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ACKNOWLEDGEMENTS

We acknowledge the collective progress of the countries and areas of the Western Pacific Region in securing regional health through the implementation of the *Asia Pacific Strategy for Emerging Diseases* (2010). We would also like to thank the many organizations, partners and others who have supported the implementation of the Strategy.
# ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>APSED</td>
<td>Asia Pacific Strategy for Emerging Diseases</td>
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<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<td>ASEF</td>
<td>Asia-Europe Foundation</td>
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<td>DSA</td>
<td>Division of Health Security and Emergencies</td>
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<td>DLI</td>
<td>dengue-like illness</td>
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<td>EBS</td>
<td>event-based surveillance</td>
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<td>EID</td>
<td>emerging infectious disease</td>
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<td>EIS</td>
<td>event information site</td>
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<td>ELISA</td>
<td>enzyme-linked immunosorbent assay</td>
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<td>EOC</td>
<td>emergency operations centre</td>
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<td>EQA</td>
<td>external quality assurance</td>
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<td>EQAP</td>
<td>External Quality Assurance Programme</td>
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<td>ESR</td>
<td>Emerging Disease Surveillance and Response</td>
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<td>EWARS</td>
<td>Early Warning Alert Response System</td>
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<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<td>FET</td>
<td>field epidemiology training</td>
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<td>FETP</td>
<td>Field Epidemiology Training Programme</td>
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<td>GISRS</td>
<td>Global Influenza Surveillance and Response system</td>
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<td>GOARN</td>
<td>Global Outbreak Alert and Response Network</td>
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<td>H5N1</td>
<td>avian influenza A(H5N1)</td>
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<td>H7N9</td>
<td>avian influenza A(H7N9)</td>
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<td>HMFD</td>
<td>hand foot and mouth disease</td>
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<td>IATA</td>
<td>International Air Transport Association</td>
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<td>IBS</td>
<td>indicator-based surveillance</td>
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<td>IHR</td>
<td>International Health Regulations (2005)</td>
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<td>ILI</td>
<td>influenza-like illness</td>
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<td>IMS</td>
<td>incident management system</td>
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<td>IPC</td>
<td>infection prevention and control</td>
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<td>LIMS</td>
<td>laboratory information management system</td>
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<td>M&amp;E</td>
<td>monitoring and evaluation</td>
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<td>MERS-CoV</td>
<td>Middle East respiratory syndrome coronavirus</td>
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<td>NFP</td>
<td>National IHR Focal Point</td>
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<td>NIC</td>
<td>National Influenza Centre</td>
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<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<td>PCR</td>
<td>polymerase chain reaction</td>
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<td>PHEP</td>
<td>public health emergency preparedness and response plan</td>
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<td>PIC</td>
<td>Pacific island countries</td>
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<td>PPHSN</td>
<td>Pacific Public Health Surveillance Network</td>
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<td>POE</td>
<td>points of entry</td>
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<td>PSSS</td>
<td>Pacific Syndromic Surveillance System</td>
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<td>RRT</td>
<td>rapid response team</td>
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<td>SARI</td>
<td>severe acute respiratory infection</td>
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<td>SARS</td>
<td>severe acute respiratory syndrome</td>
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<td>SOP</td>
<td>standard operating procedure</td>
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<td>SPC</td>
<td>Secretariat of the Pacific Community</td>
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<td>SPEED</td>
<td>Surveillance Post Extreme Emergency and Disaster</td>
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<td>TAG</td>
<td>Technical Advisory Group</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WPSAR</td>
<td>Western Pacific Surveillance and Response journal</td>
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EXECUTIVE SUMMARY

Member States in the Western Pacific Region have progressed well in the implementation of the Asia Pacific Strategy for Emerging Diseases (APSED) and consequently, towards having the International Health Regulations (2005) (IHR) core capacities in place. In June 2014, the first extension period for the deadline for achievement of core capacities expired and Member States were given the opportunity to request a second extension until June 2016. The proportion of Member States in the Western Pacific Region requesting an additional extension decreased from half to one third (14 and nine countries, respectively).

The real capacities behind these “IHR capacity scores” were put to the test on several occasions and the response to public health emergencies demonstrated the progress. Human infections caused by avian influenza viruses have continued to occur in the Western Pacific Region, dengue and other arboviral disease outbreaks have placed significant burden on the public health systems, the Middle East respiratory syndrome coronavirus (MERS-CoV) has reached countries in our Region, and natural disasters have temporarily disrupted the effectiveness of local health systems.

The systems built and strengthened through the implementation of APSED have allowed Member States to address these threats in an increasingly effective manner. For example, national surveillance systems have proven their capacity to detect new pathogens with event-based surveillance (EBS) playing a key role. The public health laboratories in Member States have increased capacities to detect novel pathogens, including MERS-CoV. Health emergency communication plans were tested during public health emergencies and ministries of health have activated, some for the first time, emergency operations centres (EOC) to coordinate response efforts. The WHO Regional Office for the Western Pacific has continued to perform a regional role in surveillance and response.

Despite the progress made, some Member States are still short of fulfilling IHR core capacity requirements. Some critical milestones in the implementation of the APSED workplan, such as the systematic application of risk assessments, the development of generic public health emergency preparedness plans or the attainment of capacities at points of entry, have not yet been met. There is still significant amount of work to be accomplished before the Western Pacific Region can benefit from a strongly functioning system of collective health security.
Recent public health emergencies have once more demonstrated the importance of collective action. APSED (2010) has promoted sustainable partnerships towards regional health security from the outset. Partnerships and cross-programme collaboration will gain more prominence in light of the expanding scope of activities and increasingly specialized capacity needs.

Monitoring and evaluation (M&E) remains of central importance for the effective implementation of APSED. The planning and review process has continued to provide a forum to connect all APSED stakeholders at country and regional levels. The *M&E Guide for APSED* was updated based on country experiences, and a new tool to illustrate APSED capacities was included. This tool, a programmatic outbreak review, aims to demonstrate the capacities used to detect, assess and respond to outbreaks. At the informal consultation on M&E for APSED, held in early 2014, participants acknowledged the need for strengthened advocacy to support the sustainability of APSED capacities in the Western Pacific Region. It was suggested that an evaluation of APSED be conducted to provide a comprehensive picture of achievements and lay out the future priorities beyond APSED (2010).
INTRODUCTION

The Asia Pacific Strategy for Emerging Diseases (APSED) is a strategic framework to build sustainable national and regional capacities and partnerships in the Asia Pacific region to ensure public health security through risk reduction, hazard detection, preparedness and response to emerging diseases and public health emergencies. The strategy has been used to guide countries’ actions to strengthen their capacities and to rally and coordinate the support of partners.

In both the WHO Western Pacific and South-East Asia Regions, APSED serves as a regional tool to help countries achieve the minimum core capacity requirements under the International Health Regulations (2005).

APSED pursues five interrelated objectives:

1. Reduce risk
2. Strengthen early detection
3. Strengthen rapid response
4. Strengthen effective preparedness
5. Build sustainable partnerships

To work towards achieving the objectives and defining activities for capacity development at local, national and regional levels, APSED lays out priority actions, or focus areas. APSED suggests a step-wise approach, whereby Member States first focus on building individual technical areas, then strengthen the capabilities that link these areas, then reinforce the system as a whole.

This report looks at the progress that countries and WHO have made since the formulation of APSED (2010), in particular in the reporting year July 2013 to June 2014. There are a number of tools countries can use to measure their progress towards implementing APSED and IHR obligations. These include the IHR monitoring questionnaire, the performance indicators developed for APSED and the milestones developed in order to track progress against the APSED workplan.

This report presents the results that countries have reported, along with the progress made by WHO in support. It is important to note that it is not meant to be comprehensive and that countries may have engaged in further activities not noted herein.

With respect to the IHR self-monitoring tool, it should be noted that throughout this report percentage values relate to responding countries only. Analysis is based on self-reported data submitted by States Parties through the IHR Monitoring Questionnaire for 2013. There are 27 IHR States Parties in WHO’s Western Pacific Region, of which 26 submitted the survey in 2013.
This report is divided into four main sections. The first section describes the progress achieved in strengthening national APSED capacities in the form of five case studies that highlight the use of systems and capacities in the preparedness or response to actual outbreaks. The second section reviews the progress made in the eight focus areas of APSED. The third section describes the outlook for the Western Pacific Region in the area of emerging diseases and public health emergencies. The report concludes with a financial overview of the expenditures incurred through the implementation of APSED in the years 2012–2013.

Lastly, we acknowledge that APSED is a broad strategy, and other programmes are working towards similar goals, often in partnership with APSED. Where relevant, we have noted the progress led by other partners.
APSED is a common strategy for national and regional capacity development. The IHR monitoring questionnaire is a tool that all countries in the Region have used to monitor their progress towards IHR implementation since 2010. The quantitative nature of the IHR monitoring questionnaire has proven to be useful in providing a snapshot of regional capacity status. However, the interpretation of numeric values, or the expression of capacities in proportions, has certain limitations.

Case studies of outbreak responses at the national level aim at overcoming these limitations. They provide an opportunity to describe in a qualitative way the use of capacities and systems that APSED has helped to build and thus, to gain a clearer understanding of progress. In the end, the existence of capacities can best be measured during either simulation exercises or real outbreaks.
CASE STUDY 1: Fighting the worst dengue epidemic in the Lao People’s Democratic Republic’s history: APSED capacities put into action

In 2013, the Lao People’s Democratic Republic had the worst dengue epidemic in its history. There were 44,171 cases and 95 deaths.

Following consultation with stakeholders, the Ministry of Health declared the dengue epidemic on 5 July 2013. The week leading up to the declaration saw a surge in the number of reported cases, with 3,437 cases reported in that week alone (29 June – 5 July); compared to 208 cases for the same period in 2012. By 14 July 2013, a total of 25,027 cumulative dengue cases, with 71 deaths, had been reported.

The epidemic generated strong political attention as it affected all 17 provinces of the country, 15 of which reached epidemic levels.

The Prime Minister’s office issued a decree urging all provincial governors to take decisive action for dengue prevention and control. The Health Minister, Dr Eksavang Vongvichit and Vice Health Minister Dr Inlavanh Keobounphanh made several visits to the dengue-prone and epidemic provinces to advocate for community-based clean-up campaigns and encourage health-seeking behaviours to control the disease.

From the onset of the outbreak, the Lao Government knew that addressing the dengue epidemic would entail action from all stakeholders and the community. They called for international support and help poured in. The World Health Organization worked closely with the Ministry of Health in implementing prevention and control measures and provided financial and technical support to the Government.

The dengue surveillance and laboratory systems played a key role in generating information that provided intelligence for risk assessments and decision-making and for targeting of further investigations. The National Centre for Laboratory and Epidemiology (NCLE) reported data on a daily basis, and managed initial case investigations and deployments of rapid response teams. It also coordinated all major health facility laboratories for dengue diagnosis, data collection and analysis, and monitoring of serotypes.

The Emergency Operations Centre (EOC), located within the Ministry of Health, was activated for the first time and was used as the operations hub to manage the government response. It became the centre of coordination where meetings of the outbreak response teams were held and the daily surveillance data were presented and discussed. It demonstrated that the mechanism put in place for emergency preparedness at the behest of APSED can be utilized to effectively respond to all acute public health emergencies of national or international concern.

Due to the large number of cases, clinical management was challenging at the start of the 2013 dengue epidemic. With some hospitals receiving hundreds of patients a day, triaging and managing the caseload became tremendous tasks. The hospitals at both central and provincial levels were overwhelmed and overburdened by the surge in patients requiring care.
To improve the clinical skills of health workers at the provincial and district levels, the National Department of Health Care conducted trainings between January and mid-March 2013 on case management and supported the provinces with large number of cases with surge capacity through staff mobilization. This included 815 medical and nursing students on their fifth and final years who were deployed for more than a month in the field to work in district and provincial hospitals. The dengue clinical working group developed a training book and flowchart for dengue case management, based on the WHO guidelines, translated into the Lao language.

The reduction of the case fatality rate over time suggests improvements in clinical management over the course of the epidemic response.

Vector surveillance and control measures were also enhanced during the 2013 epidemic and these were managed at the provincial level. Some of the activities included a weekly larvae cleaning campaign and health education in 11 affected provinces by mobilizing volunteers from the villages. These volunteers were also used to monitor breeding sites, conduct larvae surveys and lead the education campaign to eliminate mosquito-breeding sites at homes and public areas like temples.

Keeping the Lao public informed was critical in the midst of the epidemic – this was key in raising awareness of the health risks; to enable people to make responsible decisions to protect their health; and to encourage appropriate public participation and action. Risk communication was conducted through the Centre of Information and Education for Health (CIEH) where a risk communication strategy on dengue epidemic response was developed and the mass media was tapped to disseminate the key messages on the health risks.

Lao People’s Democratic Republic Health Minister Professor Dr Eksavang Vongvichit and WHO ESR Team Leader Dr Luo Dapeng visit dengue patients in Champasack Provincial Hospital. Champasack is one of the most affected provinces and the hospital is overcrowded with dengue patients that most of them are accommodated in the hospital lobby.
A national spokesperson was appointed to ensure that the public was regularly updated on the situation. Training for the media and teachers were also conducted to ensure that messaging was consistent. In total, there were more than 300,000 information, education and communication materials developed and distributed to the provincial health departments, districts and affected villages.

By October 2013, following three months of concerted efforts by the Lao Government and the development community, the number of dengue cases returned to below the surveillance threshold (or back to the expected number of cases). The Ministry of Health, in partnership with WHO and other stakeholders and partners, reviewed and assessed what had happened and identified lessons learnt and good practices.

The dengue epidemic highlighted some of the challenges inherent in dealing with a public health emergency requiring a multisector response. It called for high-level leadership and better coordination, including a command and control structure. It also demonstrated that the surveillance and laboratory systems established in the Lao People’s Democratic Republic were functional, and were key for early warning and evidence-based decision-making. Public communications also contributed to encouraging communities to take action to protect their health.

Overall, the Lao People’s Democratic Republic’s response to the 2013 dengue epidemic was an affirmation that health emergency preparedness requires a robust system to detect, assess and respond to public health threats. The strength of the individual technical areas built for many years through APSED formed a solid foundation for reinforcing the overall response system. The support of development partners and local communities in the response provided a big push for the system to manage the dengue epidemic.
CASE STUDY 2: Novel influenza viruses with unique genetic make-up: a continuing challenge in the Western Pacific Region

Influenza viruses have a remarkable ability to change their genetic composition by exchanging genes such as those coding for the hemagglutinin (H) and neuraminidase (N) proteins. This may happen in animals such as pigs or birds, resulting in novel influenza viruses which in turn may be transmitted to humans. The emergence of these viruses in the Region is of concern and poses a continuous challenge to surveillance systems. Detection of and responding to novel influenza viruses involves both the human and animal health sectors and highlights the capacity investment in APSED through preparedness, control and response measures.

The WHO collaborating centres for influenza in the Region have played a key role in detecting novel avian influenza viruses. Their ability to monitor the evolution of circulating influenza viruses has also contributed to the global influenza network. In addition, the National Influenza Centres (NICs) contribute to surveillance activities through collecting syndromic and epidemiological influenza data and clinical specimens for the detection of influenza viruses. Most NICs can identify different subtypes of influenza A viruses, including H5 and H7, which have also been instrumental in the detection of novel influenza viruses in the Region. Biregional NIC meetings have provided a unique platform for laboratory and epidemiological experts to discuss surveillance and laboratory related matters and further strengthen networks.

The following stories aim to illustrate how the strengthened surveillance and laboratory systems help to detect and monitor novel influenza viruses in various countries in the Region.

People’s Republic of China

The surveillance system in China provides a good example of how enhanced event-based and indicator-based surveillance has been able to contribute to the detection of novel influenza viruses. In 2013 and 2014, influenza A subtypes H7N9, H10N8 and H5N6 have been detected in humans for the first time. In addition, avian influenza A(H9N2) and avian influenza A(H5N1) continue to be detected, with H9N2 found in two patients in late 2013, the first patients to be reported in China since 2009.

Indicator- and event-based surveillance systems in China include influenza-like illness (ILI), severe acute respiratory illness (SARI) or pneumonia of unknown etiology (PUE) surveillance. In addition, laboratory surveillance is conducted through the Chinese National Influenza Centre of China Centers for Disease Prevention and Control which has recently been designated a WHO Collaborating Centre. China has made substantial progress in laboratories with diagnostic capacities for virus detection including at the subnational level. Using a referral system, all unidentifiable influenza strains are required to be sent to the national laboratory for testing. From this, H10N8 and H5N6 were both detected in human cases of severe pneumonia by enhanced influenza surveillance, specifically through laboratories.
Timely information-sharing under IHR (2005) about cases of human influenza caused by a new subtype has allowed for timely risk assessments and responses to be conducted. Previous outbreaks of H5N1 and the influenza A(H1N1) 2009 pandemic have demonstrated the need for well coordinated and multisectoral approaches. The APSED zoonoses focus area addresses the establishment of a functional coordination and collaboration mechanism between the human and animal health sectors.

**Lao People’s Democratic Republic**

The importance of different sectors working together at the human and animal interface was demonstrated in the Lao People’s Democratic Republic in 2014. Through event-based surveillance, a cluster of mild ILI was detected among 14 individuals who had exposure to dead poultry.

The joint field investigation between animal and human health led to the detection of influenza A subtype H5 in poultry in March 2014. The subtype was confirmed as highly pathogenic avian influenza A(H5N6) through established international laboratory referral and it was revealed that the human infection was not of avian origin. Confirmatory results from the Ministry of Agriculture were shared promptly with the World Organisation for Animal Health (OIE). This event provides a good example of how animal and human health collaboration led to the detection of the first cases of H5N6 in poultry in the Lao People’s Democratic Republic.

