and monitoring of SARS-CoV-2. Finally, Dr Salvador reiterated the fullest support from the WHO regional offices to Member States in implementing the recommendations derived from this meeting, to enable Member States to achieve their integrated surveillance and pandemic preparedness objectives.
3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

Overall progress and challenges

- Participants at the Fifteenth Biregional Meeting of National Influenza Centres and Influenza Surveillance in WHO’s South-East Asia and Western Pacific Regions acknowledged that despite existing challenges caused by the ongoing pandemic, Member States of the two regions have maintained influenza surveillance and continued building preparedness for future public health emergencies, including influenza, while responding to the COVID-19 pandemic.

- As demonstrated by existing surveillance systems during the COVID-19 pandemic, many Member States observed the re-emergence of influenza virus circulation during late 2021 and in 2022. The number of specimens processed for influenza testing by Member States returned to or exceeded pre-pandemic levels, and the number of viruses shared with WHO collaborating centres significantly increased compared to 2021.

- The Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III), a biregional framework for the implementation of the International Health Regulations (IHR 2005), has been pivotal to the response to COVID-19. The APSED approach of step-by-step public health system building, taking into consideration the country context, led to considerable progress in Member States in strengthening IHR core capacities.

- Strengthening capacities for responding to specific hazards such as influenza and building resilient health systems have long been the key to preparing for and responding to public health emergencies. The Pandemic Influenza Preparedness (PIP) Framework has made important contributions to building core capacities and systems in both regions. Enhanced country capacities in detection and response to emergencies continue to contribute to global preparedness for and achievement of goals set in the Global Influenza Strategy 2030.

- In both WHO regions, capacity-building for responding to influenza continued during the pandemic, with a shift towards broader surveillance and preparedness for responding to other respiratory viruses as a priority. These capacity-strengthening activities included laboratory capability improvement, external quality assessment programme (EQAP) participation, and Pandemic Influenza Severity Assessment trainings.

- While countries adapted relatively well to responding to the COVID-19 pandemic, countries in both WHO regions continued to face major challenges for influenza surveillance due to stretched laboratory capacity, redeployment of staff, and shortage of resources.

- During the meeting, Member States shared a number of their successes achieved during the pandemic including: integrated influenza surveillance and SARS-CoV-2 monitoring; increase in laboratories with SARS-CoV-2 testing capability;
mobilization of resources for genomic sequencing; rapid adaption of data management tools; and development of new standard operating procedures. In the context of the continued threat of pandemic influenza, the need to sustain these improvements moving beyond the COVID-19 pandemic was emphasized.

**Surveillance**

- Progress has been made in building genomic surveillance capacities in both WHO regions, i.e. through the EMPaCT initiative in the WHO Western Pacific Region and the regional Sequencing Consortium in the South-East Asia Region.
- Countries have been able to develop their capacity to assess and monitor the transmissibility, severity and impact of SARS-CoV-2 variants to support decision-making on public health and social measures as well as preparing health system capacity to respond to transmission surges.
- Member States are taking steps to adjust surveillance systems that integrate genomic surveillance with existing surveillance as part of a multisource surveillance system. This approach will support early detection and monitoring of existing and novel influenza viruses and other respiratory pathogens with pandemic potential.
- Zoonotic influenza remains a significant public health threat in both WHO regions. Member States recognized that strengthening the One Health approach, including coordination and collaboration between human, animal and environmental health sectors at the country and regional levels, is vital for surveillance of zoonotic influenza and for preparing for and responding to such outbreaks.

**Laboratory**

- Laboratory capacity at the national level has been strengthened through technical training and reagent support. However, further capacity development is needed for subnational-level laboratories.
- Multiplex testing has contributed significantly to achieve results of integrated surveillance for influenza and SARS-CoV-2 monitoring and maintain influenza surveillance, helping to reduce laboratory staff from being overwhelmed while responding to the COVID-19 pandemic.
- Many countries in the two WHO regions have developed capacity for genomic sequencing and applied it to monitoring SARS-CoV-2. Added capacities in this area will contribute to the monitoring of influenza and other respiratory viruses, providing information to support public health decision-making.

**Data management and virus sharing**

- Member States welcomed the introduction of an enhanced global platform (XMart 4) of GISRS for sharing influenza data and information to support monitoring the circulation of influenza and SARS-CoV-2 viruses.
- Although faced with challenges in data and information sharing, it was concluded that sharing of influenza viruses, clinical specimens and genetic sequencing data by
Member States remains a high priority to inform influenza vaccine composition recommendations for the Northern and Southern Hemisphere seasonal influenza vaccines, situational analysis and risk assessment.

**Pandemic influenza preparedness**

- Member States stressed the importance of long-term and predictable investment in building core capacities and resilient health systems. Investments made by PIP and the implementation of IHR (2005) through APSED III have improved laboratory capacity, understanding of regional influenza epidemiology, digital listening and systems readiness for response to the COVID-19 pandemic and future public health emergencies. Strengthening routine core capacities and abilities to translate them to response readiness was also highlighted.

The meeting highlighted the importance of sharing experiences, successes and challenges during the COVID-19 response, facilitating Member States to learn and improve for the future. Lessons identified as a result of the pandemic have guided the national response and the revisions of pandemic preparedness plans and vaccination strategies.

### 3.2 Recommendations

This set of recommendations recognizes the disruptions to influenza surveillance caused by the COVID-19 pandemic. In the context of re-emerging influenza virus circulation, it emphasizes the need to have new systems to enhance multisource surveillance, with a focus on building functional capacity that is both sustainable and agile in response to emerging respiratory pathogens of pandemic potential.

#### 3.2.1 Recommendations for Member States

Member States are encouraged to do the following:

**Surveillance**

1) Include genomic surveillance in existing surveillance systems, where appropriate, and work to enhance multisource surveillance systematically, with linkage to epidemiological and other sources of information for decision-making.
2) Strive to refocus surveillance system that will enable early detection of unusual events and novel influenza pathogens using multisource information.
3) Continue to strengthen monitoring of seasonal influenza transmission based on existing systems such as ILI/SARI sentinel surveillance. Areas for further development and strengthening may include integrating genomic surveillance with existing surveillance as part of a multisource surveillance system, improving specimen sampling and maintaining a right size for surveillance, quality and balance of resources and needs.
4) Strengthen the national One Health approach (including intersectoral collaborations) for advancing and sustaining surveillance and information sharing for early detection, risk assessment and timely response to zoonotic influenza cases.
Laboratory diagnostics

5) Further develop capacities for national and subnational laboratories. Areas of focus may include improved testing strategies, specimen sampling, transportation of samples, and genomic sequencing where feasible.

Data and virus sharing

6) Ensure the timely sharing of influenza data to FluMart (i.e. FluNet and FluID) and GISRS platforms, genomic sequencing data to the GISAID platform, and viruses to reference laboratories and WHO collaborating centres.

7) Share SARS-CoV-2 data generated through the ILI/SARI sentinel surveillance systems to FluMart and GISAID platforms.

Pandemic influenza preparedness

8) Regularly review preparedness and readiness for identification of gaps for improvement through implementing activities such as simulation exercises or after-action reviews (AARs) to identify technical areas to further build preparedness and resilient public health systems to respond to future pandemics.

9) Adopt APSED principles to guide the continued strengthening of core public health capacities outlined in IHR (2005) at national and subnational levels to respond to influenza and other respiratory-borne pathogens that cause outbreaks and pandemics.

10) Develop or update pandemic influenza preparedness plans, including national vaccine deployment plans, using experiences and lessons identified from the COVID-19 response. The updated plan may be specific to influenza or placed in the context of an unknown respiratory pathogen or take an all-hazards approach with a contingency plan to address influenza and/or other respiratory pathogens of pandemic potential.

3.2.2 Recommendations for WHO

WHO is requested to do the following:

Surveillance

1) Provide technical support to Member States where required to promote evidence-informed decision-making through the strengthening of multisource surveillance that integrates genomic surveillance with epidemiological and clinical information.

2) Sustain influenza sentinel surveillance where appropriate to monitor influenza circulation.

3) Coordinate technical support to Member States in the implementation of additional surveillance strategies, including the monitoring of high-risk groups and settings, clinical outcomes, and special studies with a view to better detect novel influenza and other respiratory viruses with pandemic potential.

Laboratory

4) Work with WHO collaborating centres for influenza and partners to support Member States to strengthen laboratory capacity at national and subnational levels, including improved testing strategies and sample referral systems in the two WHO regions, to respond to future influenza pandemics and other respiratory public health threats.
5) Support improving bioinformatics capability and provide support to countries to ensure good-quality genetic sequence data are produced for national public health decision-making and shared with the global platforms.

Data and virus sharing

6) Coordinate support provided to countries in the areas of data collection tools, data analysis, and timely reporting required for influenza data management.

Pandemic influenza preparedness

7) Support Member States to conduct reviews and exercises to build and advance capacities for pandemic preparedness and readiness and to strengthen resilient systems based on the APSED approach.
8) Considering experiences from the COVID-19 response, support Member States to update influenza, broader respiratory or all-hazards respiratory pathogen pandemic preparedness plans, including national vaccine deployment plans to support preparedness, readiness and response to future pandemics.

3.2.3 Recommendations for partners

Surveillance

1) Partners are requested to collaborate closely with WHO and relevant WHO collaborating centres taking a One Health approach to support Member States to advance zoonotic influenza surveillance as part of national surveillance systems. This will support the early detection of novel influenza viruses and other respiratory pathogens and provide information to support public health decision making.

Laboratory

2) Partners including WHO CCs are requested to continue the collaborations with WHO to support Member States to further strengthen laboratory capacity at national and subnational levels, including sampling, testing strategies and genomic sequencing capacity.

Pandemic influenza preparedness

3) Partners, together with WHO, are requested support Member States to document and share experiences related to emergency planning and response to support preparedness, readiness and response in both WHO regions.
4) Partners are encouraged to collaborate with WHO to sustain and build on existing mechanisms, such as the Expanded Programme for Immunization (EPI), to plan for national pandemic vaccine deployment to ensure timely and equitable access to vaccines during a pandemic.
Annex 1. Programme of Activities

Day 1 – Monday, 29 August 2022

10:30 – 11:10 Opening session

Welcome and opening remarks

Dr Babatunde Olowokure, Regional Emergency Director, WHO Regional Office for the Western Pacific (WHO/WPRO)

Dr Pem Namgyal, Director Programme Management, WHO Regional Office for South-East Asia (SEARO); on behalf of Dr Poonam Khetrapal Singh, Regional Director, SEARO

Dr Edwin Ceniza Salvador, Regional Emergency Director, SEARO

Overview of meeting objectives and agenda

Administrative announcements

Group photo

Self-introductions

11:10 – 12:10 Plenary 1: Review of influenza trends and update on progress of influenza related activities

Session moderator: Mr Chin Savuth, National Institute of Public Health, Cambodia

Update on influenza trends and implementation of NIC meeting recommendations

Mr Nguyen Phuong Nam, WPRO

Mr Francis Inbanathan, SEARO

Influenza activity in the Northern Hemisphere

Dr Hideki Hasegawa, Director, WHO Collaborating Centre, National Institute of Infectious Diseases, Japan

Influenza activity in the Southern Hemisphere

Dr Ian Barr, Deputy Director, WHO Collaborating Centre, VIDRL, The Peter Doherty Institute, Australia

Zoonotic influenza and relative co-circulation/co-infection of influenza and SARS-CoV-2 as monitored by GISRS

Dr Aspen Hammond, WHO/HQ

*Session moderator: Prof Kedar Parasad Baral, Patan Academy of Health Sciences, Nepal*

Implementing influenza surveillance during COVID-19 pandemic – challenges, experiences and implications for future respiratory virus circulation

*Dr Zhang Wenqing, WHO/HQ*

Multisectoral collaboration to advance zoonotic influenza surveillance – case study of Republic of Korea

*Dr Soon Bae, Korea Disease Control and Prevention Agency, Republic of Korea*

Using influenza surveillance system to support SARS-CoV-2 response: country presentations

*Dr Phonepaidth Xangsayarath, Lao PDR*

*Dr Seng Heng, Cambodia*

*Dr Nery Machado, Timor-Leste*

*Dr Pawinee Doung-ngern, Thailand*

13:40 – 14:40  Secretariat meeting

**Day 2 – Tuesday, 30 August 2022**

10:30 – 12:00  Plenary session 3: Strengthening of laboratory systems and use of new diagnostic approaches for early detection of novel influenza and other respiratory pathogens

*Session moderator: Dr Ian Barr, WHO Collaborating Centre, VIDRL, The Peter Doherty Institute, Australia*

An update on the diagnostic landscape for influenza and COVID-19 in WPR and SEAR

*Mr Francis Inbanathan, SEARO*

Genomic surveillance approaches in WPR and SEAR, COVID-19 and beyond

*Dr Satoshi Shimada, WPRO*

Approaches to sustain and enhance testing capacities for integrated surveillance, including use of novel technologies
Countries and partners experience & panel discussion

*Dr Jyoti Acharya, Nepal*

*Dr Burmaa Alyeksandr, Mongolia*

*Dr Erik Karlsson, Institut Pasteur du Camodge*

Panel discussion

Instructions for breakout sessions

**12:15 – 13:30 Breakout sessions**

Laboratory: Testing strategies, genomic surveillance to support early detection of novel pathogens

*Moderator: Dr Raymond Lin, National Centre for Infectious Diseases, Singapore*

Surveillance: Integrated & additional surveillance for respiratory pathogens

*Moderator: Dr Pham Quang Thai, Ministry of Health, Viet Nam*

Data management: Improving influenza data sharing

*Moderator: Dr Stefano Tempia, WHO-HQ*

PIP framework implementation in WPR

*Moderator: Mr Nguyen Phuong Nam*

**13:30 – 14:30 Secretariat meeting**

**Day 3 – Wednesday, 31 August 2022**

**10:30 – 11:30 Plenary session 4: COVID-19 vaccination planning and reaching set targets: implication for future pandemics vaccination response**

Regional perspectives on COVID-19 vaccination planning and operational experience and implications for future pandemics vaccination response

*Dr Yoshihiro Takashima, WPRO*

*Dr Pankaj Bhatnagar, SEARO*

Country experience

*Dr Tashi Dawa, Bhutan*

Plenary discussion
11:30 – 11:45  Mobility break

11:45 – 13:15  Plenary session 5: Outcomes of the breakout sessions and panel discussion on enhanced preparedness for future pandemics through strengthened surveillance

*Session moderator: Dr Varsha Potdar, Ministry of Health and Family Welfare, India*

- Laboratory
  - *Dr Jyoti Acharya*
- Surveillance
  - *Dr Santhi Subramani*
- Data management
  - *Dr Mahtab Singh*
- PIP PC implementation in WPR
  - *Dr Kathleen Ryan*
- Panel discussion on sustainable pandemic respiratory pathogens surveillance, influenza virus sharing, and pandemic influenza preparedness
  - *Dr Gina Samman*
  - *Dr Wenqing Zhang*
  - *Dr Kanta Subbarao*
  - *Dr Crinthana Perera*

13:15 – 14:00  Conclusions and recommendations

*Dr Kanta Subbarao, WHO Collaborating Centre, VIDRL, The Peter Doherty Institute, Australia*

14:00 – 14:15  Closing remarks

*Dr Edwin Ceniza Salvador, Regional Emergency Director, SEARO*

14:15 – 14:45  Secretariat meeting
Annex 2. List of participants, temporary advisers, observers/representatives and Secretariat members

PARTICIPANTS

WESTERN PACIFIC REGION

Australia
Dr Jen Kok, Medical Virologist, Centre for Infectious Diseases and Microbiology Laboratory Services, The New South Wales Department of Health, CIDMLS L3 ICPMR Building, Westmead Hospital, Westmead NSW 2145, email: jen.kok@health.nsw.gov.au

Dr Chuan Kok Lim, Clinical Microbiologist, Victorian Infectious Diseases Reference Laboratory, The Peter Doherty Institute for Infection and Immunity, 792 Elizabeth Street, Melbourne, email: chuan.lim@mh.org.au

Dr Benjamin Polkinghorne, Director Communicable Disease Epidemiology and Surveillance, Office of Health Protection and Response, Australian Department of Health and Aged Care, Scarborough House, 1 Atlantic St Phillip ACT, Tel. No.: (612) 6289 5170, email: ben.polkinghorne@health.gov.au

Dr David Speers, Head of Microbiology Department, QEII Medical Centre, PathWest Laboratory Medicine, WA Hospital Avenue, Nedlands, Tel. No.: (448) 6383 4438, email: david.speers@health.wa.gov.au

Brunei
Ms Mazmah Ahmad Morshidi, Scientific Officer, National Virology Reference Laboratory, Department of Laboratory Services, Ministry of Health, Commonwealth Drive, Bandar Seri Begawan, Tel. No.: (673) 2218 21, email: mazmah.morshidi@moh.gov.bn

Dr Musjarena Mulok, Consultant-Head of Primary Health Care, Primary Health Care Services, Department of Health Services, Ministry of Health, Commonwealth Drive, Bandar Seri Begawan, Tel. No.: (673) 8805 202, email: Musjarena.Mulok@moh.gov.bn