**Cambodia**

In Cambodia, avian influenza H5N1 continues to be the avian influenza subtype causing substantial disease burden among humans. The capacity to detect human cases is made clear by numerous surveillance mechanisms, including the National Influenza Virology Analysis which has detected nine cases of H5N1 so far this year. Other surveillance systems include ILI sentinel surveillance, CamEWARN (a case-based surveillance of severe respiratory infections or pneumonia), SARI surveillance, acute febrile illness surveillance and event-based surveillance. All nine H5N1 cases detected in 2014 so far were confirmed by the NIC. Through the acute febrile illness surveillance, swine origin influenza virus H3 was also detected in 2014. Timely information-sharing under IHR (2005) for cases of human influenza continues to occur, coinciding with press releases issued by Ministry of Health which include risk communication messages on prevention.

**Viet Nam**

In Viet Nam, H5N1 contributes the greatest burden of all avian influenza A among humans. To date, two fatal cases have occurred this year. Surveillance is conducted through sentinel sites for ILI, SARI and severe viral pneumonia (SVP) to allow for the detection of infection. Both cases this year were diagnosed by the NIC and notified under IHR (2005), promptly contributing to information-sharing with other National IHR Focal Points and facilitating risk assessments.
**Conclusion**

The ability of influenza viruses to rapidly change in an unpredictable fashion reinforces the need for Member States to strengthen surveillance for novel influenza viruses. Capacity for influenza detection has also been utilized for other viral pathogens such as MERS-CoV, providing further support for Member States beyond the scope of influenza. Building surveillance and laboratory capacities has been an important component of APSED in recent years. Information has been shared through IHR (2005) and continuously through the Global Influenza Surveillance and Response System (GISRS) including WHO collaborating centres, NICs, WHO and other relevant stakeholders. This has allowed Member States to take appropriate and informed public health actions.
CASE STUDY 3: Malaysia’s surveillance and response system tested by avian influenza A(H7N9) and MERS-CoV

Malaysia understands the importance of having a well functioning system in place for the surveillance of and response to emerging infectious diseases (EIDs). In 1999, for example, Malaysia faced an outbreak caused by a novel pathogen, namely Nipah virus, a zoonosis involving fruit bats and pigs. Since then other EIDs such as SARS have circulated in nearby countries and Malaysia has worked hard on being prepared for such threats.

Malaysia is committed to enhancing regional and international health security through the development of the Malaysia Strategic Workplan for Emerging Diseases or MySED Workplan (2012–2015) which is based on APSED (2010). The goal of MySED is to improve health protection in Malaysia through productive partnerships for the preparedness, planning, prevention, prompt detection, characterization, and the containment and control of EIDs. MySED has equivalent focus areas to those of APSED (2010) except for APSED’s Focus Area 7 which has a regional scope.

Here we describe two recent EID events that benefitted from the capacities that have been built in Malaysia under APSED and MySED over recent years.

The first event was an imported case of human infection caused by avian influenza A(H7N9) virus in a Chinese tourist visiting Malaysia, representing the first human case of H7N9 infection outside China. The case was reported by the Malaysian Ministry of
Health to WHO on 12 February 2014. The case was a 67-year old female tourist from China who travelled from Guangdong via Kuala Lumpur to Sabah. She was eventually brought to a private hospital in Sabah and admitted to the intensive care unit. Clinical specimens tested positive for suspected H7N9 virus at the local laboratory, which was subsequently confirmed by the Institute for Medical Research (IMR) in Kuala Lumpur on 11 February. The patient recovered and was discharged from the hospital. Contact tracing did not reveal any additional cases. Jeyanthi et al. described the laboratory analysis of this H7N9 strain in more detail in a recent publication (1).

The second event was a case of human infection with MERS-CoV in a Malaysian traveller returning from Saudi Arabia. Visiting Saudi Arabia for pilgrimage is common amongst Malaysia’s population as 60% are Muslims. On 16 April 2014, the Malaysian Ministry of Health notified WHO of a fatal case of MERS-CoV in a Malaysian pilgrim who had recently returned from Jeddah, Saudi Arabia. The case was a 54-year old man with diabetes. He had an onset of illness on 4 April followed by hospitalization and isolation for suspected MERS-CoV infection on 9 April. On 10 April his condition worsened and he passed away on 13 April. Clinical specimens tested positive for MERS-CoV at the local hospital laboratory and the results were confirmed by IMR, Kuala Lumpur. Contact tracing did not reveal any additional cases. The outbreak investigation and following actions are described in a rapid communication (2).

As shown by the two events summarized above, international air travel can result in importation of EIDs from affected countries overseas. Having the capacities in place to detect such agents quickly and accurately is important to mounting a targeted response. Such capacities have been built using the APSED and MySED workplans.

References:


CASE STUDY 4: Arboviruses in the Pacific: a test of the APSED achievements for surveillance and response

Since 2013, the Pacific island countries (PICs) and areas have experienced an unprecedented number of emerging and non-emerging arboviral disease outbreaks. Outbreaks of dengue, chikungunya and Zika virus have required countries and areas to assess their capacity to manage and respond to emerging diseases under APSED. Arboviral disease outbreaks have occurred in numerous PICs including dengue in Fiji, French Polynesia, Kiribati, Nauru, New Caledonia, Solomon Islands, and, Vanuatu; chikungunya in the Federated States of Micronesia and Tonga; and Zika virus in the Cook Island and French Polynesia. These outbreaks provide important insight into Pacific achievements in surveillance, risk assessment and response, but also highlight the need for further strengthening of key APSED priority areas.

The Pacific Syndromic Surveillance System (PSSS), implemented in 2010, is an early warning disease surveillance system for the 23 PICs. The PSSS is coordinated and managed by the WHO Division of Pacific Technical Support Office (Suva, Fiji) and is a key element supporting APSED implementation and IHR commitments. Both indicator and event-based surveillance components are included in the system. The system was established after the influenza A(H1N1) 2009 pandemic, both in response to that acute public health threat and to ensure Member States were able to meet core capacity commitments under IHR (2005).
More than 200 disease or suspected disease outbreaks have been identified and reported through the PSSS since 2010. The early and consistent reporting of early warning surveillance data has facilitated the rapid implementation of control measures to reduce the severity of outbreaks.

Dengue, chikungunya and Zika virus outbreaks can be identified by one of the standard PSSS syndromes: “acute fever and rash” as demonstrated in Figure 1. However, because rash is variably present in these arboviral infections, the “dengue-like illness” or “DLI” syndrome is currently being included in routine PSSS reporting.

During 2013 and 2014, Fiji experienced the largest outbreak of dengue in its history with nearly 27,000 cases reported. This outbreak was detected by the event-based surveillance component of the PSSS. The dengue case surveillance during the outbreak in Fiji was initially based on laboratory-tested cases, but was subsequently transitioned to DLI syndromic surveillance. The transition from laboratory to clinical surveillance in the midst of an outbreak presented challenges and highlighted the importance of establishing routine DLI surveillance prior to outbreaks.

French Polynesia has established DLI, laboratory and hospital-based dengue and arboviral surveillance. Through this mechanism, an unusual number of DLI cases was detected in February 2013, coinciding with the confirmation of two cases of dengue virus 1. The experience of French Polynesia underlines the importance of DLI surveillance in ensuring the early detection of dengue and other arboviral disease outbreaks.

The value of including DLI as a syndrome in PSSS is not restricted to dengue. In August 2013, Yap State in Federated States of Micronesia detected an increase in DLI cases through its already existing DLI surveillance. These cases were clinically unusual for dengue and rapid dengue tests were negative. This outbreak was subsequently confirmed to be the emerging arbovirus chikungunya. DLI is also presumed to be useful for identification and monitoring of Zika virus outbreaks, but this has not been verified to date.
The ability to confirm the causative agent of outbreaks in many PICs is limited due to geographical isolation, low-resource settings, frequency of transportation and laboratory capacity. To address these limitations, WHO has collaborated with the Institut Louis Malardé laboratory in French Polynesia to implement a simplified filter paper surveillance system that transports dried blood on filter paper at room temperature to identify dengue (and dengue serotype), chikungunya, Zika virus, and leptospirosis, all from a single sample. This filter paper-based surveillance system has been highly effective and has verified arboviral disease outbreaks in six countries since January 2014: four dengue; one chikungunya; and one Zika virus. As a result it has been possible to confirm that chikungunya and Zika viruses continue to emerge in the PICs, and that dengue Type 2 and Type 3 have re-emerged in the South Pacific for the first time in 15 and 20 years, respectively. Genetic sequencing of dengue virus has enabled monitoring of circulating genotype strains.

Collectively, these arboviral disease outbreaks have been the most significant public health event in the PICs since the influenza A(H1N1) 2009 pandemic. The number and variety of dengue and emerging arboviral disease outbreaks is unprecedented. Pacific risk assessments predict a large number of additional outbreaks of arboviral disease in the next two to three years and as a usual secular trend of dengue cases, high epidemic seasons are expected in the future. The PICs face many challenges including populations that are immunologically naïve to the emerging or re-emerging arboviruses, remote setting and geographic isolation, profound logistical challenges, resource limitations, and limited healthcare capacity.

The PSSS has been integral in strengthening both the national and subregional capacities to detect and respond to arboviral disease outbreaks. Collaboration and coordination with partners, particularly with consideration to the complexities of the PICs, is fundamental to progress. WHO has been centrally involved in supporting PICs prepare for and respond to arboviral disease outbreaks and other EIDs under the APSED framework. Lessons learnt from these outbreaks will continue to guide priority capacity development towards the IHR core capacity requirements.
CASE STUDY 5: Mobilizing experts for disaster response: GOARN deployments during Typhoon Haiyan in the Philippines

The Philippines was hit by a category 5 typhoon on 8 November 2013. Typhoon Haiyan (local name: Yolanda) affected over 14 million people living in a large corridor across the centre of the archipelago. There was substantial damage to infrastructure and all homes and buildings in the path of the storm were significantly damaged or destroyed. A large storm surge hit many coastal areas, washing entire communities away. Most areas had no water, power or communications and little fuel, and access was hampered by the severely damaged infrastructure.

The key issues included lack of shelter, food and water leading to an increase in foodborne and waterborne illnesses aggravated by malnutrition, leptospirosis and rabies; wounds and injuries as a direct result of the storm, or associated with the flooding after the event; respiratory infections associated with overcrowding, including measles; vector-borne diseases, especially those caused by dengue and chikungunya viruses; sexually transmissible diseases; problems associated with childbirth and pregnancy; and mental health disorders.

The overall response was unprecedented, and was organized under a civil and military, whole-of-government approach with a request for international assistance made through the National Disaster Risk Reduction Management Committee. Health was a critical part of the multisectoral and multidisciplinary disaster management and humanitarian response, with the Department of Health and WHO co-leading the Health Cluster.

Due to the magnitude of the disaster and the devastation wrought on the health system, technical expertise was urgently needed to support the Government’s health response. On 9 November, WHO requested assistance from the international community, through the Global Outbreak Alert and Response Network (GOARN), a technical collaboration of existing institutions and networks that pool human and technical resources for rapid deployment of experts. Created in April 2000 to improve the coordination of international outbreak responses and to provide an operational framework to focus the delivery of support to countries, GOARN responded to the call for help from the Philippines and sent in the needed experts from different parts of the world.

The first experts deployed through the GOARN mechanism arrived in the Philippines in the week of 16 November 2013. This included a logisician, a risk communications officer and seven field epidemiologists. The epidemiologists were quickly oriented to the standard Philippines Integrated Disease Surveillance and Response (PIDS) system and trained by the WHO Country Office on the implementation of the Surveillance Post Extreme Emergency and Disaster (SPEED) system. Members of the team were assigned to key field areas (Taclaban and Ormoc in Leyte, Borongan in Eastern Samar and Roxas in Capiz) and one senior epidemiologist remained in Manila to interact with health partners at the national level, coordinate between field teams and establish external surveillance reporting.
The second GOARN deployment arrived in the third week of December and included four epidemiologists and one consultant assisting with management of the dead. They were assigned to key field areas (Tacloban, Ormoc, Borongan) and one senior epidemiologist who remained as a coordinator and EWARN (Early Warning and Response Network) editor in Manila. Key contributions of the second wave of epidemiologists included contingency planning and clinical management training for potential outbreaks, providing assistance for outbreak response (including measles outbreak response immunization and rapid coverage assessment), and relieving the workloads of overstretched local staff.

From January to July 2014, a further 15 people were deployed through GOARN. They fulfilled key functions as field epidemiologists; collating and publishing the weekly EWARN report; acting as health cluster coordinators; undertaking stocktakes to identify gaps in routine immunization capacity and in maternal health services; and assisting with monitoring and evaluation. The necessary roles in epidemiology and surveillance included transitioning from the acute phase to the recovery phase which included capacity-building for the routine surveillance and response system, PIDS R; and executing a withdrawal strategy that was suitable to the local situation.
In total, 30 GOARN experts from 18 institutions in 12 countries contributed to the Typhoon Haiyan response in the Philippines – the biggest GOARN deployment in the Western Pacific Region. Their roles included being “an extra pair of hands on the ground”, ensuring foreign medical teams were aware of SPEED and the need to report information, determining gaps in health services, and providing a more comprehensive interface between international groups and the Department of Health.

In the surveillance role alone, GOARN experts assisted the Department of Health to monitor a total of 411 health facilities (including foreign medical teams and mobile clinics) which reported a total of over 340,000 consultations through SPEED from 10 November 2013 to 8 March 2014.

The GOARN deployments provided critical support to the overall disaster response in the Philippines. The experience in surveillance and field epidemiology (including early detection and response), a balance of being independent combined with fitting into a team in a stressful environment, and being able to adapt to needs of the local situation were key skills that the GOARN experts brought into the overall response landscape. Overall, the GOARN experts integrated well and demonstrated a high standard of professionalism across a broad range of activities.

The Philippine Department of Health, regional health offices, provincial health offices and local government units deserve sincere thanks for their generosity as hosts and willingness to integrate people into the system in providing the needed support to the local communities. Grateful acknowledgement is also made to institutions and individuals who provided their support to the Haiyan response through GOARN.

**GOARN deployments to the Philippines in the Typhoon Haiyan response**

Australia (Australia Network, Curtin University, Department of Health NSW, Department of Health Victoria); Canada (Fraser Health Department, Public Health Agency Canada); China (China CDC); Ireland (Public Health Surveillance Centre); Italy (EPIET); Malaysia (State Health Department, Penang); Norway (Norwegian Institute of Public Health, EPIET); Singapore (Ministry of Health); Spain (EPIET); Sweden (Swedish Institute of Communicable Disease); United Kingdom (Public Health England, EPIET).
FOCUS AREA 1: Surveillance, risk assessment and response

Surveillance, risk assessment and response remain crucial for ensuring the effective management of public health emergencies to mitigate the risk and impact of emerging diseases and other public health events. With effective national surveillance systems in place, public health events can be detected earlier, leading to timely and systematic risk assessments and a more rapid and proportionate response.

APSED has provided a framework for Member States in developing a robust system for surveillance and response. The key components at both the national and local levels are: event-based surveillance; indicator-based surveillance; risk assessment capacity; rapid response capacity; and field epidemiology training.

**Indicator-based surveillance (IBS):** the routine reliable and appropriate reporting of cases of disease which is analysed against trends and predefined thresholds that may trigger further public health action.

**Event-based surveillance (EBS):** the organized and rapid capture of information about events that are a potential risk to public health.

**Risk assessment:** the systematic process of gathering, assessing and documenting information to assign a level of risk and proportionate response to manage public health events. Risk assessments are an essential activity following the detection of an unusual or unexpected event that is detected through IBS and/or EBS to guide decision-making on the appropriate and proportionate response that is required by Member States.

**Field epidemiology training:** a “learning by doing” training programme to strengthen the detection and response to acute public health events through developing and enhancing national public health professionals’ competencies in field epidemiology. This is conducted through the Field Epidemiology Training Programme (FETP) or the modified FETP (FET). The FETP is a two-year conventional training programme for field epidemiology. The FET is a modified version of the FETP for countries with limited human resources which adapts to country situations and needs but maintains the basic and important concepts of training through on-the-job mentorship and training.

Strengthening partnerships and collaborations with subject matter experts in other programmes and other sectors is a key priority of APSED (2010). Working in a multi-disciplinary team allows for diversity in technical skills and experience which enable more accurate risk assessments to support response.
Interesting facts

In the Western Pacific Region

- Six countries have started FET/P since APSED (2005) including Cambodia, Lao People’s Democratic Republic, Mongolia, Papua New Guinea, Singapore and Viet Nam;
- Twelve countries have an FET/P;
- One hundred per cent of countries have a list of priority diseases or conditions for surveillance;
- Ninety-six per cent of countries have specific units for the surveillance of public health risks;
- One hundred per cent of countries analyse surveillance data on epidemic-prone and priority diseases at least weekly at subnational and national levels;
- Eighty-one per cent of countries have standard operating procedures (SOPs) and guidelines for EBS;
- Eighty-eight per cent of countries report implementing response procedures for a real or simulated public health response in the past 12 months;
- Ninety-two per cent of countries have a Rapid Response Team.

Regional level

A timely regional information-sharing mechanism exists to provide up-to-date resources to Member States. The WHO Regional Office for the Western Pacific disseminates regional biweekly reports on priority diseases (influenza, dengue and hand, foot and mouth disease) and weekly reports on avian influenza; these situational updates allow Member States to conduct risk assessments, and to plan and implement prevention and control measures as necessary. In the past year, the WHO Regional Office has also provided updates on major events globally and regionally, for example, the upsurge of human cases of MERS-CoV in the Arabian Peninsula, avian influenza A(H7N9) virus and the arboviral disease outbreaks occurring in the PICs. Through the publication of updates on WHO’s regional website and the dissemination of situation updates and assessments to WHO country offices, Member States have been able to respond in a coordinated manner and in the context of their own risk assessments.