Dr Ai Tee Sia, Senior Medical Officer, Primary Health Care Services, Department of Health Services, Ministry of Health, Jalan Commonwealth Drive, Bandar Seri Begawan, Tel. No.: (673) 8788 708, email: aitee.sia@moh.gov.bn
Cambodia
Dr Heng Seng, Chief of Surveillance Bureau, Communicable Disease Control Department, National Institute of Public Health, Samdach Penn Nuth Blve (289) Sangkat Boeungkak 2 Toul, Kork District, Phnom Penh, Tel. No.: (855) 12 852 782, email: senghengmoh@gmail.com

Dr Erik Albert Karlsson, Director of National Influenza Center, Institut Pasteur du Cambodge, 5 Monivong Blvd., PO Box 983, Phnom Penh, Tel. No.: (855) 7029 7804, email: ekarlsson@pasteur-kh.org; e.a.karlsson@gmail.com

Mr Savuth Chin, Deputy Chief, National Public Health Laboratory, National Institute of Public Health, Samdach Penn Nuth Blve (289) Sangkat Boeungkak 2 Toul Kork District, Phnom Penh, Tel. No.: (855) 23 966 449, email: savuth_chin@niph.org.kh

Dr Vuthikol Yong, Deputy Manager, National Immunization Program, Ministry of Health, National Road, No. 6, Kien Khlang Prek Leap, Chroy Changya, Phnom Penh, Tel. No.: (855) 12 897 043, email: yongvuthikol@gmail.com

China
Mrs Hong Yang, Associate Researcher, National Immunization Programme, China CDC, No. 27, Nan Wei Road, Xicheng District, Beijing, Tel. No.: (86) 18810532965, email: yanghong@chinacdc.cn

Dr Peng Zhibin, Director and Associate Professor, Respiratory Infectious Diseases, Branch No. 155, Changbai Road, Changping District, Beijing, Tel. No.: (8610) 58900541, email: pengzb@chinaadc.cn

Prof Zhou Lei, Chief of Branch for Emerging Infectious Diseases, Public Health Emergency Center, No. 155 Changbai Road, Changping District, Beijing, Tel. No.: (86) 134 2637 2029, email: zhoulei@chinaadc.cn

Fiji
Dr Ripeka Kaurasi, Medical Officer, Fiji Centre for Disease Control, Ministry of Health and Medical Services, Mataika House, Princess Road, Suva, Tel. No.: (679) 942 1905, email: rtkaurasi@gmail.com

Dr Aalisha Sahukhan, Head of Health Protection, Fiji Centre for Disease Control, Ministry of Health and Medical Services, Mataika House, Princess Road, Suva, email: aalisha@gmail.com

Ms Shalini Singh, Medical Laboratory Technologist, National Public Health Lab, Fiji Centre for Disease Control, Ministry of Health and Medical Services, Building 30 Mataika House, Tamavua, Suva, Tel. No.: 3320066, email: shalinip588@gmail.com
Ms Anaseini Vesikula, Vaccine Preventable Diseases, Surveillance and Response Officer, Epidemiology Surveillance Response, Fiji Centre for Disease Control, Ministry of Health and Medical Services, Mataika House, Princess Road, Suva, Tel. No.: (679) 728 0500, email: anaseinivesikula@gmail.com

Dr Nanley Cheng, Senior Medical Officer, Programme Management Vaccination Division, Department of Health, 4/F, Centre for Health Protection, 147C Argyle Street, Kowloon, Tel. No.: (852) 2125 2184, email: nanley_cheng@dh.gov.hk

Dr Kung Kin Hang, Principal Medical and Health Officer, Surveillance Division, Communicable Disease Branch, 3/F, Centre for Health Protection, Department of Health, 3/F, 147C Argyle Street, Kowloon, Tel. No.: (852) 2125 2300, email: kh_kung@dh.gov.hk

Dr Janice Lo, Consultant-Medical Microbiologist, Centre for Health Protection, Public Health Laboratory Services Branch, Department of Health, 7/F, Public Health Laboratory Centre, 382 Nam Cheong Street, Shek Kip Mei, Kowloon, Tel. No.: (852) 2319 8254 email: janicelo@dh.gov.hk

Dr Yuzo Arima, Unit Chief, Center for Surveillance, Immunization, and Epidemiologic Research, National Institute of Infectious Diseases, 1-23-1, Toyama Shinjuku-ku, Tokyo, 162-8640, Tel. No.: (81) 3 5285 1111, email: arima@niid.go.jp

Dr Takeshi Arashiro, Research Scientist/Epidemiologist, Center for Surveillance, Immunization, and Epidemiologic Research, National Institute of Infectious Diseases, 1-23-1, Toyama, Shinjuku-ku, Tokyo, Tel. No.: (81) 3 5285 1111, email: arashirot@niid.go.jp

Dr Shinji Watanabe, Laboratory Chief, Research Center for Influenza and Respiratory Viruses, National Institute of Infectious Diseases, 4-7-1 Gakuen, Musashi-Murayama, Tokyo, Tel. No.: (81) 42 546, email: sw@niid.go.jp

Dr Boutnhanom Sengkeopraseuth, Chief of Epidemiology Unit, Department of Communicable Disease Control, Ministry of Health, Ban Thatkho Sisattanack District, Rue Simeuang, Vientiane, Tel. No.: (856) 20 5588 4568, email: sengkeopraseuth@yahoo.com

Dr Kittiphong Viengsavanh, Chief of Surveillance and Response, Department of Communicable Disease Control, Ministry of Health, Ban Thatkho Sisattanack District, Rue Simeuang, Vientiane, Tel. No.: (856) 20 5825 4846, email: fcfornai@gmail.com
Dr Phophonepadith Xangsayarath, Director of National Center for Laboratory and Epidemiology, Department of Communicable Disease Control, Ministry of Health, Ban Thatkhaosisattanack District, Rue Simeuang, Vientiane, Tel. No.: (856) 20 5885 8878, email: phonepadithxangsayarath@gmail.com

Mr Somoulay Virasack, Deputy Chief of Laboratory, National Center for Laboratory and Epidemiology, Ministry of Health, Sisattanak district, Km3 Thadeua Road, Vientiane, Tel. (856) 21 312351; (856) 20 5560 1023, email: ncleviro@gmail.com

Malaysia

Dr Mastura Ismail, Deputy Director, Primary Health Care, Family Health Development Division, Ministry of Health, Level 5, Block E6, Complex E, Putrajaya, Tel. No.: (603) 8883 2163, (60) 12 6835908, email: drmastura@moh.gov.my

Mr Selvanesan Sengol, Microbiologist, Head of Virus Isolation and Electron Microscopy Unit, National Public Health Laboratory, Ministry of Health, Lot 1853, Kampung Melayu Sungai Buloh, 47000 Sungai Buloh, Putrajaya, Tel. No.: (60) 16 2657105, email: selvanesan@moh.gov.my

Dr Santhi Subramaniam, Public Health Physician, Head of Outbreak Response, Epidemiology Division, Ministry of Health, National Public Health Laboratory, Lot 1853, Kampung Melayu, Selangor, 47000 Sungai Buloh, Selangor, Tel. No.: (60) 12 3504966, email: ssanthi@moh.gov.my

Mongolia

Dr Burmaa Alyeksandr, Head, National Influenza Surveillance, Division National Center for Communicable Diseases, Bayanzurkh District, Nam Jan Ju Street, Ulaanbaatar, Tel. No.: (976) 1145 4921, email: aburma69@gmail.com

Dr Urtnasan Chuluunbat, Epidemiologist, National Influenza Surveillance, National Center for Communicable Diseases, Bayanzurkh District, Nam Jan Ju Street, Ulaanbaatar, Tel. No.: (976) 1145 4921, email: urtnasanc@gmail.com

Dr Dashpagam Otgonbayar, Head, Department of Immunization, National Center for Communicable Diseases, Bayanzurkh District, Nam Jan Ju Street, Ulaanbaatar, Tel. No.: (976) 8808 1464, email: dashpagam08@gmail.com

Ms Urantstsetseg Shagdarsuren, Senior Expert in-charge of Surveillance and Prevention of Common Infectious Diseases, Division for Infectious Diseases, Department of Public Health, Ministry of Health, Government Building-VIII, Olympic Street-2, Sukhbaatar District 14210, Ulaanbaatar, Tel. No.: (976) 5126 1629, email: urantsetseg@moh.gov.mn; urnaashagdar@yahoo.com
New Caledonia

Dr Antoine Biron, Clinical Pathologist, CHT Gaston Bourret BPJS 98869, Noumea, Tel. No.: (687) 526 287, email: antoine.biron@cht.nc

Dr Anne Pfannstiel, Doctor in Charge of Prevention Programs, Public Health Service, Directorate of Health and Social Affairs, 7 Avenue, Paul Doumer, Noumea, Tel. No.: (687) 243 785, email: Anne.pfannstiel@gouv.nc

New Zealand

Dr Greg Evans, Public Health Medicine Specialist, PHA, Ministry of Health New Zealand, 133 Molesworth St, Wellington, email: gregory.evans@health.govt.nz

Dr Maeve Hume-Nixon, Public Health Registrar, ODPH, Ministry of Health, 133 Molesworth Street Wellington, email: maeve.hume-nixon@health.govt.nz

Dr Sarah Jefferies, Public Health Physician, Health Intelligence, Institute of Environmental Science and Research, 32 Kenepuru Drive, Porirua 5022, Tel. No.: (64) 27 704 8696, email: sarah.jefferies@esr.cri.nz

Dr Andrea McNeill, Technical Lead, Epidemiology, Health Intelligence, Institute of Environmental Science and Research, 34 Kenepuru Drive, Kenepuru, Porirua 5022, email: andrea.mcneill@esr.cri.nz

Papua New Guinea

Mr Emmanuel Hapolo, Surveillance Officer, SER, National Department of Health, Tel. No.: (675) 7165 7759, email: emmanuel.hapolo@gmail.com

Ms Sarah Javati, Senior Scientific Officer, National Influenza Center, Infection and Immunity Unit, PNG Institute of Medical Research, P.O. Box 60, Leighvial, Homate Streets, Goroka, Tel. No.: (675) 532 2800, email: sarah.javati@pngimr.org.pg

Mr John-Paul Matlam, Health Extension Officer – Research Clinician, Infection and Immunity, PNG Institute of Medical Research, P.O. Box 60, Leighvial, Homate Streets, Goroka, Tel. No.: (675) 532 2800, email: john-paul.matlam@pngimr.org.pg

Ms Martha Pogo, National EPI Manager, Public Health, Health Ministry, National Health Department, PO Box 807, Waigani, NCD, email: martzpogo@gmail.com

Mr Barry Ropa, Program Manager Surveillance and Emergency Response, National Health Department, P.O. Box 807, Waigani, Tel. No.: (3013) 841, email: bropa2013@gmail.com

Mr Valentine Siba, Senior Scientific Officer, Infection and Immunity - COVID-19 Laboratory, Institute of Medical Research, Homate Street, PO Box 60, Goroka, Eastern Highlands Province, Papua New Guinea, email: valentine.siba@pngimr.org.pg
Mr Dagwin Suarkia, Senior Scientific Officer/Head, Virology Infection and Immunity, PNG Institute of Medical Research, P.O. Box 60, Leighvial, Homate Streets, Goroka, Tel. No.: (675) 532 4500, email: dagwin.suarkia@pngimr.org.pg

Ms Richelle Abellera, Nurse V, Epidemiology Bureau, Department of Health, San Lazaro Compound, Rizal Ave., Sta. Cruz, Manila, Tel. No.: (632) 8651 7800 Ext 2930, email: rpabellera@doh.gov.ph

Mr Eurich Roi Araneta, Senior Health Program Officer, Epidemiology Bureau, Department of Health, Imus, Cavite, email: ecaraneta@doh.gov.ph

Ms Ann Christhel Ballesteros, Senior Health Program Officer, Department of Health, Manila, Philippines, email: acmballesteros@doh.gov.ph

Ms Ma. Gelli Anne Escober, Senior Health Program Officer, Epidemiology Bureau, Department of Health, Manila, Philippines, email: mgbescober@doh.gov.ph

Ms Arguelles Vina F., Supervising Science Research Specialist, Virology, Research Institute for Tropical Medicine, FCC Compound, Muntinlupa, Tel. No.: (63) 8809 7120, email: vinalea.arguelles@yahoo.com

Mr Jovaniel Madeja, Senior Health Program Officer, Epidemiology Bureau, Department of Health, Manila, Philippines, email: inmadeja@doh.gov.ph

Mr Devon Ray Pacial, Supervising Health Program Officer, Epidemiology Bureau, Department of Health, San Lazaro Compound, Rizal Ave., Sta. Cruz, Manila, Tel. No.: (632) 8651 7800 Ext 2930, email: drpacial@doh.gov.ph

Mr Hanzel Tolentino, Senior Health Program Officer, Policy and Planning, Department of Health, Manila, email: hanzeltlntn@gmail.com

Mr Soonjong Bae, Epidemiological Investigation Officer, Division of Emerging Infectious Diseases, Bureau of Infectious Disease Diagnosis Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, Tel. No. (82) 10 2572 5236, email: soonbible@korea.kr

Dr Jin Gwack, Division Director, Division of Infectious Disease Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, Tel. No.: (82) 43 719 7140, email: gwackjin@korea.kr
Dr Eun-Jin Kim, Director, Division of Emerging Infectious Diseases, Bureau of Infectious Disease Diagnosis Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, Tel. No.: (82) 43 719 8140, email: ekim@korea.kr

Ms Nam-Joo Lee, Staff Scientist, Division of Emerging Infectious Diseases, Bureau of Infectious Disease Diagnosis Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, email: njlee@korea.kr

Dr Jee Eun Rhee, Deputy Director, Division of Emerging Infectious Diseases, Bureau of Infectious Disease Diagnosis Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, email: jerhee001@korea.kr

Ms Kim JungYeon, Deputy Scientific Director, Division of Emerging Infectious Diseases, Bureau of Infectious Disease Diagnosis Control, Korea Disease Control and Prevention Agency, 87 Osongsaengmyeong2-ro, Osong-eup Heungdeok-gu, Cheongju-si Chungcheongbuk-do, email: erijykim@korea.kr

Singapore

Dr Raymond Lin, Director, National Public Health Laboratory, National Centre for Infectious Diseases, Ministry of Health, 16 Jalan Tan Tock Seng, Tel. No.: (65) 63577325, email: Raymond_Lin@moh.gov.sg; miclprv@nus.edu.sg

Ms Shanice Teo, Public Health Officer, Communicable Diseases Division, Surveillance, Epidemiology & Response Branch, Ministry of Health, 16 College Road, College of Medicine Building, Tel. No.: (65) 82223715, email: Shanice_teo@moh.gov.sg

Dr Benny Ken Yee Yeo, Scientific Officer, National Public Health Laboratory, National Centre for Infectious Diseases, 16 Jalan Tan Tock Seng, Tel. No.: (65) 9737 7638, email: benny_yeo@moh.gov.sg

Viet Nam

Dr Cao Minh Thang, Vice Head Microbiology and Immunology Department, Pasteur Institute, 167 Pasteur Street, District 3, Ho Chi Minh, Tel. No.: (84 9) 084 79285, email: tminhcao@gmail.com

Dr Duong Huu Thai, Director, Influenza, Institute of Vaccines and Biological Medical, 09 Pasteur Street, Nha Trang, Tel. No. (84 9) 120 67319, email: duonghuuthai70@gmail.com

Mrs Ha Thi Cam Van, Deputy Head, Division of Vaccine and Biosafety Management, General Department of Preventive Medicine, Ministry of Health, 135 Nui Truc, Ba Dinh, Hanoi, Tel. No.: (849) 125 86156, email: hacamvan210@gmail.com
Dr Le Mai, Director of NIC Vietnam, Virology, National institute of Hygiene and Epidemiology, No 1-Yersin Street, Hanoi, email: lom9@hotmail.com

Dr Luong Chan Quang, Deputy Head, Department of Disease Control and Prevention, Pasteur Institute, 167 Pasteur Street, District 3, Ho Chi Minh, Tel. No.: (84) 913 704338, email: lcq33new@gmail.com

Ms Ngoc Nguyen Thu, Researcher, Microbiology and Immunology Department, Pasteur Institute, 167 Pasteur Street, District 3, Ho Chi Minh, Tel. No.: (84 9) 152 50956, email: ngocpas@gmail.com

Dr Nguyen Hai Tuan, Epidemiologist, Department of Communicable Disease Control, Vietnam National Institute of Hygiene and Epidemiology, 1 Yersin Street, Hai Ba Trung District, Hanoi, Tel. No.: (84 9) 857 67712, email: nguyenhaituan@gmail.com

Professor Thai Pham Quang, Vice Head, Communicable Diseases Control and Prevention, National Institute of Hygiene and Epidemiology, 1 Yeexanh Street, Pham Dinh Ho Ward, Hai Ba Trung District, Hanoi, Tel. No.: (84 9) 130 92777, email: phamquangthai@gmail.com

Mr Trung Hieu Nguyen, Staff, NIC, Pasteur Institute, 167 Pasteur Street, District 3, Ho Chi Minh, Tel. No.: (84 9) 835 72014, email: nguyentrunghieu204@yahoo.com
SOUTH-EAST ASIA REGION