Regional progress

Indicator- and event-based surveillance

In Cambodia and Papua New Guinea, the use of communication technology tools to support EBS has been enhanced through web-based and mobile phone systems. The advantages of a web-based approach in disseminating information is clear as demonstrated through timely weekly reporting from the Pacific Public Health Surveillance Network (PPHSN) to over 650 public health practitioners and decision-makers in the Pacific island countries on EBS and IBS (see Case study 4). In the Lao People’s Democratic Republic, surveillance has been strengthened with the implementation of community EBS via a toll-free hotline. The implementation has been expanded to incorporate an “all-hazards” approach, rather than specifically for emerging infectious diseases. In the past year, the National Policy on Surveillance and Response by the Ministry of Health was finalized and approved. This policy includes both IBS and EBS components and nationwide IBS/EBS surveillance is now fully operational. Timely weekly surveillance reports are now being produced and disseminated.
In August 2013, WHO, in collaboration with China CDC, held the International Conference on Human Infection with Novel Influenza Virus. The meeting aimed to gather a group of international experts to discuss current research and to share experiences in human and animal surveillance systems, risk assessments, clinical management and response to such viruses in China with other Member States. Lessons learnt from China’s experience in managing H7N9, and the ongoing situation of MERS-CoV in the Arabian Peninsula, have prompted numerous Member States to enhance surveillance activities to detect human infections caused by H7N9 and MERS-CoV and strengthen intersectoral cooperation and coordination with the animal health sector.

In the Lao People’s Democratic Republic, sentinel surveillance systems for influenza-like illness (ILI) and severe acute respiratory infection have been intensified, increasing the likelihood of detecting human infections caused by H7N9 or MERS-CoV. Earlier this year, the Health Minister urged all central and provincial hospitals to conduct ILI and SARI surveillance. In both the Lao People’s Democratic Republic and Viet Nam, sentinel surveillance sites for ILI and SARI have been established in high-risk areas bordering countries where human infections and/or animal outbreaks of avian influenza have been reported. In Cambodia, the Lao People’s Democratic Republic and Mongolia, WHO provided direct in-country support to enhance surveillance of hospitalized influenza patients though optimization of ongoing IBS/EBS systems. For travelers returning from the Arabian Peninsula, Viet Nam and the Philippines are now issuing health declaration cards on arrival as part of enhanced surveillance to detect MERS-CoV.

As APSED (2010) evolves to an all-hazards approach, in the past year, the strengthening of surveillance systems in the Region for foodborne disease has been a key priority of the Regional Office. An informal consultation was organized by WHO in Manila in February 2014 to review existing surveillance systems, identify challenges and opportunities, and develop practical guidance for strengthening surveillance in Member States.

In most countries, the strengthening of surveillance has occurred through the enhancement of existing systems; however, in Mongolia a new sentinel surveillance system was established in the past year. Sentinel surveillance for respiratory infections was implemented across 34 childcare facilities in nine districts in the country in accordance with a joint order approved by the Ministries of Health and Education. Training of public health staff in surveillance has been undertaken in Cambodia, the Lao People’s Democratic Republic, Papua New Guinea, the Philippines and Viet Nam, both at the local and national levels.

In the past year, the important role of EBS in the early detection of acute public health events has been evident. The major events detected by EBS led to prompt responses from Member States, including the first human infection with H7N9 outside China (Malaysia) and the first report of MERS-CoV in the Region (Malaysia and the Philippines). Moreover, these events have highlighted adherence to the IHR through timely information-sharing from Member States to the global community via IHR communications.

Influenza-like illness clusters in Cambodia and the Lao People’s Democratic Republic and multiple arboviral disease outbreaks in the PICs were also detected through EBS. Immediate reporting has been key, and in most instances has resulted when clinicians
have observed unusual clinical presentations and disease clusters and notified public health authorities in a timely fashion. EBS was also activated soon after Typhoon Haiyan with the objective of detecting outbreaks in the postdisaster setting, although communications affected its implementation. In addition, following the aftermath of a number of natural disasters in other Member States (drought in the Republic of Marshall Islands, cyclone Ian in Tonga and flooding in the Solomon Islands), postdisaster surveillance systems were established to detect outbreaks.

The benefits of IBS and the complementary nature of EBS and IBS are undeniable, nowhere more so than during the large dengue outbreak in the Lao People’s Democratic Republic in 2013 where IBS was instrumental in collecting critical epidemiological and virological information through enhanced dengue-like illness surveillance in existing ILI/SARI sentinel sites in five provinces (see Case study 1). In Mongolia, the recent implementation of ILI surveillance in sentinel childcare facilities has contributed to the early detection, identification and treatment of cases during outbreaks. Similarly, during a chicken die-off in Palau detected through EBS, background ILI syndromic surveillance data was influential in ruling out a possible human cluster of infection with avian influenza.

Surveillance system evaluations have been conducted in Malaysia and the Philippines to ensure that public health events are being monitored effectively and to provide recommendations to improve systems. The Philippines conducted a noteworthy assessment of the three different surveillance systems (see Case study 5) that were in operation simultaneously in areas affected by Typhoon Haiyan in order to examine how these systems were harmonized.

Despite the progress and achievements made in strengthening capacity in IBS and EBS, a number of Member States rely on project-based surveillance to detect outbreaks. The need to shift from project-based to institutionalized surveillance systems is evident. This is of particular importance for epidemic-prone and priority diseases, and will ensure that such a system is firmly entrenched to monitor diseases and detect outbreaks. The ability to improve surveillance with new technologies is hampered in some Member States by the limited capacity of staff to implement new technologies without training. Another priority is the strengthening of existing SARI/ILI surveillance and laboratory networks. Given the ongoing threat of emerging pathogens such as avian influenza viruses and MERS-CoV, it is essential that the detection and confirmatory diagnosis of emerging diseases is timely to inform risk assessment and ensure that prevention and control measures are evidence-based.

**Risk assessment**

Risk assessment training for FET/Ps was conducted in Viet Nam and in the Philippines with technical support from WHO. In the Lao People’s Democratic Republic, a risk assessment tool was finalized and applied at the national level during the dengue, typhoid and rabies outbreaks. This was to ensure a more systematic approach to conducting risk assessments across the country. Furthermore, a national joint animal and human risk assessment for H7N9 is conducted on a monthly basis. Similarly in Viet Nam, joint risk assessments for avian influenza A(H5N1) and A(H7N9) were conducted with the WHO Country Office taking the lead in collaboration with the Ministry of Health and the animal health sector. Viet Nam also conducted two risk assessments for MERS-CoV in the past year using the new standardized tool for risk assessments. While this demonstrates progress, several Member States have reported conducting risk assessments on an adhoc basis only.
**Rapid response**

The ability to respond rapidly to acute public health events can prevent the further spread of disease and also lead to better health, social and economic outcomes. Activities centered on strengthening response capacities in Member States have focused on public health staff development. In Malaysia and the Lao People’s Democratic Republic, training was conducted at both the national and provincial/state level in the development and deployment of rapid response teams (RRT). In the last year, Mongolia has developed standard operating procedures for RRT deployments. The importance of RRTs was demonstrated in Cambodia following the detection of a human case with H5N1 infection (see Case study 2).

**Field epidemiology training**

Since the commencement of APSED (2005), six countries have introduced the FET/P, adding to the 12 existing FET/P in the Region. Four modified FET programmes have been implemented since 2009 and continue to be maintained. The FET fellowship in the Regional Office continues with five FET/Ps involved in the programme in the past year with an objective of building capacity in EBS and rapid risk assessment for implementation in their own countries.

Building capacity in communicating epidemiological and operational research among FET/Ps in the Region occurred through scientific workshops during the biregional FET (TEPHINET) conference in Cambodia, the Philippines, Papua New Guinea and Viet Nam.

FET/P fellows have been involved in surveillance and the investigation of a number of important acute public health events in the past year. Fellows of the youngest FET programme of the Region in Papua New Guinea have already contributed in response to important outbreaks. The first cohort of fellows was involved in investigating typhoid and cholera in 2013. In Cambodia (now in its fourth year of field epidemiology training), FET fellows were part of the RRTs following the reporting of human infections of H5N1 and have also been involved in numerous foodborne disease outbreak investigations. In the Lao People’s Democratic Republic (now in its sixth year of the programme), FET fellows were deployed to support the response to the large dengue outbreak in 2013, the typhoid outbreak that began in late 2013 and the A(H5N6) outbreak in poultry in 2014. In the Philippines, FETP fellows played a vital role in the response to Typhoon Haiyan and to numerous outbreaks including a hepatitis A outbreak and a cholera outbreak in 2014. In Mongolia (now in its fifth year), FETP fellows are involved in strengthening antimicrobial resistance surveillance in the country. In Viet Nam, FETP fellows were involved in the investigation of human infections of H5N1, hand, foot and mouth disease outbreaks, an ongoing measles outbreak and a disease of unknown etiology. Furthermore, FET/P alumni have continuously contributed to public health emergencies as surge capacity, especially in the aftermath of Typhoon Haiyan.

The sustainability of the FET in Papua New Guinea has been secured through the National Department of Health in Papua New Guinea pledging to incorporate the training into its regular budget. The institutionalization of the Mongolian FETP (MFETP) during October 2013 was finalized with the establishment of a FET department at the National Center for Communicable Disease, moving away from a project-based FET.
Field epidemiology training programmes are the backbone of national capacity development in field epidemiology in dozens of countries around the world. In April 2013, the first intake of Papua New Guinea’s six-month combined onsite and distance-training programme, the PNG Field Epidemiology Training Programme (FETPNG), began with a two-week induction course.

The FETPNG aims to provide suitable candidates with advanced skills in practical disease surveillance, data analysis and outbreak response. The inaugural cohort included 19 fellows from 12 provinces and Port Moresby. The introductory phase comprised a combination of didactic lectures presented by national and international experts in field epidemiology, case studies, and one-on-one mentorship to develop practical analytic projects in the fellows' areas of work.

Sixteen of the 19 fellows remained in the programme to attend the second face-to-face training component for over a week in August. The fellows presented the results of projects they had undertaken over the previous four months, including outbreak investigations and evaluations of surveillance systems in their provinces and recommendations for interventions to improve the systems they had studied. Importantly, these recommendations were designed to be feasible (implemented by the fellows themselves and/or by colleagues accountable to the fellows), and achievable over a short period of time (i.e. during the following 2–3 months before the third phase of the course). In addition to developing realistic interventions, the fellows were all required to develop and implement detailed monitoring and evaluation frameworks to track the progress of their interventions; this has been hailed as a world-first for any FETP.

The third phase, a face-to-face meeting, took place for a week in November 2013. This phase included additional didactic training and case studies, and presentation of interventions and monitoring/evaluation results by the fellows. The course concluded in the morning of 29 November with presentations to colleagues and key dignitaries at the PNG National Department of Health (NDOH), and a graduation ceremony. Fifteen fellows graduated as PNG’s first indigenously trained field epidemiologists.

Following the formal course, interested graduates were invited to participate in a week-long WPSAR (WHO’s Western Pacific Surveillance and Response Journal) Scientific Writing Workshop, at which 11 manuscripts were prepared for submission to the journal. The most successful graduates from each cohort will be provided with additional training in order for them to serve as future FETP mentors and epidemiology leaders in PNG. One graduate is currently undergoing a two-year overseas FETP in order to prepare him to come back and become FETPNG’s national coordinator.

This course has been lauded by many officials as the first of its kind in PNG, one which has already achieved transformative results in the jurisdictions from which the fellows were recruited. This course aims to avoid some of the failures of other training models by including in its design an analytic project for each fellow, work with a technical mentor, presentation of project results and recommended interventions, and evaluation of intervention effectiveness. Each component of this programme reinforces the prior activity and enhances participant accountability.

The course faculty consisted of staff from the WHO, the US Centers for Disease Control and Prevention (CDC), FETP – Thailand, Australian Aid, and NDOH. Funding for the initial cohort has been provided by WHO and CDC. To ensure sustainability, the NDOH has pledged to incorporate future FETP programmes into its regular budget.

Fellows from the first cohort of the Papua New Guinea field epidemiology training programme (FETPNG) work through an epidemiological case study.
Enhanced surveillance for avian influenza A(H5N1) in Cambodia

Since 2003, Cambodia has reported 56 cases of human infection caused by avian influenza A(H5N1) virus. Nearly 50% (n=26) of cases were reported in 2013, accounting for over two thirds (26/39) of the global case count for the year. As part of the rapid response protocol to a suspected or confirmed human case of H5N1, a team is immediately mobilized to the field and enhanced surveillance is implemented in the affected community. The ability to mobilize rapid investigations and response at a local level demonstrates the strength of a country’s capacity in rapid response, a key capacity under APSED.

Enhanced surveillance for H5N1 aims to ensure that close contacts and symptomatic people who live in the affected community are tested and rapidly treated. In February 2014, following the detection of the 49th laboratory confirmed case of human infection with H5N1, a rapid response team travelled to Snuol district, Kratie province in Cambodia to conduct an outbreak investigation. After initial contact tracing and information gathering, the team proceeded to set up a mobile clinic and conduct both daily surveillance of close contacts and enhanced surveillance of unwell community members in the village.

What was thought to be a routine sporadic case became a community cluster investigation after the team identified that the sister of the 49th confirmed case had also died with similar symptoms on the same day as the case without being tested. Furthermore, a boy from the same school presented to the mobile clinic with influenza-like symptoms. This suspected case became the 50th laboratory confirmed case of human infection with H5N1. The team ensured immediate treatment and care and due to the timely detection and response, the boy survived.

The mobile clinic remained in the village for 14 days; no further cases were detected. During this time, the investigation team provided risk communication through health messages to ensure people in the village were aware of how they could protect themselves and their families from infection with H5N1. Through much discussion with the community and tracing the time line of the event, the investigation team concluded that human-to-human transmission was unlikely; rather the two confirmed and one probable case were most likely exposed via a common source.

Despite the increase in detected human cases of H5N1 infection in Cambodia and the number of investigations conducted so far, this was the first time further confirmed cases within a community had been detected by enhanced surveillance.

Enhanced surveillance enables early detection and is also providing invaluable training to fellows of the Applied Epidemiology Training initiative in Cambodia, a modified Field Epidemiology Training Programme (FETP). Fellows have been heavily involved in the response to H5N1 in Cambodia. The “learning-by-doing” philosophy has undoubtedly played an important role in increasing the country’s preparedness and capacity to respond to future public health events, another key component under the APSED framework.

Dr. Seng Heng, from the Communicable Disease Control Department, raising awareness at the school of two H5N1 cases during an H5N1 community cluster outbreak, Snuol, Kratie, Cambodia (February 2014)
Outlook

- Institutionalize surveillance though advocating for requirements to report on epidemic-prone and priority diseases.
- Strengthen existing SARI/ILI surveillance and laboratory networks for the detection and confirmatory diagnosis of emerging diseases.
- Strengthen government commitment to field epidemiology training to secure its sustainability.
- Conduct an outbreak review in a number of Member States to assess and demonstrate the progress of capacity-building in surveillance, risk assessment and response under APSED.
- Facilitate a more systematic approach to risk assessments through training and promote the documentation of risk assessments for major public health events requiring adapted responses exceeding the scope of existing standard operating procedures.
- Expand surveillance, risk assessment and response beyond emerging infectious diseases in accordance with the all-hazards approach, to include challenges such as food safety, environmental health issues, chemical hazards, and natural and manmade disasters.
APSED recognizes that building linkages and coordination mechanisms between public health laboratories at all levels within a country and internationally as well as between public health and other sectors (for example clinical, food safety and animal health) contributes to a well functioning public health laboratory system that supports accurate surveillance and can act quickly and effectively during an outbreak.

To determine the causative agent of an outbreak, APSED emphasizes the approach of using the public health laboratory system to rule out “knowns” and to safely forward unknown specimens to more advanced laboratories, such as WHO collaborating centres, based on observed symptoms. Such approach to laboratory testing will support the detection of novel agents causing severe acute respiratory infections such as avian influenza A(H7N9) and MERS-CoV. Whenever possible, existing systems such as the Global Influenza Surveillance and Response System (GISRS) are utilized.

For a public health laboratory to function properly, a laboratory quality management system needs to be in place to achieve, maintain and improve testing accuracy, timeliness and reliability. Under APSED, laboratories are encouraged to strengthen their quality management in line with international laboratory standards and organize or participate in external quality assessment (EQA) programmes to determine a laboratory’s performance.

The public health laboratory system needs to be able to adapt itself quickly to the needs that arise and provide technical support to those within the system who are faced with the same threats. Active collaboration and longstanding working relationships with other partners in the Western Pacific Region, including ASEAN and the animal health sector (e.g. FAO and OIE) ensure that lines of communication are in place when a public health event occurs.

Interesting facts
- Twenty-seven laboratories in the Western Pacific Region participated in the 2013 EQA for influenza with 83% of the laboratories scoring 100% with their results.
- Re-certification for shipping of infectious materials needs to take place every two years.
- Seventy-seven per cent of the countries reported that they have national reference laboratories that are certified or accredited to international standards.

Regional progress
Influenza remains one of the priority diseases in the Asia Pacific region with continued detection of avian influenza A(H5N1) in humans and animals, the recent outbreak of H7N9 in China and the detection of several new influenza subtypes such as A(H5N6) and A(H10N8). The laboratory capacity for influenza testing is strong in the Region as shown by the increasing performance of laboratories in the EQA for influenza. This laboratory capacity has been built in large part by the WHO GISRS, a network of collaborating centres, other reference laboratories and laboratories in Member States called National Influenza Centres (NICs). GISRS gathers and analyses information on...
seasonal and novel influenza strains and other activities, such as making vaccine composition recommendations. Every year WHO organizes its Asia Pacific NIC meeting and this year it was held in Beijing, China. Participants included Directors of NICs and epidemiologists of the Ministry of Health overseeing the influenza surveillance system. The conclusion of the meeting was that there is a need to continue to develop flexible, adaptable surveillance systems and networks that not only meet, but that also stay ahead of, EID challenges and focus on support of practical control and response efforts.

WHO started to work with selected Member States on developing workplans for the Pandemic Influenza Preparedness (PIP) framework. The framework focuses on pandemic influenza preparedness and response, in particular sharing of influenza virus specimens with human pandemic potential and increasing the access of developing countries to vaccines. The influenza laboratory capacity and infrastructure built over the years has proven an efficient mechanism for laboratory detection of other viral pathogens such as MERS-CoV.