Bangladesh  
Dr Manjur Hossain Khan, Assistant Professor, Virology, Institute of Epidemiology, Disease Control and Research, Dhaka, email: khanmanjur56@gmail.com

Dr Mahbubur Rahman, Assistant Professor, Institute of Epidemiology, Disease Control and Research, Directorate General of Health Services, Ministry of Health, Mohakhali, Dhaka-1212, Tel. No.: (880) 1712 044103, email: dr_mahbub@yahoo.com

Bhutan  
Mr Tashi Dawa, National EPI Manager, Communicable Diseases Division, Department of Public Health, Ministry of Health, Thimphu, email: tdawa@health.gov.bt

Mr Kunzang Dorji, Senior Laboratory Officer, Royal Centre for Disease Control, Department of Public Health, Ministry of Health, Thimphu, Tel. No.: (975) 17 445513, email: kunzangdorji@health.gov.bt

Mr Binay Thapa, Chief Laboratory Officer, Royal Centre for Disease Control, Department of Public Health, Ministry of Health, Thimphu, Tel. No.: (975) 17 562422, email: bthapa@health.gov.bt

India  
Dr Deepika Singh, Lab Advisor, CDC India - Influenza Division, New Delhi, Tel. No.: (91) 9350 646300, email: rxu7@cdc.gov

Indonesia  
Dr Alfinella Izhar Iswandi, Focal Point for Acute Respiratory Infection, Directorate of Communicable Disease Prevention and Control, Ministry of Health, Jalan H.R. Rasuna Said Blok X.5 Kav. 4-9 Jakarta Selatan, Jakarta, Tel. No.: (62) 81 2672 8439, email: ella_doct@yahoo.com

Dr Krisna Nur Andriana Pangesti, Virology Laboratory Manager, National Infectious Disease Laboratory, Health Policy Agency, Minister of Health, Jl. Percetakan Negara 23, Jakarta, Tel. No.: (62) 81 2848 64973, email: krisnaaus@gmail.com

Dr Catharina Praptiningsih, Medical Epidemiologist, Centers for Disease Control Indonesia, U.S. Centers for Disease Control and Prevention, Jakarta Timur, email: xel3@cdc.gov

Dr Ikke Yuniiherlina, Epidemiologist, Director General of Disease Prevention and Control, Ministry of Health, HR. Rasuna Said Street, DKI Jakarta, email: ikke.yuniiherlina@yahoo.com

Maldives  
Ms Nashiya A.Ghafoor, Director, Health Protection Agency, Ministry of Health, Roashany Building, Ministry of Health, Sosun Magu, Malé, Tel. No.: (960) 7903118, email: nashiya@health.gov.mv
Ms Aishath Hareera, Public Health Program Officer, Health Protection Agency, Ministry of Health, Roashany Building, Ministry of Health, Sosun Magu, Malé, Tel. No.: (960) 797-8849, email: hareera@health.gov.mv

Ms Aminath Shazleena, Medical Laboratory Scientist, Department of Laboratory Medicine, Indira Gandhi Memorial Hospital, Rabarugas Magu 8, Tel. No. (960) 7794123, email: shazlynaa@gmail.com

Nepal
Ms Jyoti Acharya, Chief Medical Technologist, Microbiology Department, Ministry of Health and Population, National Public Health Laboratory, Teku, Kathmandu, email: jyotigan30@gmail.com

Mr Sagar Dahal, Sr Public Health Administrator, Family Welfare Division, Department of Health Services, Ministry of Health and Population, Ministry of Health and Population, Teku Kathmandu, Tel. No. (977) 98511 93947, email: dhlsagar76@gmail.com

Dr Khageshwor Gelal, Senior Health Administrator, Epidemiology and Disease Control Division, Ministry of Health and Population, Ward No. 16 Balaju, Katmandu, Tel. No.: (977) 97610 71624, email: kgelaldr@gmail.com

Dr Runa Jha, Director, National Public Health Laboratory, Ministry of Health and Population, Teku, Kathmandu, email: runa75jha@gmail.com

Sri Lanka
Dr Jude Jayamaha, Consultant Virologist, Medical research Institute Colombo, P.o.box528 danister de Silva Mawatha, Colombo 08, Tel. No.: (94) 766 621939, email: jayamahacar@gmail.com

Dr Chinthana Perera, Consultant Epidemiologist, Epidemiology Unit, Ministry of Health, 231, De Saram Place, Colombo 10, Tel. No.: (94) 070 3384515, email: pcsperera@yahoo.com

Thailand
Dr Thomas Cotrone, Director of Lab Operations, Virology, Armed Forces Research Institute of Medical Sciences, 315 26th Street, 48 Sukhumvit Soi 16, Bangkok, Tel. No.: 4347369028, email: Thomas.cotrone.mil@afrims.org; trogersc@gmail.com

Dr Stefan Fernandez, Chief, Department of Virology, Armed Forces Research Institute of Medical Sciences, Bangkok, Tel. No. 660803387262, email: stefan.fernandez.mil@afrims.org

Dr Wanitchaya Kittikraisak, Epidemiologist, Influenza Program, U.S. CDC, Ministry of Public Health, DDC Building 7, Tiwanon Road, Muang, Nonthaburi 11000, email: glr9@cdc.gov
Ms Pornnapa Makkasan, Public Health Technical Officer, Practitioner Level, Division of Communicable Diseases, Department of Disease Control, Ministry of Public Health, 88/21 Tiwanon Rd. Talard-Kwan, Nonthaburi 11000, Tel. No.: (66) 2 813893425, email: r506_2012@hotmail.co.th

Dr Prabda Prphasiri, Influenza Epidemiologist, Influenza Program, CDC Thailand, Floor 5, Building 7, Tivanont Road, Nonthaburi 11000, Tel. No.: (66) 818751480, email: hpu3@cdc.gov

Ms Oiythip Yasopa, Public Health Technical Officer, Practitioner Level, Division of Epidemiology, Department of Disease Control, Ministry of Public Health, Nonthaburi, Tel. No.: 992717095, email: o.thippp@gmail.com

Timor Leste

Ms Belo Adriana, Lab Technician, Molecular, National Health Laboratory, Dili, Tel. No.: (670) 7870 4138, email: beloadriana77@gmail.com

Ms Eugenia Da Costa, Staff, National Health Laboratory, Timor-Leste, Dili Bidau Toko, Baru, Tel. No. (670) 7788 8588, email: eugenia.dacosta0312@gmail.com

Ms Elisabeth Hornay, Molecular Unit, National Health Laboratory, Fatuhada Dili, Tel. No.: (670) 7823 3082, email: hornayelisabeth@gmail.com

Dr Filipe de Neri Machado, Chief Department, Surveillance and Epidemiology, Ministry of Health, Tel. No. (670) 7782 34000, email: machado.26587@gmail.com

Dr Virgilia Maria dos Reis, Programme Associate Integrated Disease Surveillance Response, Expanded Programme Immunization, Rua Avenida Nicolau Lobato, Tel. No. (670) 7872 6861, email: virgiliamariadosreis@gmail.com

Mr Germano dos Reis Moreira, Laboratory Technician, Molecular, Bidau Dili, Tel. No.: (670) 7806 2720, email: Jeryrubydiga@gmail.com

Dr Ari Jayanti Tilman, Director of Pathology Clinic and Microbiology, Molecular Unit, National Health Laboratory, Rua Bidau Toko Baru, Dili, Tel. No.: (670) 77882905, email: aritilman25@gmail.com

Mr Joao Ximenes, Laboratory Technologist, Molecular Lab, National Health Laboratory, Dili, email: joaocosta.8625@gmail.com

48
TEMPORARY ADVISERS

Dr Kedar Baral, Professor, School of Public Health, Patan Academy of Health Sciences, Lalitpur, Nepal, email: kedarbaral@pahs.edu.np

Dr Ian Barr, Deputy Director, WHO Collaborating Centre for Reference and Research on Influenza, Victorian Infectious Diseases Reference Laboratory, Doherty Institute, Melbourne, Australia, Tel. No.: (613) 9342 9311, email: Ian.Barr@influenzacentre.org

Dr Wang Dayan, Director, Chinese National Influenza Center, National Institute for Viral Disease Control and Prevention, China Center for Disease Control and Prevention, Changbai Road 155#, Beijing, China, email: dayanwang@cnic.org.cn

Dr Hideki Hasegawa, Director, Research Center for Influenza and Respiratory Viruses, National Institute of Infectious Diseases, 4-7-1 Gakuen Musashimurayama-shi, Tokyo, Japan, Tel. No.: (81) 42 561 0771, email: hasegawa@nih.go.jp

Ms Pilailuk Okada, Chief of NIC, Department of Public Health, Ministry of Public Health, Nonthaburi, Thailand, email: pilailuk.o@gmail.com

Dr Varsha Potdar, Scientist E and Head NIC India, Indian Council of Medical Research, National Institute of Virology, Ministry of Health and Family Welfare, 20 A Dr Ambedkar Road, Pune, India, Tel. No.: (91) 20 26016290 Ext 283, email: varshapotdar9@gmail.com

Dr Kanta Subbarao, Director, WHO Collaborating Centre for Reference and Research on Influenza, Victorian Infectious Diseases Reference Laboratory, 792 Elizabeth Street, Melbourne, Australia, Tel. No.: (61 0) 3 9342 9310, email: kanta.subbarao@influenzacentre.org

Dr Thai Duong Huu, Director, The Institute of Vaccines and Medical Biologicals, 9 Pasteur, Xương Huân, Khánh Hòa, Nha Trang, Viet Nam, email: duonghuuthai70@gmail.com

Dr David Wentworth, Director WHO Collaborating Centre for Surveillance, Epidemiology and Control of Influenza, Chief, Virology Surveillance and Diagnosis Branch, Influenza Division Centers for Disease Control and Prevention, Royal Campus, Atlanta, GA, U.S.A, email: DWentworth@cdc.gov; gjl9@cdc.gov
OBSERVERS / REPRESENTATIVES

Centers for Disease Control and Prevention

Ms Archana Kumar, Public Health Advisor, Influenza Division, US CDC, 1600 Clifton Road, Atlanta, GA, U.S.A., email: gIx5@cdc.gov

Ms Ester Mulyadi, Medical Research Technologist, CDC Indonesia, Jl. Medan Merdeka Selatan no.3-5 Central Jakarta 10110, Indonesia, Tel. No. (628) 1268357, email: xeI8@cdc.gov

Dr Nguyen Lan, Program Officer– Laboratory, Influenza Program, U.S. CDC Viet Nam, Tungshing Bldg, No 2 Ngo Quyen St, Hanoi, Tel. No. (84) 24 3935 2083, email: yhq0@cdc.gov

Ms Nguyen Thi Minh Thoa, Technical Program Officer, Influenza, US CDC, No. 2 Ngo Quyen, TungShing Building, Hoan Kiem, Hanoi, Tel. No.: (84 9) 022 84400, email: ksi1@cdc.gov

Dr Sonja Olsen, Senior Advisor, Influenza Division, US CDC, 1600 Clifton Road, Atlanta, GA 30329, U.S.A., email: sco2@cdc.gov

Food and Agriculture Organization of the United Nations

Dr Filip Claes, Lab Coordinator, Emergency Centre for Transboundary Animal Diseases, Food and Agriculture Organization of the United Nations, 1 soi chidlom, 10330 Bangkok, Thailand, Tel. No.: (66) 61 4174581, email: filip.claes@fao.org

Dr Gael Lamielle, Regional Surveillance Coordinator, Emergency Centre for Transboundary Animal Diseases, Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, 39 Phra Athit Rd, Chana Songkhram, Phra Nakhon, Bangkok 10200, Thailand, Tel. No.: 800627864, email: gael.lamielle@fao.org

National Institute of Infectious Diseases

Dr Takuri Takahashi, Researcher (Surveillance), Center for Surveillance, Immunization, and Epidemiologic Research, National Institute of Infectious Diseases, Toyama 1-23-1, Shinjuku-ku, Tokyo 162-8640, Japan, email: takuri@niid.go.jp

Victorian Infectious Diseases Reference Laboratory

Dr Ammar Aziz, Bioinformatician, Victorian Infectious Diseases Reference Laboratory, Australia, email: ammar.aziz@influenzacentre.org

Ms Mariana Baz, Head, Antiviral Division, WHO Collaborating Centre for Reference and Research on Influenza, 792 Elizabeth Street, Melbourne 3000, Australia, email: mariana.baz@influenzacentre.org
Mrs Sook Kwan Brown, Medical Scientist, WHO Collaborating Centre for Reference and Research for Influenza, Melbourne, Victorian Infectious Diseases Reference Laboratory, 792 Elizabeth Street, Melbourne 3000, Victoria, email: Sookkwan.brown@influenzacentre.org

Dr Tanya Diefenbach-Elstob, Epidemiologist, WHO Collaborating Centre for Reference and Research on Influenza, 792 Elizabeth Street, Melbourne 3000, Australia, email: tanya.diefenbachelstob@influenzacentre.org

Ms Jessie Goldsmith, PhD Student, The Peter Doherty Institute for Infection and Immunity, University of Melbourne, 56 Auburn Avenue Northcote 3070, Victoria, Australia, email: goldsmithj@student.unimelb.edu.au

Ms Heidi Peck, Head, Serology, WHO Collaborating Centre for Reference and Research on Influenza, 792 Elizabeth St, Melbourne 3000, Australia, email: heidi.peck@mh.org.au

Professor Patrick Reading, Education and training, WHO CC for Reference and Research on Influenza, The Peter Doherty Institute for Infection and Immunity, 792 Elizabeth St, Melbourne 3000, Australia, email: Patrick.Reading@influenzacentre.org; preading@unimelb.edu.au

Prof Sheena Sullivan, Head of Epidemiology, WHO Collaborating Centre for Reference and Research on Influenza, Peter Doherty Institute for Infection and Immunity, 792 Elizabeth St, Melbourne 3000, Australia, email: sheena.sullivan@influenzacentre.org

Dr Yi-Mo Deng, Head of Genetics Analysis Unit, WHO Collaborating Centre - Melbourne, Victorian Infectious Diseases Reference Laboratory, Doherty Institute, 792 Elizabeth Street, Melbourne, email: yi-mo.deng@influenzacentre.org

Ms Tasoula Zakis, Medical Scientist, Antigenic Analysis-Serology, WHO Collaborating Centre - Melbourne, 792 Elizabeth St, Melbourne Victoria 3000, email: tasoula.zakis@influenzacentre.org

World Organisation for Animal Health (WOAH) Dr Lesa Thompson, Regional Project Officer, RRAP, OIE, Food Science Building 5F - The University of Tokyo 1-1-1 Yayoi, Bunkyo-ku, Tokyo, Japan, email: l.thompson@woah.org
SECRETARIAT

WHO Regional Health Office for the Western Pacific

Dr Babatunde Olowokure, Regional Emergencies Director, WHO Emergencies Programme, and Director, Division of Health Security Emergencies, World Health Organization Regional Office for the Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: olowokureb@who.int

Mr Nguyen Phuong Nam, Responsible Officer, Technical Officer, Pandemic Influenza Preparedness, Infectious Hazard Management, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63 2) 8528 9783, email: nguyenp@who.int

Dr Viema Biaukula, Technical Officer, Surveillance, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: biaukulav@who.int

Mr Sean Casey, Health Emergency Officer, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: scasey@who.int

Dr Qiu Yi Khut, Technical Officer, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: khutq@who.int

Mr Jan-Erik Larsen, Technical Officer, Emergency Operations–Logistics, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63) 920 983 3428, email: larsenj@who.int

Dr Sangjun Moon, Medical Officer, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63 2) 8528 9862, email: smoon@who.int
Dr Ariuntuya Ochirpurev, Technical Officer, Surveillance Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: ochirpureva@who.int

Dr Manilay Phengxay, Epidemiologist, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: phengxaym@who.int

Dr Sharon Salmon, Technical Officer, Emergency Operations, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63) 918 985 7397, email: salmons@who.int

Ms Dina Saulo, Epidemiologist, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: saulod@who.int

Dr Yoshihiro Takashima, Coordinator, Vaccine-Preventable Diseases and Immunization, Division of Programmes for Diseases Control, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: takashimay@who.int

Ms Lieke Visser, Technical Officer - Risk Communication, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: visserl@who.int

Dr Cory Couillard, Consultant, Risk Communication, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: Couillardc@who.int

Dr Sophie Dennis, Consultant, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: denniss@who.int
Ms Kaori Dezaki, Consultant, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: dezakik@who.int

Ms Laura Goddard, Consultant, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: goddardl@who.int

Mr Algreg Gomez, Epidemic Intelligence Officer, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: gomezal@who.int

Ms Kareena Hundal, Consultant, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: hundalk@who.int

Dr Zulraini Jusof, Field Epidemiology Fellowship Programme, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: jusofz@who.int

Dr Tamano Matsui, Programme Area Manager, Health Emergency Information and Risk Assessment, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63 2) 8528 9944, email: matsuit@who.int

Ms Olivia Price, Consultant, Infectious Hazard Management, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: o.price@unsw.edu.au