When the first cases of MERS-CoV were reported in the Middle East in 2012, the WHO Regional Office for the Western Pacific started working on building laboratory capacity in the Region. This effort has continued through the past year and will remain important as new or improved laboratory findings and techniques related to the detection of MERS-CoV become available. Immediately, the Regional Office reached agreement with a small group of laboratories in the Region to provide technical support and reference testing for MERS-CoV while building capacity throughout the Region. During that time, national public health laboratories or other laboratories charged with testing for MERS-CoV were provided with test protocols and other guidance, including biosafety, as well as assistance in obtaining positive control material. The Regional Office for the Western Pacific provided technical support and guidance related to laboratory confirmation when Member States were faced with imported suspected MERS-CoV cases. To date, all national public health laboratories in the Region have reagents in place for MERS-CoV testing, including key laboratories based in Pacific island countries that support neighbouring countries or areas. Good working relationships among laboratories in the Region and regular meetings, including the National Influenza Centers (NIC) meeting, proved key to building testing capacity for MERS-CoV.

Over the last two years, the WHO Regional Office for the Western Pacific has coordinated the establishment of an EQA for dengue with support of dengue and EQA experts, including those from WHO collaborating centres. The programme applied lessons learnt from existing EQA programmes, in particular the one for influenza. In 2013, the programme was successfully conducted among 19 national public health laboratories in the Western Pacific Region. The majority (84%) of the participating laboratories were able to detect dengue virus and antibodies accurately. As recommended during the Second Meeting on Laboratory Strengthening for Emerging Infectious Diseases in the Asia Pacific Region (June 2013), the first round of the programme was critically reviewed during a consultation in Singapore (April 2014). Experts agreed that the EQA programme was well designed, coordinated and conducted. They also agreed that the 2014 EQA proficiency test panel for EID should be scenario-based for dengue-like illness-causing agents (dengue, chikungunya and Zika viruses). Besides dengue, EQA is available for several pathogens and national reference laboratories successfully participate in EQA schemes for diagnostic laboratories for major public health disciplines in 96% of countries.
Despite the progress made with the public health laboratory system under APSED, situations may arise whereby novel pathogens appear in Member States that do not have the capacity (technical expertise, appropriate biosafety level facilities and equipment) to characterize such unusual agents. Therefore, a system needs to be in place to assist countries in such situations by providing immediate access to experts and facilities at more advanced laboratories at regional or global levels. A system of this type should take advantage of existing subnational and national capacities, such as for specimen referral and shipping, as well as existing networks such as GISRS, the Emerging and Dangerous Pathogens Laboratory Network (EDPLN) and advanced animal health laboratories. As recommended by the Bi-Regional APSED Meeting in July 2013, WHO Regional Office for the Western Pacific is working on identifying advanced laboratories in the Region that can serve as reference laboratories to support the detection and characterization of novel agents, including emerging dangerous pathogens. This will be an area of work that will receive significant attention over the next year.

Finally, WHO worked closely with national public health laboratories in the Region to provide guidance and technical support, including protocols, reagents and expert consultations, to strengthen the laboratory component of surveillance and support the rapid, accurate and safe detection of EIDs, in particular H7N9 and MERS-CoV.

All countries in the Region set up molecular assays for detection of H7N9 and MERS-CoV at national level and several have done so at the subnational level. Performance of testing for these agents, however, needs to be determined.

In Lao People’s Democratic Republic, the National Strategic Plan for Health Laboratories (2013–2020) was approved by the Minister of Health and a National Laboratory Committee was established to oversee its implementation. The Strategic Plan reflects the key strategic elements for health laboratory services, including requirements for laboratory quality management and biosafety programs. The key elements of the plan were prioritized and the Ministry of Health is defining progress milestones and drafting a workplan which will be integrated into the Lao health sector development plan.

Mongolia has established a national laboratory network for EIDs. The draft workplan was discussed during the annual meeting of national laboratory specialists organized by the National Center of Communicable Diseases (NCCD), Ministry of Health, in August 2013. The workplan was subsequently approved by Ministerial Order in December 2013 and piloted in four regional diagnostic treatment centres.

After an effort of nearly three years, NCCD was accredited ISO 15189. This is a standard for medical laboratories that relates to quality management system requirements. In Cambodia, WHO supported the establishment of an EQA programme for microbiology with participation of five laboratories in 2012, 10 in 2013, and further expansion to 19 in 2014. The results demonstrate the importance of regular, objective and quantitative assessments of laboratory performance to identify weaknesses and monitor the impact of corrective measures.

Cambodia developed a national electronic laboratory information system with the support of WHO: the Cambodia Laboratory Information System (CamLIS). It is the cornerstone of
the national programme to improve integration of referral laboratories, to ensure that a laboratory-based surveillance system for targeted diseases is developed, and that laboratory data are collated nationally and reported to national authorities in a timely manner. The CamLIS is currently installed in the national reference laboratory as well as ten national and provincial referral laboratories.

In Malaysia, a National Steering Committee and a National Technical Advisory Committee for Laboratories have been established which function as an intersectoral collaboration. So far, there have been activities related to national pathogen surveillance, sharing of information, and managing a laboratory registry with up-to-date information about the capabilities and capacities of laboratories. Additionally, Malaysia has produced a national policy and guidelines or standards on biosafety and biosecurity.

Papua New Guinea organized national refresher dangerous goods shipping certification training. WHO sponsored 25 laboratory staff from throughout the country to undergo instruction. It is an expensive course which needs to be revisited regularly for individuals to remain certified.

In the Philippines, training sessions were conducted on EID molecular detection for national and subnational laboratories, including influenza and MERS-CoV. Capacity building in terms of biosafety and quality assurance, including assessment visits to the five subnational laboratories as part of the quality assurance programme of the Philippines NIC.

The Singapore National Public Health Laboratory (NPHL) has actively assisted the public hospital clinical laboratories to enhance their capabilities for diagnostic testing, especially in response to EIDs. NPHL regularly participates in local and overseas technical consultations and meetings to network with counterparts. Importantly, NPHL also partners both local and overseas reference laboratories involved in the diagnosis and investigation of Risk Group 3 and 4 agents.

In Viet Nam, laboratory diagnostic capacity for EIDs, including influenza (H7N9 and H5N1) and MERS-CoV, was strengthened at national and provincial levels. Training was provided to provincial laboratories on specimen collection, storage and transport as well as molecular testing. Training was provided to NIC staff in both Hanoi and Ho Chi Minh City on antiviral resistance testing and sequencing techniques. Several activities related to biosafety have taken place, including progress with the development of the biosafety strategic plan. In the Western Pacific Region, regulations, policies, or strategies for laboratory biosafety are available in 81% of countries.

In 2013, WHO continued supporting Pacific island countries in evidence-based strategic planning and introduction of monitoring and evaluation mechanisms for laboratory services. Laboratory quality standards were implemented in Fiji and Kiribati and are being developed in Tonga, Vanuatu and Solomon Islands. Biosafety and biosecurity were strengthened throughout the Region, including safety audits and biorisk assessments, development of safety manuals, and staff safety training. Partnerships and referral networks have been further strengthened to facilitate and expedite shipment of surveillance and confirmation samples. Country situational analysis for antimicrobial resistance (AMR) was completed to guide WHO assistance to countries in AMR reduction; lab-based AMR surveillance was also strengthened.
The Philippine National Influenza Center: Progress towards improved preparedness, response and sustainability

The Research Institute for Tropical Medicine-National Influenza Center (RITM-NIC) was established in 2005 through the support of the Philippines Department of Health, WHO and US CDC. It was built on the necessary infrastructure and technical capacity to perform routine virological surveillance of influenza-like illness (ILI) through a sentinel-based system in selected regional hospitals and health centres. It was also designed to provide support to the Department of Health for confirmation of potential influenza outbreaks.

The regions covered by the surveillance included facilities in identified regional “hot spots”, i.e. migratory pathways of the local population of ducks and poultry, and tertiary level hospitals among admitted patients. ILI surveillance sites were established in 12 of the 17 regions of the Philippines. Following the outbreak of influenza A(H1N1) 2009 pandemic, five subnational laboratories were established to augment the capacity of the NIC.

In 2012, the NIC downsized, retaining high-quality sentinel sites in five regions and adopting a new algorithm of testing to improve the sensitivity of influenza detection and turnaround time. Two years later, the Center’s NIC was officially recognized by the Department of Health as the Philippine National Influenza Center (PNIC) through an Administrative Order. Transitioning to full funding support under the Department of Health in 2014, the PNIC is partnering with the National Epidemiology Centre (NEC) to establish sentinel Severe Acute Respiratory Illness surveillance, while maintaining its ILI sentinel surveillance system.

The PNIC is the laboratory component of the influenza surveillance of the Philippine Integrated Disease Surveillance and Response System. Its technical staff are trained to isolate and detect influenza virus subtypes to determine trends of circulating influenza strains. The strains isolated by the PNIC are regularly shipped to the WHO Collaborating Centre in Australia to be part of strain selection for the formulation of an appropriate vaccine for the succeeding year’s influenza season. The PNIC also provides testing support to the Department of Health event-based surveillance system by testing outbreak referrals from the regions and FETP outbreak investigations, guiding management and response measures.

The PNIC is part of the global laboratory network for influenza, and contributes to the data of the Global Influenza Surveillance and Response System, which monitors global influenza activity for potential emergence of pandemic or highly pathogenic strains such as avian influenza A(H5N1), avian influenza A(H7N9) and swine influenza A(H3N2v).

PNIC also includes technical training to other RITM staff to act as frontliners and second-liners, training workshops for subnational laboratories, and training on respiratory specimen collection, handling and shipment for sentinel sites, local epidemiology surveillance units, city and provincial health offices, staff of the Bureau of Quarantine and other agencies.

The laboratory capacity, technical expertise and surveillance network system built by the PNIC with its partners have provided a platform for the country’s preparedness and response not only for influenza but other emerging infectious disease threats, such as the novel MERS-CoV. While sustainability is still a work in progress, the PNIC’s activities and goals are in line with APSED, support the country’s compliance with the IHR and contribute to regional and global health security.
Outlook

• The Asia Pacific region is a hotspot for EIDs. And in an era of mass air travel, foreign pathogens can suddenly arrive from overseas. While laboratory systems are becoming stronger, they may not be universally capable of detecting EIDs quickly and accurately. National laboratories may need international technical support, in particular with emerging dangerous pathogens.

• The syndromic approach to laboratory testing is lacking or needs significant strengthening in countries of the region. Necessary capacity needs to be built in this area, including a syndromic approach to EQA.

• Early detection of pathogens requires efficient collaboration of the public health and other sectors, such as food safety and animal health. There is still room for improvement.
FOCUS AREA 3: Zoonoses

Emerging zoonoses are serious public health threats in the Asia Pacific region. The emergence of avian influenza A(H7N9) virus – an avian influenza virus infecting people for the first time – along with the first imported cases of human infection with MERS-CoV reported in the Western Pacific Region, have kept animal-related outbreaks at the forefront.

Given the unique nature of zoonotic diseases, ensuring sustainable and effective coordination and collaboration mechanisms between the human and animal health sectors is vitally important. Under the tripartite partnership, WHO, FAO and OIE are working together and in partnership with Member States, other implementing partners at regional and national levels to strengthen collaborative work at the human-animal-ecosystem interface. Recently, the collaborative network for the prevention and control of zoonosis has been expanded to involve other key stakeholders including the environmental sector and the food safety sector. The main areas for collaboration include: sharing of information, conducting surveillance and joint risk assessment, coordinated response, risk reduction and research.

Working collectively during outbreaks and on a routine basis in prevention and preparedness will improve the effectiveness of combating zoonoses, demonstrated in the coordinated response to avian influenza A(H7N9) and A(H5N1), rabies and other important zoonoses in the Asia Pacific region.

Interesting facts

- About 75% of emerging diseases that have affected humans over the last three decades are of animal origin and approximately 60% of all human pathogens are zoonotic.
- In the Western Pacific Region, 25 of 27 Member States have established a mechanism for collaboration and coordination between the human health and animal health sectors.
- 22 of 26 Member States have confirmed that they have a list of priority diseases with case definitions.

Regional progress

In recent years, progress has been made to further enhance collaboration between the human health, livestock, wildlife and environment sectors to share best practices and innovative ideas to address emerging and re-emerging diseases at the human-animal-ecosystem interface.

Measurable progress has been made in operationalizing collaboration mechanisms for zoonoses in several countries. As reported in the 2013 IHR monitoring questionnaire, a general mechanism for collaboration between the human health and animal health sectors has been established in 25 of 27 Member States. These mechanisms were used in the responses to outbreaks of H5N1 in Cambodia in 2013 and 2014, H7N9 in China in 2013 and 2014, anthrax in the Lao People’s Democratic Republic in 2013, and rabies in Viet Nam in 2013.
In Cambodia, an interministerial committee is in place to facilitate coordination of the surveillance and response to zoonotic events by the human health and animal health sectors. The Zoonosis Technical Working Group meetings are held once a month to address the key issues in preventing and controlling zoonoses. In 2013, an urgent call to strengthen multisectoral collaboration was raised in the directives released by the national government following a surge in human cases of H5N1 infection. Effective information-sharing was demonstrated between the animal and human health sectors in response to the call for action. The Ministry of Health and the Ministry of Agriculture in Cambodia worked together to develop joint SOPs on outbreak investigation and response to avian influenza that provided practical guidance in outbreak response to the local level staff.

In the Lao People’s Democratic Republic, an agreed zoonotic diseases coordination mechanism supported by Government decrees has been in place since April 2010. A multi-agency response involving the Ministry of Health, the Ministry of Agriculture and a number of Nongovernmental organizations was carried out to address the rabies outbreaks in June 2013 and March 2014, including control measures for human and animal vaccination, and health promotion. During the avian influenza A(H5N6) outbreak in poultry, rapid response teams from the animal health and human health sectors at national and local levels conducted response operations, including destruction of poultry and enhancing human surveillance. Coordinated efforts in responding to zoonotic disease threats were also seen in the joint survey on exposure assessment of potential zoonotic risks from wildlife in markets.

In Malaysia, the existing zoonosis coordination mechanism has continuously been strengthened in recent years with interagency meetings at both national and state levels. A list of priority zoonotic diseases has been identified and shared between the sectors and a mechanism for sharing surveillance information has also been created. To strengthen coordinated response to avian influenza, a national joint simulation exercise on the response to avian influenza was conducted in June 2014.

In Mongolia, the terms of reference and the implementation plan of the Intersectoral Coordinating Committee on Zoonoses was approved by the Ministry of Health and the Ministry of Agriculture and also involved the wildlife and environment sectors, the emergency management sector and others. Information is shared among the sectors under this coordination mechanism, and intersectoral response procedures are being updated to ensure early detection and response to zoonotic threats.

In Viet Nam, an interministerial circular on coordination and collaboration between the human and animal health sectors for sharing surveillance information and coordinating response to zoonotic diseases was approved and disseminated. To prepare and respond to the threats from H5N1 and H7N9, avian influenza surveillance in poultry at live bird markets was enhanced and surveillance information is now regularly shared between the human health and animal health sectors.
During 2013, a number of Member States conducted activities to advance this area of work. The Lao People’s Democratic Republic, Mongolia and Viet Nam organized national coordination and collaboration workshops to highlight the importance of multisectoral coordination and networking among the sectors working at the human-animal-ecosystem interface.

Member States celebrated World Rabies Day to improve the public’s awareness of rabies prevention and control. Viet Nam held a nationwide rabies communication campaign and a training-of-trainers course for the animal health and human health sectors on rabies control measures involving epidemiologists, clinicians and laboratory workers. With the support of WHO, the National Institute of Hygiene and Epidemiology (NIHE), Viet Nam provided training on H7N9 surveillance and response for public health and animal health staff working at the national and regional levels and in 28 provinces in the north of the country, including the provinces bordering China. Joint training for animal health and human health field epidemiology teams to build critical capacity and collaborative relationships to enable sharing of limited resources were also held in the Lao People’s Democratic Republic. In Mongolia, research studies on anthrax were conducted by a multisectoral taskforce to inform a joint control strategy.

The fourth regional Asia Pacific Workshop on Multisectoral Collaboration for the Prevention and Control of Zoonoses organized by WHO in collaboration with FAO and OIE was held in Kathmandu, Nepal, in November 2013. Progress made in the prevention and control of zoonoses was reviewed, as were the best practices to further enhance intersectoral coordination at the regional and national levels. The lessons learnt from the closure of live bird markets in the response to H7N9 in China were discussed, and recommendations made to further strengthen risk reduction measures at live bird markets, including strengthening joint surveillance of influenza viruses at the markets for early detection, and implementation of risk mitigation measures to reduce the risk of avian influenza transmission to animals and humans at live bird markets.
Multisectoral collaboration on zoonoses: Mongolia

APSED (2010) emphasizes the importance of multisectoral collaboration on zoonosis prevention and control. In response to the Strategy, a number of countries in the Region have developed plans for multisectoral coordination and collaboration between the human and animal health sectors and other sectors. Mongolia is an example for those looking to build a sustainable and collaborative approach to managing zoonotic diseases.

Mongolia has a centuries-old tradition of livestock husbandry of horses, sheep, goats, cattle and camels. The Mongolian economy is based on three main industries, one of which is agriculture which primarily consists of livestock husbandry.

Due to the large livestock population, this country is facing specific threats from diseases of animals, including zoonotic diseases. Over 20 bacterial and viral diseases, and 18 parasitic zoonotic diseases, were reported in animals. Endemic zoonotic diseases such as brucellosis, anthrax, rabies, plague and tick-borne diseases are important public health risks. Increasing urbanization and migration from rural to urban and periurban areas in recent years have made the challenge to control zoonoses more complicated.

As supported by WHO, the Intersectoral Coordination Committee on Zoonoses was officially established in Mongolia in February 2010 with a written Memorandum of Understanding, terms of reference and working procedures. The Committee is chaired by either the Vice-Minister of Health or the Vice-Minister of Food and Agricultural and Light Industry, with the involvement of representatives from the Ministry of Health, the Veterinary and Animal Breeding Agency of the Ministry of Food and Agriculture and Light Industry (MoFALI), the National Emergency Management Agency (NEMA), the Ministry of Nature and Environment, the General Agency for Specialized Inspection, and WHO.

A functional intersectoral coordination mechanism established between the animal health and public health sectors has recently been expanded to incorporate more work on food safety, emergency management and the effects of climate change on zoonotic diseases.

Surveillance, information exchange and risk assessment, risk reduction, coordinated response and collaborative research have been identified as the four pillars of the zoonosis framework.

The human and animal health sectors have developed joint operational plans, including a long-term risk reduction plan for 2011–2015, initiated a prioritization exercise and risk assessment of 29 zoonotic diseases, and reviewed and revised standards, procedures and communication strategies. A list of experts on zoonoses has been compiled with representation from the different sectors to form a zoonoses taskforce. A list of zoonoses that are important for both human and animal populations has also been compiled.

Coordinated surveillance activities, underpinned by SOPs for information-sharing, are underway for anthrax, brucellosis, tick-borne diseases and
Veterinary and human health sectors have provided a joint risk assessment and a coordinated response to outbreaks of anthrax, avian influenza in birds, rabies and Newcastle Disease. SOPs for coordinated response are in place for brucellosis and anthrax. Information, education and communication materials on avian influenza, anthrax, brucellosis, rabies, plague and tick-borne disease have also been developed collaboratively. Risk reduction strategies on animal and human anthrax and brucellosis are under development.

Mongolia also made progress in research on priority zoonotic diseases. Based on study findings, a draft national action plan for echinococcosis was developed. A multisectoral taskforce on anthrax has started several research studies towards development of a practical model for an animal and human anthrax control strategy.

### Outlook

Despite the progress made in developing and maintaining the multisectoral collaboration and coordination mechanism for zoonoses, it is important to continue to further strengthen and expand these mechanisms at national and regional levels towards closing gaps in prevention, preparedness and response at the human-animal-ecosystem interface.

**Some key gaps and challenges were identified as follows:**

- lack of clear cross-sectoral coordination mechanisms at the local level, especially for information sharing and joint outbreak response;
- expanding collaboration to include other sectors such as environment, food safety and emergency management in order to ensure comprehensive risk assessment, risk reduction strategies and response to zoonoses;
- the need for high-level commitment from government and through legislation to support the implementation and maintenance of collaborative mechanisms; and
- managing the different priorities among partners which can hinder effective collaboration.

In order to address these gaps and challenges, the following elements should be emphasized for establishment and improvement of a functional coordination mechanism for the prevention and control of zoonoses:

- recognition of shared benefits for partners;
- strategic planning for capacity-building and response operations;
- identification and involvement of stakeholders; and
- guidance on strengthening cross-sectoral collaboration.
FOCUS AREA 4: Infection prevention and control

Infection prevention and control (IPC) is an essential element in reducing the risk of transmission of diseases among patients, health-care workers, family members and the community, especially during outbreaks of communicable diseases. APSED focuses particularly on IPC during outbreaks. The components of this area target health facilities and complement the other focus areas which work at other levels of the public health system.

Regional progress

APSED recognizes the importance of this focus area for effective preparedness and support response during outbreaks by ensuring adequate systems and capacities for infections prevention are in place. Yet, IPC has not received as much attention as other core areas such as strengthening surveillance systems or developing emergency operation centres.

In the Western Pacific Region, the focus has been on strengthening national structures to oversee and coordinate work for IPC as well as on developing technical guidelines and conducting training. In 2013, 25 of 26 countries reported having a national infection control policy or operational plan available, and that SOPs, guidelines and protocols for IPC were available to hospitals.

In the Lao People’s Democratic Republic, the national IPC committee was updated based on the new Ministry of Health structure which now includes all concerned sectors such as the Department of Health Care, the Department of Communicable Disease Control and the therapeutic centre. Since May 2014, the revised IPC strategy extends to all levels of health care facilities. Mongolia held its first national IPC conference and approved a ministerial order on IPC. In Singapore, a national infection control workgroup has been established and is functioning well. In addition, the new Singapore Healthcare Improvement Network (SHINE) has started to work with public sector health-care institutions on a large-scale quality improvement initiative targeting prevention of health-care-associated infections, among other harm reduction initiatives.

Several countries conducted training for health care workers. Cambodia held a training-of-trainers on IPC guidelines for participants from public and private medical schools in November 2013. The national IPC training unit in the Lao People’s Democratic Republic has conducted nine basic training courses on IPC for 218 health care staff since its establishment in 2011. The Philippines has conducted IPC training for 30 local government hospitals.

In October 2013, Malaysia conducted a national simulation exercise on IPC for MERS-CoV. Viet Nam conducted a communication campaign for IPC in the context of World Hand Hygiene Day.

Outlook

The ongoing threat of avian influenza A(H7N9) and in particular MERS-CoV, which has caused outbreaks in health care settings, requires that health workers understand and apply appropriate IPC measures as soon as outbreaks occur. IPC capacities will need to be continuously strengthened and appropriate guidelines disseminated to protect health workers and patients and prevent further spread of infections.
FOCUS AREA 5: Risk Communications

The complexity and magnitude of public health emergencies that occurred during the past year proved both an opportunity and a challenge for risk communications. It was a year that highlighted the increasing role of risk communications in public health, and also a time that tested the capacities that exist within the Member States. Natural disasters such as the Typhoon Haiyan in the Philippines and flash floods in Solomon Islands, and reports of infectious diseases like MERS-CoV in some countries in the Western Pacific have put risk communications at the heart of public health preparedness and response measures.

As outlined in the APSED (2010) workplan, capacity development for risk communications entails that a system is in place to raise awareness of health risks; that people be empowered to make responsible decisions to protect their health; and that appropriate public participation and action is encouraged. The three components of a risk communications system – health emergency communications, operational communications and behaviour change communications – are a functional and integral component of public health measures.
Regional progress

Through the years, the majority of Member States in the Western Pacific Region have put in place systems, procedures and structures for risk communications within the Ministry of Health as embodied in the APSED workplan. This has enabled the great majority of the countries (88%) to inform their populations and partners of a real or potential risk within 24 hours of confirmation.

In 2013–2014, health emergency communications plans have been operational in most countries (92%) in the Western Pacific Region and have been validated by 81% of the countries through actual emergencies or simulation exercises in the past 12 months. Policies, standard operating procedures or guidelines on the clearance and release of information during public health events have been developed in 77% of countries.

Evaluation of public health communications after emergencies has taken place in many countries (77%) and 62% have used the results of the evaluations to update their risk communications plan.

Regularly updated information sources are accessible to the media and the public for information dissemination in 96% of the countries. Accessible and relevant information, education and communication materials are tailored to the needs of the population in all countries in the Western Pacific Region.

The regional health emergency communications framework developed in 2012–2013 has guided the identification of priority activities in the Western Pacific Region and in supporting the development of systems for risk communications at the national level. The countries supported in the past year included Brunei Darussalam, Cambodia, Fiji, Lao People’s Democratic Republic, Mongolia, Philippines, Solomon Islands and Viet Nam.

Brunei Darussalam conducted a workshop on risk communications for its key personnel and facilitated the drafting of an action plan or SOPs for communications. The activity was attended by stakeholders from other sectors (animal health, disaster management, police and law enforcement, etc.) to ensure collaboration and partnership.

Cambodia has established a Risk Communication Unit staffed by officials from the Communicable Disease Control Department. The Unit has developed its terms of reference and SOPs that have been tested in a series of simulation exercises. Information education and communication (IEC) materials have also been developed on major public health issues and information campaigns have been carried out for avian influenza A(H5N1), avian influenza A(H7N9) and MERS-CoV. Media relations have also improved as a result of media training and orientations.

China operationalizes its risk communications capacity with proactive and timely communication on H7N9 and other public health issues. It continues to ensure that risk assessment results feed into its risk communications strategies and messages.

In the Lao People’s Democratic Republic the National Health Emergency Communication policy and action plan was approved by the Prime Minister and this has been officially disseminated to development partners and to all the 17 provinces of the country. A communication taskforce has been established at the national level and in 12 provinces. Communication SOPs for health emergencies have been developed and tested in a national simulation exercise. IEC materials on 17 notifiable diseases have been developed and approved for use when needed, and training has been conducted for provincial and district staff and NGOs.
Malaysia leads the ASEAN Risk Communications Resource Centre and has conducted regional trainings on risk communication for the ASEAN member states. In addition, a Training of Trainers on Risk Communications was also held in-country for its 30 Ministry of Health personnel. Two studies have also been conducted to find out the knowledge and awareness of MERS-CoV among pilgrims for Umrah and Haj in Malaysia in order to develop appropriate messages to these target groups.

In Mongolia, a risk communications network composed of health, non-health sectors and media has been established and is operational. The network is coordinated by a national core communications team within the Ministry of Health and regular alert and health messages are disseminated to the public through the network following approved procedures and SOPs. Risk communications training and exercises on MERS-CoV and other public health emergencies were conducted in four provinces.

During the past year, the Philippines has faced multiple devastating disasters. The government’s response to Typhoon Haiyan has demonstrated the value of capacity development for risk communications. In addition, it has developed policy guidelines and SOPs for risk communications which were put into practice in the form of timely and effective communication when an imported MERS-CoV case was reported in the country. The use of social media such as Facebook has been lauded by the public as an innovation in its information dissemination efforts.

Many Pacific island countries faced health emergencies in the past year that demanded a strong role for risk communication. For example, during the dengue outbreak in Fiji, risk communications were key in reaching out to the public about preventive measures. Many other countries are also making sure that risk communication is incorporated into their outbreak response plans and actions and enhancing the skills of staff.

During the past year, Papua New Guinea developed health messages for chikungunya and measles in response to the outbreaks. Moving forward, the country is working to enhance collaboration with its partners in identifying opportunities for proactive communications, rather than simply reacting during outbreaks.

Solomon Islands experienced flash floods in April 2014 in an event that was considered the biggest natural disaster in the country’s history. Given the magnitude of the emergency, the value of risk communications was highlighted and, together with its partners, including WHO, the Ministry of Health and Medical Services put in place mechanisms to address the need. Based on this experience, work is underway to ensure that sufficient capacity is established to respond to future emergencies. (See story on the next page)

In Singapore, an interagency mechanism is in place for health emergency communications and coordination among stakeholders is established. SOPs are developed and regularly tested. For behaviour change communication, the Health Promotion Board serves as the focal point and messages are integrated into various health education campaigns.

Viet Nam has identified a risk communications team and a national action plan for risk communications on emerging infectious diseases (2013–2016) has been developed and disseminated to 63 provinces for integration into their provincial plans. A modified functional simulation exercise on H7N9 was conducted to test the risk communications capacity and become the basis for the development of SOPs. Training was given to journalists on adverse events following immunization and rebuilding trust in Viet Nam’s immunization programme.
Communications in a time of disaster: Solomon Islands

For three days in early April 2014, heavy rains resulted in unprecedented flash flooding in Honiara, the capital city of Solomon Islands. The final death toll was 22, with 52,000 people affected across the country; many have lost their homes and livelihoods. At the peak of the response, there were more than 10,000 people taking shelter in 32 evacuation centres.

It was considered the most devastating natural disaster to have ever hit the country and the Government declared a state of emergency in Honiara and the rest of Guadalcanal province.

At the forefront of the national response was the Ministry of Health and Medical Services (MHMS), which addressed the health concerns of the affected communities and those in evacuation centres. Risk communications was one of the critical interventions for health and a key function in the Ministry of Health Emergency Operations Centre (MEOC).

Armed with its previous experience in responding to disease outbreaks, the MHMS Health Promotion Department mobilized its human resources and called on its partners to work together to ensure that critical health information was made available to the public in a timely manner. WHO provided technical support in communications planning, implementation of activities and in coordinating the efforts of the development partners.

Prior to the crisis, radio was one of the main sources of information but with displacement of people and limited communication systems still functional, the biggest challenge was to find ways to get health messages to communities. The Honiara City Council and Guadalcanal Province mobilized health workers to go to each community and evacuation centre by foot and deliver the health messages.

Development partners such as the Red Cross and World Vision were also tapped to send in communications volunteers. Through announcements in the social media, 50 volunteers responded and were trained to support the MHMS in its communication programmes on the ground.

In addition, a media forum was held to enable the health sector and local media personnel to discuss the health-related concerns facing the flood survivors and to work together on risk communications. “Communication is very important in the overall health response to the Solomon Islands disaster and we want the support of all our partners in doing our work”, says Lester Ross, Permanent Secretary of the MHMS during the media forum.

As the country shifts from emergency response to early recovery, the MHMS continues to work with WHO and other partners in addressing the communication needs of the affected population as they rebuild their lives. Along with this process is also a revisiting of the experience and identifying ways to improve the risk communications response in the context of a complex emergency.

Mr Alby Lovi, Director of Health Promotion Services, MHMS, summarized the lessons learnt on risk communications: “We were quite unprepared for the magnitude of the disaster and we built on our outbreak communications experience in our initial response actions. We relied on the support of our partners, including WHO. But I think we could have done better.

“As we move forward, we want to do better – we need to build our health emergency communications system, sharpen our communications tools and enhance our skills for risk communications. With these enhanced capacities, we could a lot more for the people of Solomon Islands.”
Outlook

Although risk communications capacity is already in place in most countries in the Region, maintaining the communication skills within ministries of health remains a challenge due to limited longer term capacity-building opportunities and investment in communications.

At the national level, Member States face difficulties in establishing and maintaining functional linkages with relevant sectors and partners that can be operationalized and applied in a real public health emergency. Although some countries have mainstreamed risk communication in other areas of work such as in natural disasters and food safety, further work and testing needs to be conducted to ensure clarity of roles among different sectors. Coordinating communication between local and national agencies is also an area for improvement.

One of the critical areas that remain to be improved is a more seamless coordination between risk assessment and risk communication, as both components can benefit from the knowledge of the other. Evaluating communications strategies after a health emergency is one of the key challenges for communications due to limited capacities and staff numbers to conduct such evaluations.

At the regional level, lessons learnt and best practices on health emergency communications need to be shared and used as a basis for reviewing communications strategies. With the rich experience of Member States, a regional workshop of the communication focal points needs to be organized to facilitate this regional exchange. This would also encourage Member States to consciously evaluate communications interventions in every public health event to generate lessons learnt and improve communications systems.

Meanwhile, support to Member States needs to continue in developing and testing national health emergency communications frameworks and protocols, either for real events or through simulation exercises.
FOCUS AREA 6: Public health emergency preparedness

This area of work goes beyond managing emerging infectious diseases and aims at supporting Member States in developing a national system that brings together all the key functions and players to prepare for and respond to public health emergencies.

The suggested approach to public health emergency planning involves using the continuous planning cycle to exercise, evaluate and revise the emergency plans and a step-by-step approach to formulate a generic public health emergency preparedness and response plan built on the experience of developing a national pandemic preparedness and response plan. The emergency plans should be underpinned by a clear command and control system, supported by a functional emergency operations centre within the Ministry of Health. The functional EOCs will be able to contribute to the timely information collection and risk assessments vital to informing rapid decision-making during a response, and also to be used for daily activities in quiet times to maintain functionality and readiness for emergencies.

Beyond public health emergency planning supported by an EOC, the following specific functions also need to be developed, in particular to fully implement IHR.

**National IHR Focal Points (NFPs)** in the Western Pacific Region play vitally important roles in facilitating IHR event communications and information-sharing related to public health events and emergencies. Strengthening NFP functions and capacities therefore contributes to the improvement of overall public health emergency management.

**Points of entry (POE)** play a unique role in preventing the international spread of diseases and in responding to events in a manner commensurate with the public health risks related to international travel and transport. Ensuring the IHR core capacities at designated POE requires coordinated multiagency preparation for emergency response and implementation of routine public health measures including inspection services and vector control.

**Response logistics** aim to allow Member States to rapidly, efficiently and effectively deploy required resources to all acute and ongoing public health events.

**Clinical management** focuses on building the capacities of health-care facilities and their staff to rapidly identify and treat emerging disease in order to apply appropriate therapeutic and infection prevention and control measures to reduce mortality and morbidity.

**Health-care facility preparedness and response** involves formulating a comprehensive national guideline or plan for surge capacity (for screening and triage, beds, staff, laboratory testing and communications); prioritization of treatment, and supplies of consumables; and plans to strengthen clinical management and infection prevention and control.
Regional progress

The key milestones in the APSED workplan for this reporting period include WHO’s commitment to run an exercise annually to test and maintain the function of the NFPs (which has occurred) and to support the establishment of an EOC within the Ministry of Health in each country (work which is actively ongoing).

Public health emergency planning

Most countries in the Region have developed their national pandemic influenza preparedness and response plans. Based on the experiences and lessons from the influenza A(H1N1) 2009 pandemic, countries such as Cambodia, China, Malaysia and Mongolia have reviewed and updated their national pandemic influenza plans in recent years. Following the recommendations from the APSED TAG meeting in 2013, some countries have been moving forward from pandemic influenza preparedness and response plans to a more generic public health emergency plan to address the threats from all emerging infectious diseases and hazards, including Lao People’s Democratic Republic and Papua New Guinea.

In the Lao People’s Democratic Republic, the Inter-Agency Contingency Plan (IACP) was revised in 2014. A health cluster response plan is included. The Ministry of Health are working closely with relevant sectors to develop a public health emergency response plan upon the existing national pandemic influenza response plan.

In Papua New Guinea, the public health emergency preparedness and response plan on all hazards was developed with the support of WHO and will be finalized by further consultation with additional stakeholders.

National pandemic influenza response plans and strategies are being finalized in Cambodia and reviewed in Malaysia.

As described in APSED Workplan (2010), by the end of 2015, a functional Emergency Operation Centre should be developed within the Ministry of Health which is equipped with facilities to support public health emergency response.

EOCs were established within ministries of health and equipped with communication facilities in Cambodia, Mongolia, Lao People’s Democratic Republic and Viet Nam. EOC standard operating procedures were drafted or developed in Cambodia and Mongolia. In Mongolia, training on SOPs and equipment maintenance will be conducted with support from WHO.