Dr Satoshi Shimada, Consultant, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: shimadas@who.int
Dr Fernan Talamayan, Consultant, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: talamayanf@who.int

Ms Nguyen Thu, Consultant, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, email: nguyenthimi@who.int

Dr Amelia Tuipulotu, Consultant, WASH, WHO Health Emergencies Programme, World Health Organization Regional Office for the Western Pacific, United Nations Avenue corner Taft Avenue, Manila 1000, Philippines, Tel. No.: (63) 908 892 0279, email: amyafuhaamango@gmail.com

WHO Cambodia

Dr Anne Badrichani, Consultant, Laboratory, WHO Country Office for Cambodia, No. 61-64, Preah Norodom Blvd. (corner Street 306), Sangkat Boeung Keng Kang I, Khan Chamkamorn, Phnom Penh, Cambodia, email: badrichania@who.int

Dr Shang Mei, Consultant, WHO Health Emergencies Programme, WHO Country Office for Cambodia, No. 61-64, Preah Norodom Blvd. (corner Street 306), Sangkat Boeung Keng Kang I, Khan Chamkamorn, Phnom Penh, Cambodia, email: shangm@who.int

Dr Sarika Patel, Technical Officer, Epidemiology, WHO Health Emergencies Programme, WHO Country Office for Cambodia, No. 61-64, Preah Norodom Blvd. (corner Street 306), Sangkat Boeung Keng Kang I, Khan Chamkamorn, Phnom Penh, Cambodia, email: patelsa@who.int

Mr Ieng Vanra, Technical Officer, WHO Health Emergencies Programme, WHO Country Office for Cambodia, No. 61-64, Preah Norodom Blvd. (corner Street 306), Sangkat Boeung Keng Kang I, Khan Chamkamorn, Phnom Penh, Cambodia, email: iengv@who.int

WHO China

Dr Chin Kei Lee, Medical Office, WHO Health Emergencies Programme, WHO Country Office for China, 401, Dongwai Diplomatic Office Building, 23, Dongzhimenwai Dajie, Chaoyang District, 100600 Beijing, China, Tel. No.: (86 10) 6532 7190, email: leec@who.int

WHO Fiji

Ms Sara Demas, Information and Surveillance, WHO Country Office for Fiji, Level 4, Provident Plaza One, Downtown Boulevard, 33 Ellery Street, Suva, Fiji, email: demass@who.int
<table>
<thead>
<tr>
<th>Country</th>
<th>Contact Person</th>
<th>Position</th>
<th>Phone Number</th>
<th>Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lao People's Democratic Republic</td>
<td>Ms Carmela Co Kim</td>
<td>Technical Officer</td>
<td>(856) 20 7781 7809</td>
<td><a href="mailto:ckim@who.int">ckim@who.int</a></td>
</tr>
<tr>
<td></td>
<td>Dr Phetdavanh Leuangvilay</td>
<td>Technical Officer</td>
<td>(856) 20 7781 7809</td>
<td><a href="mailto:Leuangvilayp@who.int">Leuangvilayp@who.int</a></td>
</tr>
<tr>
<td></td>
<td>Dr Satoko Otsu</td>
<td>Team Leader</td>
<td>(976) 99100155</td>
<td><a href="mailto:otsus@who.int">otsus@who.int</a></td>
</tr>
<tr>
<td>Mongolia</td>
<td>Dr Gerelmaa Danzan</td>
<td>Special Services Agreement</td>
<td>(976) 95929696</td>
<td><a href="mailto:danzang@who.int">danzang@who.int</a></td>
</tr>
<tr>
<td></td>
<td>Dr Nyamkhuu Dulmaa</td>
<td>National Professional Officer</td>
<td>(976) 99100155</td>
<td><a href="mailto:dulmaan@gmail.com">dulmaan@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Dr Aguedo Troy Gepte</td>
<td>Consultant</td>
<td>(63) 927 2025</td>
<td><a href="mailto:gidoy4@gmail.com">gidoy4@gmail.com</a></td>
</tr>
<tr>
<td>Papua New Guinea</td>
<td>Dr Anup Gurung</td>
<td>Team Leader, Communicable Disease</td>
<td></td>
<td><a href="mailto:gurunga@who.int">gurunga@who.int</a></td>
</tr>
</tbody>
</table>

Dr Nuha Mahmoud, Team Coordinator, WHO Health Emergencies Programme, WHO Country Office for Fiji, Level 4, Provident Plaza One, Downtown Boulevard, 33 Ellery Street, Suva, Fiji, Tel. No.: '+6797779729, email: hamidn@who.int

Ms Shakila Naidu, Special Services Agreement-Influenza Surveillance Officer, WHO Country Office for Fiji, Level 4, Provident Plaza One, Downtown Boulevard, 33 Ellery Street, Suva, Fiji, Tel. No.: 679 9930433, email: shakilan@who.int

WHO Lao People's Democratic Republic

WHO Mongolia

WHO Papua New Guinea
Ms Nola Ndrewei, Technical Officer, WHO Health Emergencies Programme, WHO Country Office for Papua New Guinea, 4th Floor, AOPI CENTRE, Waigani Drive, Port Moresby, Papua New Guinea, Tel. No.: (675) 79261425, email: ndrewein@who.int

WHO Philippines

Dr Kathleen Ryan, Technical Officer, Surveillance, WHO Health Emergencies Programme, WHO Country Office for the Philippines, Ground Floor, Building 3, Department of Health, San Lazaro Compound, Rizal Avenue, Sta. Cruz, Manila, Philippines, email: ryanka@who.int

WHO Viet Nam

Dr Do Thi Hong Hien, Epidemiologist, WHO Health Emergencies Programme, WHO Country Office for Viet Nam, 304 Kim Ma Street, Hanoi, Viet Nam, email: doh@who.int

Dr Nguyen Thi Phuc, Technical Officer, WHO Health Emergencies Programme, WHO Country Office for Viet Nam, 304 Kim Ma Street, Hanoi, Viet Nam, Tel. No.: (84) 988 082 493, email: Phucn@who.int

WHO Regional Office for South-East Asia

Dr Pem Namgyal, Director, Programme Management, World Health Organization Regional Office for South-East Asia, World Health South-East Asia House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No.: (91) 9650197388, email: namgyalpe@who.int

Dr Pushpa Ranjan Wijesinghe, Co-Responsible Officer, Programme Area Manager, Infectious Hazard Management, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No. (91) 8588 979351, email: wijesinghep@who.int

Mr Francis Inbanathan, Technical Officer, Laboratory, Infectious Hazard Management, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, email: inbanathanfi@who.int

Ms Taru Bahl, Consultant, Communication Specialist, Laboratory, Infectious Hazard Management, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No. (91) 9899834464, email: tarubahl@gmail.com
Dr Pankaj Bhatnagar, Technical Officer Immunisation Systems Strengthening, Immunization and Vaccine Development, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No. (91) 9810189025, email: bhatnagarp@who.int

Ms Anupurba Chowdhury, Laboratory Consultant, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No.: 8697960481, email: roya@who.int

Dr Maung Maung Htike, Technical Officer, Public Health Emergency Preparedness Country Health Emergency Preparedness and IHR, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, email: htikem@who.int

Dr Masaya Kato, Programme Area Manager, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No.: 7042733665, email: katom@who.int

Dr Tran Minh, Team Leader, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No.: (917) 428380307, email: TranMinhN@who.int

Dr Pavana Murthy, National Professional Officer, Influenza Focal Point, Health Security and Emergency, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No.: 8800797655, email: murthyp@who.int

Dr Dhamari Naidoo, Public Health Laboratory Scientist, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, email: naiddoo@who.int

Dr Mahtab Singh, Consultant, Monitoring and Evaluation, Health Emergency Information and Risk Assessment, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, Tel. No. (91) 9953750540, email: drmahtab2013@gmail.com
Dr Sourabh Sinha, Technical Officer, WHO Health Emergencies Programme, World Health Organization Regional Office for South-East Asia, World Health House Indraprastha Estate Mahatma Gandhi Road, New Delhi 110002, India, email: sinhaso@who.int

WHO Bangladesh
Dr Muhammad Rahim, National Professional Officer, EHA, WHO Country Office for Bangladesh, House No. SW(l) 1/A, Road # 8, Gulshan-I, Dhaka-1212, Bangladesh, Tel. No. (880) 1 7300 32311, email: rahimm@who.int

WHO Bhutan
Mr Kencho Wangdi, National Professional Officer, WHO Country Office for Bhutan, World Health Organization in the Ministry of Health Building, Kawangjangsa, Post Box – 175, Thimphu, Bhutan email: wangdik@who.int