In 2013, during the dengue epidemic in the Lao People’s Democratic Republic, the EOC was activated and operated on a daily basis. In Viet Nam, the EOC was fully activated in response to the rise in measles cases.
Prepared and proactive: functional exercise for avian influenza A(H7N9) in Viet Nam

As reported in the IHR monitoring data, most countries in the Western Pacific Region have developed their national pandemic influenza emergency response plan. However, experiences and lessons learnt from pandemic influenza 2009 showed that these emergency response plans and national emergency response operations frameworks need to be updated regularly. Therefore, the need to ensure a continuous cycle of exercising and revising these plans is highlighted. Functional exercises are normally used to test and evaluate operational procedures and are characteristically fully simulated.

Viet Nam’s Ministry of Health has been proactive in strengthening communication and preparedness for avian influenza A(H7N9) virus. As part of this preparedness, the Ministry’s General Department of Preventive Medicine (GDPM), with WHO support, proposed that they organize an exercise on risk communication using a simulated H7N9 outbreak. This activity fits into overall objectives for improving risk communications in the country in order to fulfill the IHR (2005) core capacities.

The objectives of the exercise were to provide a practical training experience, enhance intersectoral collaboration in emergency health communications, and to build these capacities at central and provincial levels.

To meet these objectives, a “modified functional exercise” was designed, meaning that the real time discussion elements of a tabletop exercise were incorporated into the compressed time framework of a functional exercise. A team of experts from WHO and GDPM was assembled to develop and run the exercise, with support from the Food and Agriculture Organization of the United Nations, US Centers for Disease Prevention and Control (US CDC) and two external consultants.

Twenty-six people participated in the exercise, including 17 players, four simulators, two evaluators, two controllers, and an exercise director. The players were from the Ministry of Health, the Ministry of Agriculture and Rural Development, the National Center of Communication and Health Education, and the Provincial Center of Preventive Medicine of Lang Son province.

Players engaged in the exercise with visible enthusiasm as they dealt with incoming messages and reacted appropriately. They noted the ease with which they could share information with colleagues from other agencies, highlighting the importance of having information-sharing mechanisms in place. Players at all stages of the game took into account the public’s need for information, and looked at many channels in order to reach various audiences with the information they might need.

Some of the recommendations from the exercise pointed to the importance of developing standard operating procedures for communications in an emergency. These procedures should be very specific and relate to the immediate period following the identification of an emergency.

Viet Nam has a wealth of experience in outbreak response. It is now at the stage where the overall vision needs to be taken down to the very practical level of determining who needs to do what at the very moment an emergency strikes.
National IHR Focal Points

All 27 Member States in the Western Pacific Region have identified their National IHR Focal Points (NFPs). Most countries in the Region (85% of those reporting in 2013) have standard operating procedures in place for their NFPs and regularly use the IHR event information site (EIS). For the period 1 July 2013 to 31 May 2014, WHO’s IHR contact point at the Western Pacific Regional Office received over 1000 IHR email messages from NFPs. The major public health events communicated through the IHR communication channel were: avian influenza A(H7N9) and A(H10N8) in China, avian influenza A(H5N1) in Cambodia, and MERS-CoV in the Philippines and Malaysia.

To maintain and strengthen the functions of NFPs and the WHO IHR contact point, four IHR exercises (named “IHR Exercise Crystal”) were conducted in the Western Pacific Region in 2008, 2010, 2011 and 2012. IHR Exercise Crystal tested the IHR verification and notification functions and again highlighted the vital role of NFPs and the importance of IHR event communications. The fifth IHR Exercise Crystal was organized by WHO from 4 to 5 December 2013 in Manila, Philippines. A total of 23 NFPs (85%) participated in the exercise, an increase from 21 NFPs (78%) in 2012 and 18 NFPs (67%) in 2011. The exercise was well received, and a majority of NFPs could be contacted using the registered contact details or alternative contact details provided for the purposes of the exercise. Most participants were able to demonstrate the expected communications and information flow, including sharing of information and requests for situation updates from local public health authorities and event notification to the WHO IHR contact point. Of the participating NFPs, 78% (18/23) were able to give notification to WHO, and 74% (17/23) were able to complete the EIS posting process, which represents an improvement over the previous IHR exercise.

In Mongolia, an Interagency Contingency Plan Simulation Exercise was held in May 2014 to test the communication among NFP and relevant sectors.

Points of entry

Progress has been made by Cambodia, Lao People’s Democratic Republic, Mongolia and Viet Nam in improving the core capacity required by IHR at points of entry (POE). Training workshops were organized by the countries and simulation exercises at designated POEs were organized by bordering countries. SOPs and contingency plans for designated POEs are being developed and finalized to ensure the rapid and effective response to public health emergencies.

From 5 to 6 July 2014, an international workshop was held by the China General Administration of Quality Supervision, Inspection and Quarantine and supported by WHO in order to strengthen the core capacity at designated POEs under IHR (2005). Representatives of POEs from more than 16 countries and areas as well as experts from WHO collaborating centres participated in the workshop and shared the global progress on implementation of IHR at designated POEs. They also discussed how to accelerate the process of core capacity-building at POEs.
In Cambodia, a workshop on POEs was organized in Sihanoukville Seaport in December 2013 with participation from various stakeholders to enhance the IHR core capacity at designated points of entry. The Public Health Emergency Contingency Plan at POE-Sihanoukville Seaport was drafted with the support of WHO.

In the Lao People’s Democratic Republic, work on achieving the IHR core capacity requirements for designated POE began in 2013. Terms of reference and an emergency contingency plan for the designated POE-Vientiane Wattay International Airport were drafted and a stakeholders meeting was held. A workplan was developed with the vision that within the next two or three years, the designated airport in the Lao People’s Democratic Republic would meet the core capacity requirements under IHR (2005).

In Mongolia, a cross-border simulation exercise was conducted in collaboration with Russia and China. A training workshop was conducted on POE public health preparedness in Zamiin Uud, Bichigt and Khavirga border. Twenty-six ports have updated their public health preparedness contingency plans.

In Viet Nam, two training courses for border health quarantine officials and staff of provincial centres for preventive medicine on sanitation of aviation and ships were conducted in September 2013. The evaluation of the designated POEs and other international POEs was conducted to identify the gaps and constraints. Recommendations resulting from the evaluation will strengthen the core capacity-building at POEs.

Clinical management and health-care facility preparedness

In Cambodia, training on avian influenza for clinicians in outbreak provinces was organized and training materials in the local language were developed.

In the Lao People’s Democratic Republic, annual hospital preparedness for emergency (HOPE) training was conducted at provincial and district levels to ensure accessibility to health-care facilities during emergency events.

In Papua New Guinea, clinical management guidelines on selected priority infectious diseases were drafted and distributed during major outbreaks such as chikungunya and measles.

In Viet Nam, capacity for clinical management of SARI was also strengthened in health-care facilities. A quick training needs assessment on clinical management was conducted and two training courses on clinical management were organized for nearly 80 doctors working in clinical management in more than 45 hospitals. A toolkit on training for intensive care for SARI cases was translated and adapted to Viet Nam. The Ministry of Health developed a national action plan on disaster preparedness, response and recovery of the health sector for 2014–2020. Policy on the preparedness and response of hospitals and health-care facilities to public health emergencies and disasters was developed. Information-sharing on health sector damage and needs in the wake of disaster was strengthened. The Ministry of Health has developed reporting forms on damage inflicted and needs of the health sector in public health emergencies and disasters. These reporting forms are available for use in 2014 and coming years.
Training-of-trainers on ensuring delivery of high-quality clinical care: regional clinical management training

Human infections with influenza virus, MERS-CoV, and other pathogens cause severe acute respiratory infection (SARI). Ensuring delivery of high-quality clinical care in the management of SARI is critical to saving the lives of people with these diseases and developing capacities to respond to outbreaks.

APSED (2010) emphasizes the importance of building capacities in clinical case management of critically ill patients during infectious disease outbreaks in order to reduce morbidity and mortality. Developing guidelines and training materials to address gaps in clinical management and connecting the trained clinicians to outbreak response are the main approaches for the regional clinical management network.

WHO has built a global technical network of international clinical experts with abundant experience in SARI and influenza clinical case management. These experts are working together with WHO to review and update the clinical treatment guideline documents, develop training packages and deliver high-quality training courses. The training packages for clinical management of SARI in low- and middle-income countries have been developed on the basis of the experience of clinical management of avian influenza and SARS. In the Western Pacific Region, WHO training workshops were held in 2013 in China and in Viet Nam to improve clinical capacity in critical care of avian influenza A(H7N9) and A(H5N1).

From 16 to 19 May 2014, a training workshop, “Regional Training for Clinical Management of Influenza A (H7N9) and Severe Acute Respiratory Infection”, was convened in Nanjing, Jiangsu, China by the WHO Regional Office for the Western Pacific. The objectives of the training-for-trainers were to improve the clinicians’ knowledge and skills in diagnosis, treatment and infection control of critically ill patients, particularly in the event of an outbreak of avian influenza or other pathogens causing SARI.

More than 70 participants from 15 countries of the WHO Western Pacific and South-East Asia Regions attended the workshop. Most of the participants were clinicians working in intensive care units or equivalent departments in a hospital at the national or subnational level with substantial experience in managing influenza cases including avian influenza in humans and SARI. Jiangsu Province, where the training workshop was convened, is one of the provinces most affected by H7N9 in China, with 56 human cases and 22 deaths reported as of June 2014. The local government made a firm commitment and mobilized substantial resources to ensure high-quality care for critical cases and reduce mortality during outbreaks. More than 20 clinicians from hospitals in Jiangsu and other provinces of China also participated this training and shared their experiences of clinical management of SARI cases. This will further help the improvement of critical care capacity at subnational level hospitals in the affected provinces.

Multiple interactive courses of video display, role play, case study and field visit were applied in the training in addition to the plenary presentations. Participants found these interactive “adult learning” methods interesting and engaging. At the end of the workshop, facilitators and participants discussed next steps. Several countries (Lao People’s Democratic Republic, Nepal, the Philippines, Viet Nam, China) expressed interest in organizing similar training using the WHO training curriculum and packages in their countries. Viet Nam already has a plan to run the course later this year (led by Hanoi Tropical Disease Hospital), as does China (Shanghai Public Health Clinical Centre).

The training contributes to the capacity strengthening of health-care facilities, enhancing clinical networks and identifying associated issues. Evaluation forms from participants indicated that the training was well designed and well received.
Outlook

Countries’ preparedness and readiness to respond to acute public health events is critical to mitigating the negative impact of emergencies on public health. Despite progress in this focus area through the establishment of functional EOCs and strengthening of the capacity for national emergency planning and exercise, some challenges in improving the public health emergency preparedness in the Western Pacific Region remain, as described below:

- Because the organizational dynamics within each Ministry of Health are different, EOCs and emergency planning need to be tailored to meet specific needs.
- Coordinating intersectoral efforts in developing national public health emergency preparedness plans to address the threats beyond pandemic influenza and emerging infectious diseases poses a challenge.
- Significant gaps remain in most settings of the South Pacific. NFPs’ functions and capacity in some Pacific island countries need to be further improved to ensure timely communication during public health events.
- Lack of expertise and resources in supporting the activities to improve response logistics in some countries.

The following elements should be strengthened for the sake of public health emergency preparedness in the Western Pacific Region:

- Provision of support to countries when moving forward on developing public health emergency contingency plans for generic emerging disease threats beyond pandemic influenza.
- Continuing to support the establishment of EOCs in countries and enhancement of the functioning of EOCs through encouraging use of the practical guide. Ensure that response logistics are integrated to support public health emergency operations at EOCs.
- Strengthening and maintaining the skills of NFPs through regular trainings/exercises at the regional and national levels.
- Improving IHR core capacity-building at designated POEs by developing contingency plans for emerging infectious diseases, organizing training and sharing best practices among POEs.
FOCUS AREA 7 Regional preparedness, alert and response

Acute public health events may go beyond national borders. Under IHR (2005), WHO is required to strengthen regional and global systems and capacity for preparedness, alert and response to ensure that rapid and appropriate support can be provided to countries in response to acute public health events.

The goal of this focus area is the development of a regional system that will effectively monitor and alert Member States of emerging diseases and acute public health emergencies, produce risk assessments, support rapid response through enhanced global and regional networking and share relevant information. To achieve this, the following activities continue to be prioritized: a systematic regional platform for regional outbreak alert and response; linking with similar WHO initiatives to expand scope to an all-hazards approach; and information dissemination via new IT technologies and social networking sites.

In the past year, a number of major emergencies have occurred, testing the capacity of the regional system. These included: Typhoon Haiyan in the Philippines; flooding in Solomon Islands; avian influenza A(H7N9) and dengue in the Lao People’s Democratic Republic. The newly operational Regional Emergency Operations Centre was activated twice during the year, serving as a hub during these acute events and continuing to be the hub during more peaceful times when routine surveillance, regional preparedness exercises and risk assessments are undertaken.

Interesting facts

In the past 12 months:

- Surveillance officers spent 2000 person-hours/year conducting regional surveillance.
- Surveillance officers assessed at least 200 media reports and 50 emails from WHO country offices per day.
- The regional surveillance team assessed and monitored over 240 public health events.
- From the 240 acute events, the Regional Office supported Member States through WHO country offices in their risk assessment and response by close communication: situation updates, technical advice, and coordination with partners including expert deployment and procurement.
- A total of 75 biweekly surveillance reports for dengue, hand, foot and mouth disease, and seasonal influenza (ILI) were published.
- A total of 48 avian influenza weekly surveillance reports were published.
- Ten fellows participated in the FET/P Fellowship Programme from five Member States, resulting in a total of 50 fellows from 13 Member States since 2010.
- Four public health events were given Emergency Response Framework (ERF) grading: Typhoon Haiyan, the Solomon Islands flooding, and H7N9 and dengue outbreaks in the Lao People’s Democratic Republic.
- The Regional EOC was activated for two public health events: dengue in Lao People’s Democratic Republic and Typhoon Haiyan in the Philippines.
Regional progress

Regional surveillance

WHO’s regional surveillance team continued to support Member States with regional preparedness, alert and response and surveillance activities. On a daily basis, the surveillance team monitors, screens, verifies and assesses events using an all-hazards approach rather than just focusing on emerging infectious diseases. Regional surveillance remains the core activity through event-based and indicator-based surveillance. Fellows from the FET programme play an integral role in regional surveillance through EBS, IBS and rapid risk assessments. The skills gained at the Regional Office have been transferred, with a number of surveillance officers continuing EBS activities upon return to their own Member States. Ten fellows from five Member States participated in this programme during the previous year, resulting in a total number of 50 fellows from 13 Member States since 2010. The EOC continues to be the nucleus of all the surveillance teams’ activities. The multidisciplinary team meets on a daily basis to report events detected through EBS and IBS, conduct rapid risk assessments, communicate with stakeholders and to plan required actions.

One of the primary responsibilities of the surveillance team is to keep Member States informed of priority diseases in the Region. In the past year, 246 events have been reported in the Western Pacific Region, including 67 infectious disease events, 107 avian influenza A(H5N1) animal events, 71 disasters and other events (including pharmaceutical and food-related events) and one chemical event. Of these, 26 were initially detected through unofficial means.

Sharing of regional surveillance data

The Regional Office continues to disseminate regional updates on priority diseases: influenza; dengue; and HFMD on a biweekly basis. This report has kept Member States informed of high-level dengue activity in the Lao People’s Democratic Republic and a number of islands in the Pacific. Weekly regional avian influenza updates continued to be disseminated, which were particularly salient early in 2014 during the second wave of H7N9 when an upsurge of cases occurred. The importance of these reports was highlighted with numerous references in CIDRAP, ProMED and a number of media sources. In the past year, for H7N9 alone, there were over 1100 email correspondences from the Regional Office including communications with country office colleagues, other Regional Offices and WHO Headquarters, in addition to partners in animal health and Member States. For other avian influenza strains including H5N1, over 1500 email dispatches by the Regional Office were sent including IHR communications, providing technical support to country offices, communication with partners from the animal health sector and communication with other Regional Offices and WHO headquarters, and information sharing through the Event Information System.

In the past year, the format for biweekly surveillance reports for dengue, HFMD, and seasonal influenza (ILI) was updated to enhance readability and a total of 75 reports were published. Similarly, the format of the avian influenza report was updated and a total of 48 reports were published. A weekly line list of human H7N9 cases in the Region is included in this report – the only source to do this that is available in the public domain. These publications are posted on the Regional Office website in a timely manner. Continued
monitoring of public health events in the Western Pacific Region and the sharing of this information with other divisions and country offices of WHO is imperative.

Almost all IHR notifications by National IHR Focal Points in the Western Pacific Region were posted on the IHR Event Information Site (EIS). EIS is a platform created by WHO to share information on public health events of importance including situation updates and risk assessments with National IHR Focal Points. The Regional Office and country offices supported Member States with drafting EIS posts for a number of public health events in the Western Pacific Region, including MERS-CoV and human infection with avian influenza viruses. The Regional Office also facilitated EIS updates in collaboration with WHO headquarters. In the past year, 100 posts on the EIS for 11 events including three food safety events with six postings were shared. Cross-programme collaboration continues to be strengthened with 17 food safety events detected through EBS by the surveillance team and subsequently shared with the food safety team at the Regional Office. In collaboration with WHO headquarters, a number of events in the Western Pacific Region were published on WHO’s Disease Outbreak News webpage.

Another important source of information for the public is the peer-reviewed Western Pacific Surveillance and Response journal. WPSAR creates a platform for timely sharing of information to improve surveillance of, and response to, public health events in the Western Pacific Region. In addition, it aims to build capacity in communicating epidemiological and operational research by assisting Member States in building capacity for epidemiological writing through scientific writing workshops and offering pre-submission guidance and editing of articles. Manuscripts are published continuously, allowing for rapid release to describe ongoing outbreaks of acute public health events. It continues to be an open access without any charge for authors.

WPSAR was indexed on MEDLINE and archived in PubMed in August 2013 and continues to be indexed in other databases including the Directory of Open Access Journals, Western Pacific Region Index Medicus and Google Scholar. In the past year the WPSAR website and online journal system (OJS) were both upgraded and integrated. During June, a WPSAR readership survey was conducted to understand the WPSAR audience more comprehensively and to explore how the journal is currently being used and what the readers’ expectations are. One of the conclusions from this review was that in the relatively short time since its inception, WPSAR has established itself as a good quality regional journal that is well regarded by its readership on measures of content, delivery, operation and expectations. In the past year, 29 articles have been published in WPSAR, including one from FET/FETPs. The Regional Office has supported capacity-building for scientific writing by providing pre-submission assistance to 24% (7/29) of published articles in 2013–2014. Four scientific writing workshops were also conducted with support from the Regional Office, including at the biregional TEPHINET (FETP) conference in Viet Nam in November 2013.

Regional preparedness and response

The Regional Office supports Member States through country offices in conducting risk assessment and response through close communication. Situation updates, technical advice and coordination with partners including expert deployment and procurement have been done predominantly through regular email communication as noted above.
In addition, teleconferencing with country offices and other partners plays an important role in sharing information in a timely manner. The state-of-the-art Regional EOC allows participants from several divisions and/or organizations to connect efficiently and discuss risk assessment and next steps.

Risk assessments at a regional level continue to be conducted on a daily basis as a part of surveillance. Documentation of risk assessment has been done in the past year for 18 major public health events in eight countries and the Pacific region. Risk assessments aim to assess the overall risk to Member States in the Western Pacific Region with a specific focus on the likelihood for further transmission of emerging infectious diseases and the consequences of infection to the Member States. Routine risk assessments between country offices, Regional Office and WHO headquarters are conducted for avian influenza and H7N9 with over 20 risk assessments conducted in the past year in addition to monthly risk assessments for other avian influenza viruses. In addition, a joint risk assessment was conducted between the Division of Pacific Technical Support and the Regional Office for the emerging Zika virus. This risk assessment is being used as guidance for the global risk assessment for Zika virus.

In the past year, two acute public health events in the Region were graded using WHO’s internal Emergency Response Framework. These were Typhoon Haiyan in the Philippines and the flooding in Solomon Islands. The grading system provided a framework to guide the coordination of these events in addition to specific response decisions. In addition, the 2013 dengue outbreak in the Lao People’s Democratic Republic was ERF Grade 1 and human infection with H7N9 remains at ERF Grade 2 since April 2013.

The regional EOC was activated for two public health events in the last year: dengue in the Lao People’s Democratic Republic and Typhoon Haiyan. An event management system was implemented for the Lao dengue event and the event manager was based in the Regional Office. Fifteen teleconferences were held with the Country Office during the period of July to November 2013 in order to monitor closely the situation and to provide technical support on epidemiological analysis and vector control. Joint risk assessment was done with the Country Office and the Regional Office including a public health entomologist from the Malaria, Other Vector-borne and Parasitic Diseases Unit in the Division of Combating Communicable Diseases. The conclusions of these teleconferences formed the basis of technical support for the Lao People’s Democratic Republic while it was experiencing its largest outbreak of dengue in recorded history.

Regional preparedness, alert and response are facilitated through the rapid procurement of resources required by the Region. Regional stockpiles of Tamiflu for a potential influenza pandemic, personal protective equipment and diagnostic kits for influenza and arboviruses have supported the rapid response during outbreaks. In the past year, the rapid procurement of resources has contributed to the timely response to a cluster of human cases of H5N1 in Cambodia and dengue outbreaks in Solomon Islands and the Lao People’s Democratic Republic.
Regional preparedness was strengthened in the past year with the Emerging Surveillance and Response team in the Regional Office participating in the PanStop exercise in February 2014. The scope of the exercise was to assess preparedness of the team to identify the need for and implement a rapid containment operation. Professional and general service staff from the Emerging Disease Surveillance Unit including staff from surveillance and response, risk communications, laboratory, logistics and information technology participated, as did an observer from the Japan International Cooperation System (JICS). The exercise was based on the scenario of human infection with novel influenza virus in a hypothetical country in the Western Pacific Region. Exercise participants responded to simulated events in their planned roles within a given timeframe. The two-day exercise enabled the Emerging Diseases Surveillance and Response team to strengthen capacity in the Region to initiate rapid containment operations in preparation for a potential pandemic influenza outbreak.

As part of regional preparedness, the establishment and maintenance of a regional stockpile of antiviral drugs and personal protective equipment (PPE) is vital. As a part of the Asia-Europe Meeting (ASEM) Project for Stockpiling of Antiviral drugs and Personal Protective Equipment for Rapid Containment of Pandemic Influenza, 500 000 courses of antivirals and PPEs, which can be deployed promptly for rapid containment, are maintained in Singapore. The deployment of this stockpile was simulated in the PanStop exercise. During April 2014, the annual coordination meeting of the ASEM stockpiling project was held in Japan involving the WHO Regional Office, Asia-Europe Foundation (ASEF) and JICS. Considering the importance of maintaining the regional stockpile, ASEF, WHO and the Government of Japan agreed to implement Phase 2 of the stockpile project starting in 2015.

The rapid deployment of human resources for a number of acute public health events occurred in the past year. Global/regional expertise networks like GOARN facilitated a coordinated response and human resources through this network continued to be strengthened. Moreover, the events responded to were across regions and countries as well as across units. This included 32 experts who were deployed to the Philippines following Typhoon Haiyan, five GOARN deployments to the Zamboanga conflict in the Philippines (November 2013) and a GOARN deployment to the dengue and Zika outbreak in French Polynesia (December 2013). The GOARN mechanism was formally activated in 2014 following the flooding and diarrhoeal outbreak in Solomon Islands. The Regional Office also played an active role in the GOARN Steering Committee.

**Outlook**

- Continued upgrading of the regional surveillance and information sharing system.
- Continued refining of risk assessments.
- Active promotion of WPSAR as a venue for publishing manuscripts.
- Training for WHO staff in the Western Pacific Region on emergency and disaster risk management based on the *WHO Emergency Response Framework*. 
FOCUS AREA 8: Monitoring and evaluation

Monitoring and evaluation (M&E) remains of central importance for the effective implementation of APSED/IHR core capacities. It aims at strengthening the national and regional capacities required to effectively plan and monitor APSED implementation. In the context of APSED, M&E fulfils two functions. Firstly, it provides information on the progress of the implementation of workplans to all concerned stakeholders. Secondly, it provides a management framework to connect all APSED stakeholders at country and regional levels.

At the country level, APSED introduces a simple and practical country-owned M&E system – the national planning and review process. This process creates the collaborative space to develop and regularly update the national workplan for APSED (be it a dedicated plan or one that is embedded in a larger emerging infectious disease plan) to regularly assess progress using monitoring indicators, and to prepare and validate the annual national APSED progress report. It is an important forum that establishes links to other sectors beyond the area of emerging diseases.

At the regional level, the annual meeting of the Asia Pacific Technical Advisory Group (TAG) on APSED performs an important monitoring role. It reviews national progress and produces recommendations on priority activities for implementation in countries. This feedback mechanism provides an effective flow of information between countries and the regional level, which allows for continuous learning and improvement.

Interesting facts

- Number of IHR monitoring questionnaires submitted in 2010 (21), 2011 (19), 2012 (26), 2013 (26), 2014 (20 as of 8 August).
- Number of countries requesting first IHR extension in 2012: 14.
- Number of countries requesting second IHR extension in 2014: 9.

Regional progress

The progress in establishing the planning and review process – a forum for relevant stakeholders to share their experiences, discuss and make decisions – has been encouraging and effective use of the process has been achieved. At country level, the basic planning and review process as outlined in the M&E Guide for APSED has been established in most focus countries:

National APSED/IHR/EID workplans are in place in at least 14 countries. These national workplans serve as a tool to harmonize and align activities across a wide range of sectors.

Regular planning and review meetings with multisectoral participation have taken place in at least six countries – Cambodia, Lao People’s Democratic Republic, Malaysia, Mongolia, Singapore, Viet Nam. These meetings are coordinated and supported by the national M&E facilitator who in most countries is the EID programme manager or the National IHR Focal Point.

Eight countries – Brunei Darussalam, Cambodia, Lao People’s Democratic Republic, Malaysia, Mongolia, Papua New Guinea, Philippines and Viet Nam – used the APSED performance indicators in 2013 to review their overall progress against APSED capacities. Twenty-six out of 27 Member States submitted the IHR monitoring questionnaire in 2013.
In 2014, seven countries have prepared national progress reports which form the main source of information of this regional overview. The WHO Division of Pacific Technical Support has prepared a summary report on behalf of the Pacific islands countries.

At the regional level, the meeting of the Asia Pacific Technical Advisory Group on APSED has been held annually since the inception of original APSED in 2005. The regional progress reports are shared and discussed, TAG recommendations are agreed and followed up, and formal and informal networks are strengthened.

If we look behind these facts, we can appreciate the many benefits that the planning and review process entails. The nature of emerging diseases and public health emergencies demands the coordination of a multitude of stakeholders, government departments, institutions and organizations, beyond the communicable disease department. This coordination needs to be based on agreed protocols and must be used in both routine work and emergencies. Examples are:

- coordination between animal and human health surveillance;
- coordination between public health experts conducting risk assessments and communications experts formulating messages informed by these;
- coordination within the public health laboratory system and with surveillance teams.

While the national planning and review process does not create these coordination mechanisms between stakeholders, it does provide a management framework which connects different sectors for improved coordination in preparedness and response (including food safety, chemical and radiation).

In many countries, this management framework has continued to provide a forum to bring relevant stakeholders together on a regular basis to discuss and document the progress against the APSED/EID workplan, identify challenges and propose solutions and agree on joint priorities. Most recently, the national planning and review meetings have been used to determine the status of IHR achievements across all core capacities, thus facilitating the ministerial decision as to whether to seek a second two-year extension or not.

The regular participation of partners has expanded the purpose of these meetings to include advocacy and resource mobilization, alignment/harmonization of donor programmes and general partnership building.

Since the last biregional TAG meeting in 2013, the WHO Regional Office for the Western Pacific has advanced M&E for APSED in several ways. At an informal consultation, supported by US CDC and former AusAID (now Department of Foreign and Affairs and Trade, Australia), the M&E framework for APSED was reviewed and fine-tuned to address outstanding challenges. This included:

- Updating of the *M&E Guide for APSED* to include the experiences from implementing the draft guide. To complement the existing monitoring tools like the national workplan and the IHR monitoring indicators, it was agreed to conduct “programmatic outbreak reviews” to demonstrate the use of APSED capacities during real outbreaks. Guidance on how to conduct programmatic outbreak reviews for APSED was prepared.
With the aim of supporting Member States and WHO in the continuous advocacy and demonstration of good results, the Regional Office prepared an evaluation concept note to be discussed at the APSED TAG meeting in 2014.

The progress in this focus area has also benefitted from the technical expertise of APSED partners, helping to improve M&E tools.

**Outlook**

Despite strong progress, the M&E process in some countries remains largely dependent on WHO’s financial and technical support. The need for stronger institutional integration of M&E processes, including budget allocation, is needed to ensure sustainability.

There are two key issues that currently hinder the sustainability of the M&E process. The first is linked to funding. In some priority countries, the national workplans are still largely externally funded, including staff, with little contribution from the national budget. In light of the uncertain nature of external funding, this puts at risk past achievements. While this institutional challenge cannot be addressed by APSED, alignment with national processes needs to be promoted. In this regard, it is suggested that the national planning and review meetings be better aligned with the national budget cycle so that workplan updates and corresponding budget requirements can feed into the national planning cycle.

The second issue is buy-in from, and coordination with, APSED stakeholders beyond ministries of health. In some countries, focal points for IHR matters do not exist in other ministries, hindering effective coordination.

Domestic and external advocacy for M&E for APSED can help address both issues mentioned. A stronger focus on demonstrating the collective achievements of APSED implementation and documenting lessons learnt is needed. The following is a list of the next steps:

- Introduce and implement outbreak reviews as a way to demonstrate the existence and use of APSED capacities;
- Prepare for and conduct external evaluation; and
- Strengthen advocacy and resource mobilization through case studies, evaluation findings and building the economic case.
Gender is a major determinant of health risk, disease burden and health outcomes. Understanding the role of gender in infectious diseases can provide invaluable insight in transmission patterns and hence, targeted public health interventions. Increasing the efficacy of disease control programmes with a gender-focus can increase the likelihood of well informed responses, reducing gender inequalities. It is also a step toward universal health coverage. Under APSED, gender cuts across all eight focus areas and when gender differences are observed in a particular disease, one needs to consider whether this is due to biological factors or rather differential access to health services, for example.

### Regional overview

#### Acute public health events

In the past year, a number of public health events have highlighted the importance of disaggregating surveillance data by age and gender.

**Figure 2.** Suspected dengue cases stratified by age group and sex, Lao People’s Democratic Republic in 2010(A) and 2013(B)

In 2013, Lao People’s Democratic Republic experienced the largest outbreak of dengue recorded in the country’s history. Previous outbreaks have affected more males than females.\(^1\) However, in 2013 there was no significant difference in the number of male cases compared to female cases. Detailed analysis during 2010 in Savannakhet Province found that the excess of male cases appeared to be due to a truly higher risk of disease in males compared to females (females had a higher health-care seeking behaviour). \(^2\) Interestingly, this was not observed in 2013. Whether this may be due to a change in risk of disease or perhaps a change in health care-seeking behaviour remains unclear. But mainstreaming gender into surveillance and the collection of sex data during outbreaks allows for hypotheses to be generated to explore what may be behind differences and hence provide a more gender-sensitive approach to response activities.

<< Teachers wearing protective face masks stand next to students at a school building following a flu outbreak in Kuala Lumpur.\(^3\)>>
Another example of the importance of collecting sex and age data during outbreaks is human infection with avian influenza A(H5N1) in Cambodia. Nearly half of human cases occurred during 2013 and age and sex data are collected for all confirmed cases. Although there was no difference in the number of male and female cases during 2013 (both 13), the case fatality rate differed (39% versus 44%, respectively). Since 2003, the difference in overall case fatality rate between males and females is more substantial (54% versus 77%, as of 20 June 2014). Whether this is due to differences in promptness of health-care access, differentials in opportunity of exposure due to gender-specific roles (a higher viral load among females preparing/cooking sick/dead chicken), or biological differences resulting in more serious outcomes for females, it highlights that further investigations are required.

**Surveillance**

It is clear that Member States in the Region have mainstreamed gender into surveillance data during periods of outbreaks; however, it is important that it is applied on a routine basis. Currently, there appear to be some gaps in terms of collection of sex data for routine indicator-based surveillance.

The simplicity and ease of application of age and sex-disaggregated analysis on routine surveillance data can be demonstrated from the Philippines IBS system – the Philippines Integrated Disease Surveillance and Response (PIDS). Age and sex data are routinely collected without much burden in terms of time and resources. By collecting age and sex data, unusual or unexpected observations can lead to the generation of hypotheses. For example, dengue and chikungunya are both arboviruses which share the same vectors – *Aedes aegypti* and *Aedes albopictus*. Given this, and that the risk of exposure of getting bitten by the vector are identical, surveillance data in 2013 identified an unexpected observation. The majority of cases of chikungunya are in older females whilst the sex distribution in dengue was equal, with cases predominantly occurring in individuals 1–20 years of age (See Figure 3). What may be behind such an unexpected finding? Is it that the clinical sequelae differ between males and females? Or perhaps that health seeking

**Figure 3.** Chikungunya (A) and dengue (B) cases stratified by age group and sex in the Philippines as reported in 2013
behaviours differ? Such differences allow for hypothesis generation, ultimately the drive toward deeper investigation. Such work can lead to findings that support a more targeted response, for example with regard to risk communication messages.

Integrating gender into infectious disease programmes was highlighted in the publication, *Taking sex and gender into account in emerging infectious disease programmes: an analytical framework (2011)*. The tool developed by Regional Office based on this work provides a simple model for Member States to apply when analysing and assessing surveillance data with a gender focus.

**Outlook**

**Challenges**

Although progress has been made in mainstreaming gender into APSED, it is vital to continue to advocate for gender-sensitive surveillance. As mentioned, a number of Member States do not collect data on gender and age through indicator-based surveillance. As these systems are already in place, collection of sex and age data is unlikely to be expensive or labour-intensive, as highlighted in the Philippines. Often, staff working in surveillance are under-resourced and have a high work burden, but mechanisms could be implemented to ensure that collection of data is simple with minimum effort required using existing systems. Moreover, training may raise the awareness of how mainstreaming gender into surveillance could inform the public health response.

**Next steps**

The Western Pacific Region continues to face a burgeoning threat from emerging diseases. During March and April 2014, an upsurge of cases of MERS-CoV led to increased concerns that the virus was mutating, increasing the threat of global spread. Indeed, in April 2014, the Western Pacific Region reported its first case in Malaysia in a pilgrim from the Kingdom of Saudi Arabia. Soon after, the Philippines reported a case in an overseas Filipino worker from the United Arab Emirates who had returned to the Philippines. Both cases were male, similar to the global cases, where over 60% are male. The Regional Office continues to monitor many aspects of MERS-CoV including the epidemiological and virological characteristics of the disease, gender among them.

Gender is a challenging and ever-evolving area. To encourage gender sensitization, a workshop on gender is planned to assist Member States in mainstreaming gender into surveillance and response. As the implementation of APSED nears in 2015, it is timely to reiterate the importance of having a gender perspective with regard to emerging infectious diseases. The Regional Office will continue to promote the analysis of disaggregated data by sex and the publication of findings through WPSAR to support information-sharing.
A case study: H7N9 and gender

During the early stages of the avian influenza A(H7N9) virus outbreak in China, scientists noticed that older men were the group most affected by the disease. The reporting of age- and sex-stratified data is an essential component of surveillance if we are to hypothesise about what is behind observed gender differences. For example, biology, exposure and health-seeking behaviour may differ by gender. A targeted response can thus be implemented following the identification of particular patterns of disease.