WHO Indonesia
Dr Endang Widuri Wulandari, Epidemiologist, WHO Health Emergencies Programme, 5th Floor, Gama Tower, Jl HR Rasuna Said Kav. C-22, Jakarta 12940, Indonesia, Tel. No.: 8118712670, email: eulandarie@who.int

WHO Myanmar
Dr Mya Yee Mon, National Professional Officer, WHO Health Emergencies Programme, WHO Country Office for Myanmar, World Health Organization No. 403 (A1), Shwe Taung Kyar Street, Bahan Township, Yangon 11201, Myanmar, email: veemonm@who.int

Dr Zar Zar Naing, National Professional Officer, WHO Health Emergencies Programme, WHO Country Office for Myanmar, World Health Organization No. 403 (A1), Shwe Taung Kyar Street, Bahan Township, Yangon 11201, Myanmar, Tel. No. (95) 942 1059 118, email: znaing@who.int

WHO Nepal
Dr Vinod Bura, Medical Officer, Team Lead, Immunization Preventable Disease Programme, WHO Country Office for Nepal, United Nations House, Pulchowk, Lalitpur, Nepal, Tel. No.: (977) 9802300663, email: burav@who.int

Prof Arunkumar Govindakarnavar, Technical officer (Public Health Lab), WHO Health Emergencies Program, WHO Country Office for Nepal, United Nations House, Pulchowk, Lalitpur, Nepal, Tel. No.: (977) 9802300669, email: govindakarnavar@who.int

Dr Palpasa Kansakar, National Professional Officer, WHO Country Office for Nepal, United Nations House, Pulchowk, Lalitpur, Nepal, email: pkansakar@who.int

Dr Saugat Shrestha, Fellow, Lab Capacity, Antimicrobial Resistance - Structured Operational Research and Training Initiative, WHO Health Emergencies Program, WHO Country Office for Nepal, United Nations House, Pulchowk, Lalitpur, Nepal, email: shresthasau@who.int
WHO Sri Lanka  
Dr Preshila Samaranweera, National Consultant, CDC, WHO Country Office for Sri Lanka, 5 Anderson Road, Colombo 05, Sri Lanka, Tel. No.: (94) 714 938916, email: samaranweerap@who.int

Dr Sapumal Dhanapala, National Professional Officer, Emergency Risk Management, WHO Country Office for Sri Lanka, 5 Anderson Road, Colombo 05, Sri Lanka, Tel. No.: (94) 714 429793, email: dhanapalas@who.int

WHO Thailand  
Dr Rick Brown, WHO Health Emergencies Programme, WHO Country Office for Thailand, 88/20 Permanent Secretary Building 3, 4th Floor, Ministry of Public Health, Tiwanon Road, Nonthaburi, 11000 Thailand, email: brownr@who.int

Ms Phiangjai Boonsuk, National Professional Officer, WHO Health Emergencies Programme, WHO Country Office for Thailand, 88/20 Permanent Secretary Building 3, 4th Floor, Ministry of Public Health, Tiwanon Road, Nonthaburi, 11000 Thailand, email: boonsukp@who.int

WHO Timor Leste  
Ms Maria A. V. Niha, National Professional Officer, Surveillance, WHO Country Office for Timor Leste, United Nations House, Caicoli Street, Dili, Timor-Leste, Tel. No. (670) 7738 2672, email: varelama@who.int

Dr Amelia Ferreira Pinto, Medical Officer, Surveillance, WHO Country Office for Timor Leste, United Nations House, Caicoli Street, Dili, Timor-Leste, Tel. No.: (670) 7708 8845, email: amelifaerpinto@gmail.com

Dr Dongbao Yu, Medical Officer, WHO Country Office for Timor Leste, United Nations House, Caicoli Street, Dili, Timor-Leste, email: yud@who.int

WHO Headquarters  
Ms Jennifer Barragan Fromme, Project Manager, Pandemic Influenza Preparedness (PIP), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: barraganj@who.int

Dr Isabel Bergeri, Technical Officer, Global Influenza Programme (GIP), Global Infectious Hazard Preparedness (GIH), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: bergerii@who.int

Dr Supriya Bezbaruah, Team Lead, Science Translation, Epidemic and Pandemic Preparedness and Prevention (EPP), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, Tel. No. (41) 795 133 582, email: bezbaruahs@who.int
Ms Ioana Ghiga, Technical Officer, Evidence and Information for Policy Cluster (EIP), Global Infectious Hazard Preparedness (GIH), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: ghigai@who.int

Dr Aspen Hammond, Technical Officer, Epidemic and Pandemic Preparedness and Prevention (EPP), Global Influenza Programme (GIP), World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: hammonda@who.int

Ms Poonam Huria, Technical Officer, Pandemic Influenza Preparedness (PIP), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, Tel. No.: (41) 795 473 065, email: sachdevap@who.int

Mr Joshua Adam Mott, Technical Adviser, Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: mottj@who.int

Dr Dmitriy Pereyaslov, Team Lead, Global Influenza Surveillance and Response System (GISRS), Global Influenza Programme (GIP), Epidemic and Pandemic Preparedness and Prevention (EPP), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, Tel. No.: (41) 798 648 576, email: pereyaslovd@who.int

Dr Gina Samaan, PIP Secretariat, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, Tel. No.: (41) 795 965 691, email: samaang@who.int

Dr Stefano Tempia, Team Lead, Global Influenza Programme (GIP), World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: tempias@who.int

Dr Katelijn Vandemaele, Medical Officer, Global Influenza Programme (GIP), Global Infectious Hazard Preparedness (GIH), Emergency Preparedness, World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, email: vandemaelek@who.int

Dr Zhang Wenqing, Unit Head, Global Influenza Programme (GIP), World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland, Tel. No.: (41) 794 671 935, email: zhangw@who.int
Annex 3. Opening address by Dr. Babatunde Olowokure, Regional Emergency Director, on behalf of Dr. Takeshi Kasai, Regional Director, WPRO

Good morning and good afternoon colleagues and distinguished guests. Thank you very much for joining the 15th Bi-regional National Influenza Centre (NIC) meeting today.

Since 2007, the annual bi-regional NIC meetings have provided an opportunity for NICs, Ministry of Health officials WHO and partners to share experiences, successes and challenges. It also provides an opportunity to contribute to strengthening the Global Influenza Surveillance and Response System.

The meetings have encouraged collaboration between public health laboratories, epidemiologists, National Influenza Centres, WHO collaborating Centres, reference laboratories, influenza surveillance networks, policymakers, and immunization programmes. This multi-partner collaboration has facilitated the development and implementation of evidence-based strategies across the WHO South-East Asia and Western Pacific Regions.

Clearly, long term investment is critical. Over the past decade, Member States have made significant progress in improving virological testing capacity, understanding regional influenza epidemiology, and improving response and reporting platforms.

Genomic sequencing capacities are being developed in Member States in the Region, and the inaugural meeting of the WHO Western Pacific Region Emerging Molecular Pathogen Characterization Technologies (EMPaCT) Surveillance Network took place in September 2021. Capacities developed for Member States in this area have allowed for detection and identification of existing and new variants, providing critical information to support ongoing COVID-19 response and future health emergencies.

Under the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies, or APSED, now in its third iteration, Member States have developed their response plans – and, crucially, the capacities and systems required to implement them. Through implementation of the APSED strategic framework, systems and capacities were developed and further enhanced including surveillance, laboratory, contact tracing, and risk assessment – which have proven critical in the COVID-19 response.

However, challenges remain. The Asia Pacific region remains a hotspot for influenza and other emerging respiratory pathogens, as highlighted by the recent emergence of SARS-CoV-2 and novel subtypes of avian influenza virus infecting humans.

The COVID-19 pandemic has brought unprecedented challenges to public health systems in every country. Existing systems and resources have been repurposed to support COVID-19 response. Surveillance and laboratory systems in many countries were overwhelmed, creating challenges for monitoring of existing pathogens, including influenza.

However, these challenges have also brought new opportunities. Countries have used different surveillance systems including influenza to provide information for COVID-19 response. Many countries are taking a step-by-step approach to develop systems that include genomic surveillance as part of multi-source surveillance that support detection and monitoring future pathogens of pandemic potential.
We should anticipate that health emergencies will become more frequent and more complex, and that new systems and capacities will be needed to detect early novel pathogens that have epidemic and pandemic potential.

Strengthening capacities for response to specific hazards such as influenza together with building resilient health systems have long been the key to prepare for and respond to public health emergencies. Collectively, the world is better prepared for the next health emergency when countries are prepared and ready to respond at both national and sub-national levels.

We need new capacities and robust systems to provide quality information from multiple sources to better support response decision making.

I believe this meeting will provide Member States with a forum to maximise collaboration and support between partners towards achieving such goal.

I wish you a successful meeting and I look forward to hearing about the outcome of the meeting.