In the second wave of the H7N9 outbreak (since October 2013) a shift in the age and sex distribution has been observed. Most notably, the number of cases among children has increased, particularly in girls (See Figure 4). The reasons behind this are unclear. Was it improved and enhanced surveillance in the second wave that was able to detect more mild cases (all cases among children <15 years were mild/stable at the time of notification)? This, however does not explain why there were nearly double the female cases <15 years (n=13) that were reported compared to males (n=7). Could it be that young girls in China are helping more with the rearing, feeding and preparation of slaughtered chickens than boys?

Exploring gender-associated behaviours and norms that may result in an increased risk for one gender is an important consideration when interpreting observed sex distributions in reported surveillance. Other factors to consider include differentials in health-care access, health-care seeking behaviour and biology.

Investigations continue into the reasons behind the observed differences between the first and second wave of H7N9. It does highlight the importance of collecting age- and sex-specific information which, when clear differences are observed, can guide assessment and response activities.

Figure 4. Human infection with avian influenza A(H7N9) stratified by age group and sex in the Western Pacific Region during Wave 1: April–September 2013 (A) and Wave 2: October 2013 – June 2014 (B)

References:
Health security threats, especially emerging diseases, pose significant risks to health, social and economic development. The common goal of regional health security can only be achieved if collective actions and effective partnerships are in place. Building sustainable technical collaborations and partnerships in the Asia Pacific region has been an important objective of APSED (2010).

APSED (2010) seeks to provide a common framework for countries, the Technical Advisory Group, WHO, donors and partners to work together to enhance regional defences against health security threats. The successful implementation of APSED relies on effective coordination, collaboration and harmonization among different stakeholders and needs to be supported by sustainable financing mechanisms.

Monitoring and evaluation, one critical focus area of APSED (2010), promotes stakeholders’ planning and review mechanisms, thus fostering partnerships both at the country level and the regional level. At the country level, ministries of health invite various departments within the health sector, other ministries, technical institutions and external partners to participate in annual planning and review meetings to openly discuss country progress and challenges, thus strengthening stakeholders’ collaboration. At the regional level, since the inception of APSED, a partners’ forum has been an integral part of the annual TAG meeting on APSED. It is now widely recognized that APSED is a useful tool to guide prioritization of investments, coordinate activities and mobilize resources.

Throughout APSED (2010) implementation, partnerships have been promoted across the Region around technical issues, investments, and operational matters (see Figure 5).

- Technical partnerships have included establishing and sustaining collaborative mechanisms like the annual TAG meeting, promoting informal technical working groups, developing technical guidance and tools, as well as providing assistance in enhancing national and regional surveillance and response systems.

- Investment partnerships have focused on ensuring that adequate funding, human resources, and supporting infrastructure, equipment and supplies are available for securing regional health.

- Operational partnerships have addressed ongoing enhancements and sustaining of functional national surveillance, alert and response systems for collectively managing all acute public health events and emergencies within the Region, promoting technical networks like GOARN to support response operations, and promoting situational awareness and information-sharing among countries and partners of the Asia Pacific region and beyond.
The following are some examples of how partnerships have been promoted, used and further enhanced through these APSED partnership efforts.

- The detection and characterization of and response to viruses like avian influenza A(H5N1) and A(H7N9) have been supported by the well established Global Influenza Surveillance and Response System (GISRS), which connects all National Influenza Centres and WHO collaborating centres. Countries and partners like the US CDC continue to invest financial, human and technical resources to enhance both national and regional influenza surveillance and response systems, as well as pandemic influenza preparedness planning.

- WHO’s regional and global surveillance, alert and response system continues to detect, assess and respond to disease outbreaks and acute public health events of national and international concern. The Pacific Syndrome Surveillance System, established as a collective effort in the Pacific to comply with IHR (2005), plays a vital role in outbreak and public health event detection, situation monitoring and response. GOARN has been mobilized by WHO to support the responses to many emerging diseases and humanitarian disasters like Typhoon Haiyan in November 2013.
• The WHO collaborating centres in the Western Pacific Region have provided critical support not only on influenza work, but also in the establishment of an external quality assessment programme for dengue over the past two years. These centres supported the drafting of an action plan and provided technical expertise in the composition, coordination, logistics and evaluation of the EQA.

• The APSED (2010) focus area on zoonoses provides a range of opportunities for coordination between the human health and animal health sectors in countries. At the regional level, a FAO/OIE/WHO tripartite annual meeting has been held in recent years as a mechanism to improve collaboration and promote technical partnerships around the prevention and control of zoonotic diseases.

• A great effort has also been made to enhance investment partnerships, including funding support from development agencies, for Field Epidemiological Training fellowship programmes and establishment of a regional stockpile of antiviral drugs for pandemic influenza rapid containment. Financial contributions for APSED through WHO can be found in the “Financial Overview” section.
Countries and areas in the Western Pacific Region have progressed well towards meeting the IHR core capacity requirements through collective actions and APSED (2010) partnerships. These achievements have been evidenced by the early detection of and the rapid response to several disease outbreaks, as well as by the results of the annual IHR Monitoring Questionnaire in 2012 and 2013. As of June 2014, the proportion of Member States in the Western Pacific Region that have reported having IHR core capacities in place increased from half to two thirds (13 and 18 countries, respectively).

Despite this progress, the Region is not well prepared to manage severe regional health security threats. A significant number of Member States have requested a further extension of two years for attaining the IHR core capacities. Some critical milestones in the implementation of the APSED workplan, such as the systematic application of risk assessments, the establishment of EOCs in ministries of health, the development of generic public health emergency preparedness plans, or the attainment of core capacities at points of entry, have not yet been met. There is still a significant amount of work to be accomplished before the Region can enjoy a well functioning system of collective health security.

In addition, the inevitable emergence of new pathogens requires constant maintenance and improvement of capacities and functions. Middle East respiratory syndrome coronavirus and other emerging infectious diseases continue to be a risk for the Western Pacific Region, while novel avian influenza viruses appear to be circulating more frequently. Ongoing generic capacity development through APSED (2010) needs to have a continuous focus on increased preparedness against these threats.

In sum, confronting these challenges requires a continuing, sustainable network of partnerships to ensure efficient and effective management of health security risks in the Asia Pacific region.
ANNEXES

ANNEX 1 Status report on IHR (2005)

National capacity monitoring

With the coming into force of the International Health Regulations (2005) on 15 June 2007, all IHR States Parties were required to assess the ability of their national structures and resources to meet minimum national core capacities for surveillance and response as specified in the Regulations and to develop a plan of action to ensure that these capacities would be present and functioning throughout their territories by 2012. WHO was mandated to provide appropriate tools, guidance and support to State Parties to achieve these goals. In accordance with Article 54 of the IHR and a related World Health Assembly resolution, States Parties and WHO are required to report annually to the World Health Assembly on the implementation of the Regulations. For this purpose, a monitoring framework was developed on the basis of technical expert views drawn globally from WHO Member States, technical institutions, WHO partners, and from within WHO.

Throughout this report, percentage values relate to responding countries only. Analysis is based on self-reported data submitted by States Parties in the 2013 IHR Monitoring Questionnaire. Specific country contexts and other sources of information, if available, may also need to be considered in identifying priorities and needs as well as planning for future activities.

IHR REGIONAL AVERAGE CAPACITY SCORE 2012–2013 (%)

WESTERN PACIFIC REGION

Capacity scores are defined as the proportion of attributes present expressed as a percentage. Scores shown here are averages for each capacity within the Western Pacific Region based on the scores of all responding countries within the Region (26/27 States Parties in both 2012 and 2013).

Regional core capacity scores based on responses from the same 26 countries - Comparison 2012 and 2013

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<tr>
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<tr>
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### STATUS REPORT ON IMPLEMENTATION OF IHR CORE CAPACITIES  
**WESTERN PACIFIC REGION**  
Information as of 15 August 2014*

**Data will be updated as official confirmation is received from countries.**

**In 2014, the WHO’s global deadline for submission of the filled questionnaire from countries is 1 August 2014, while the regional deadline for the Western Pacific Region was 20 June 2014.**

**New Zealand has formally provided WHO with a statement that the established core capacities would continue to be maintained in 2014, although the country did not request an extension in 2012.**

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Recommendations for Member States

1. Although substantial progress has been made in the past year there are a number of challenges that remain. Member States are urged to accelerate the implementation of the updated national workplans.

In the last year, Member States have continued implementing their national APSED/IHR/EID workplans with support from partners. This has resulted to improvements in a number of important areas which are described in this progress report.

2. In the context of existing emerging infectious diseases (e.g. H5N1), and the recent emergence of H7N9 and MERS-CoV, and by further utilizing existing capacities developed through APSED, Member States are encouraged to consider the following:

- strengthening capacity for event-based surveillance and indicator-based surveillance, with a focus on the detection of cases and clusters of severe acute respiratory infection and influenza-like illness;
- establishment and strengthening of laboratory referral pathways for specialized detection of unknown pathogens;
- further strengthening the functional coordination mechanism between human health, animal health and other sectors;
- supporting establishment of infection prevention and control policies and practices, including arrangements for surge capacity during outbreaks;
- enhancing effective communication of risk messages to target audiences;
- advocating for government investment in strengthening public health emergency preparedness and response capacities.

Surveillance and laboratory systems for SARI and ILI were strengthened and used in the following events:

- EBS systems enabled Malaysia to detect the first MERS-CoV case in the Western Pacific Region. The case from Malaysia and the suspected case in the Philippines were diagnosed through national laboratory capacities.
- EBS systems enabled China to detect several types of avian influenza.
- The IBS system in Palau helped to rule out avian influenza during the occurrence of an ILI cluster.

Upon request, WHO supported Member States in the international referral of specimens for pathogen confirmation/characterization.

Collaboration mechanisms between human health and animal health sectors have been developed in 25 of 27 Member States. These mechanisms were used in the responses to outbreaks of certain zoonotic threats such as H5N1 in Cambodia in 2013 and 2014, H7N9 in China in 2013 and 2014, anthrax in the Lao People’s Democratic Republic in 2013 and rabies in Viet Nam in 2013.

Several Member States have progressed in the area of infection prevention and control. The focus has been on strengthening national structures to oversee and coordinate work for IPC as well as on developing technical guidelines and conducting training. The Regional Training for Clinical Management of Influenza A (H7N9) and Severe Acute Respiratory Infection held in Nanjing, China and organized by the WHO Regional Office for the Western Pacific had a focus on IPC.
Member States made use of the regional health emergency communications framework developed in 2012–2013 to guide systems development for risk communications at the national level. The countries supported in the past year included Brunei Darussalam, Cambodia, Fiji, Lao People’s Democratic Republic, Mongolia, Philippines, Solomon Islands and Viet Nam.

3. To accelerate the establishment and strengthening of emergency operation centres in ministries of health as a platform to enhance preparedness, response and operational readiness for public health emergencies.

The establishment of emergency operations centre is a lengthy process that involves both the physical (and often costly) upgrade of the location but also the training of staff and development of work processes, such as standard operating procedures.

Considering the above, the Region has progressed well in establishing EOCs within ministries of health. Most Member States have an EOC, albeit with varying degrees of sophistication. With support from ASEF, financial and technical support was provided to Lao People’s Democratic Republic and Mongolia to establish EOCs in the Ministry of Health. In Lao People’s Democratic Republic, the multisectoral and nationwide response to the dengue epidemic included activation of the EOC with daily participation of different departments to coordinate the response activities including enhanced surveillance, clinical management, vector control and risk communication.

In Mongolia, the establishment of the EOC within the Ministry of Health has been included in the annual workplan. A working group was established by ministerial order to oversee and assist EOC operation. Procedures for EOC operation, structure, and incident management system have been drafted.

In Viet Nam, an EOC was established in August 2013 with technical and financial support from US CDC, and WHO supported an exercise. In Cambodia, the EOC is currently located in the CDC Department meeting room. In August 2013 SOPs were drafted. Viet Nam also conducted a functional PanStop exercise with a particular focus on risk communications, using a simulated outbreak of H7N9.

Other Member States including Malaysia, Philippines and Singapore have functioning EOCs.
4. To expand the scope of preparedness planning beyond avian and pandemic influenza in a step-wise manner to cover all emerging infectious diseases. Further, to consider moving towards the development of public health emergency preparedness and response plans that take an all-hazards approach. Important components include risk communications and communication with other ministries.

Member States have started the gradual expansion of their preparedness plans to cover all EIDs and adopt an all-hazards approach.

Cambodia finalized its Pandemic Preparedness Plan, Rapid Containment Plan, and Risk Communication for Pandemic Influenza. Malaysia has started to review and update its National Influenza Pandemic Preparedness Plan. Singapore has in place a national response strategy to an influenza pandemic that involves both health and non-health sectors. Lao People’s Democratic Republic has revised the Inter-Agency Contingency Plan (IACP) in 2014 and conducted a simulation exercise for IACP. Papua New Guinea has developed a public health emergency preparedness and response plan on all hazards with support from WHO.

Yet, it is evident that this area of work requires continuous attention.

5. To strengthen event-based surveillance as part of moving towards an all-hazards approach and establish collaboration with other sectors for risk assessment and response to non-infectious public health events (e.g. food, chemical and radiation safety).

Overall, this is work in progress. Some Member States have started to set up mechanisms to integrate foodborne pathogens into their surveillance system. Most notably, Mongolia has made progress in linking food safety and zoonotic threats into their event surveillance.

The Philippines used its event-based surveillance infrastructure to monitor health threats during the recovery efforts for typhoon Haiyan.

6. To encourage use of the national planning and review process to:
   • update or strengthen current national APSED/IHR plans;
   • develop realistic estimates of required financial and technical resources, and arrangements for robust monitoring and evaluation; and
   • include components to address social determinants of health, including gender.

Member States have made increasing use of the planning and review process to advance the implementation of APSED. Many Member States, including those that have requested an additional IHR extension, have reviewed and updated their national APSED/IHR plans in 2014. These updates include an estimation of required technical and financial resources.

The IHR monitoring questionnaire, reviewed and agreed at multisectoral planning and review meetings, was used to determine the status of IHR core capacity achievement and served as evidence to facilitate a national decision as to whether to seek an additional extension.

Lao People’s Democratic Republic has piloted an outbreak review to learn from the response to the dengue epidemic. Outbreak reviews will be promoted as a practical M&E tool for APSED.
1. To maintain and strengthen WHO’s human and financial capacity to provide immediate and ongoing support to Member States to strengthen surveillance, laboratories, preparedness, coordination and response for current threats such as avian influenza H7N9, H5N1 and MERS-CoV. WHO remains dependent on external resources to finance APSED implementation. The Regional Office has maintained the core staff required to provide technical advice to Member States in surveillance, laboratories, preparedness and coordination for current regional threats.

WHO mobilized experts to support Member States in the response to numerous public health events, either through deployment of staff or sourcing from networks such as GOARN.

The Regional Office’s financial capacity to respond to public health emergencies is limited by the amount of flexible funding available to provide rapid financial support to Member States.

Working closely with partners to ensure sustainable and long-term contributions is therefore vital.

2. To continue to provide support for the establishment and strengthening of emergency operation centres in ministries of health. WHO supported Lao People’s Democratic Republic and Mongolia in establishing their emergency operations centres, including procurement of hardware and renovation.

In addition, through the ASEF antiviral project, a total of 500,000 courses of antiviral drugs and personal protective equipment (PPEs) are maintained in Singapore as a stockpile for rapid containment of pandemic influenza.

3. To take steps to enhance public health preparedness planning through the following:

- support for the establishment of links with other sectors for risk assessment and response to acute public health events;
- support for the development of appropriate guidance;
- cross-programme collaboration.

In light of the expanding scope of information captured by surveillance systems, particularly in the area of food safety, the Regional Office upgraded its SOP for IHR communications to facilitate information-sharing with the International Food Safety Authorities Network (Infosan). In addition, the Regional Office organized an informal consultation in February 2014 to review existing systems and develop practical guidance for strengthening foodborne surveillance for Member States.

In the last year, it coordinated closely among programme units to jointly support the response to public health emergencies as well as natural and man-made disasters. In addition, GOARN was used for the typhoon Haiyan and the Zamboanga conflict in the Philippines, the flooding in Solomon Islands, and the dengue and Zika outbreaks in French Polynesia.
4. To work with partners to provide technical support to Member States in the development and strengthening of the national planning and review process for APSED/IHR implementation plans.

WHO has continued to support Member States in the development and organization of national planning and review meetings. In 2014, six Member States conducted these M&E meetings with the participation of WHO and other partners. Other countries, such as Malaysia and Brunei Darussalam, organized their APSED/EID/IHR meetings with the participation of relevant sectors but without external support.

In January 2014, the WHO Regional Office organized an informal consultation with selected partners, including the Regional Office for South-East Asia, to review and improve the design of the planning and review process based on country experiences. The informal consultation resulted in the finalization of the *M&E Guide for APSED* and its adoption by both WHO regions. The guide was further improved by adding guidance on how to conduct a programmatic outbreak review to learn lessons from responses to public health events and demonstrate existing capacities.

5. To support the mobilization of technical and financial resources for APSED/IHR implementation by developing evidence-based advocacy materials and the economic case for investment in health security.

The brochure “Avian influenza A(H7N9) response: An investment in public health preparedness” was published to highlight lessons learnt from the event and to promote further investment in health security.

A draft advocacy document, “Investing in health security in the Western Pacific”, was developed in 2013. Further refinement is required for publication.

6. To report back to the next meeting(s) of the APSED Technical Advisory Group and related meetings of National IHR Focal Points and emerging infectious disease programme managers on the implementation of the recommendations of this meeting.

The WHO Regional Office has included the actions taken in response to the 2013 TAG meeting recommendations throughout this progress report. This table provides a summary for convenient reference.

7. To produce an annual consolidated report on the status of implementation of previous recommendations for WHO made by the APSED Technical Advisory Group and reviews commissioned by WHO.

The WHO Regional Office is currently producing a consolidated report on the status of implementation of recommendations made by previous TAG meetings and the independent evaluation of APSED in 2010.
8. To identify advanced laboratories in the Region that can serve as reference laboratories to support the detection and characterization of novel agents. WHO is currently preparing for an informal consultation specifically on this topic and has started drafting a workplan for emerging dangerous pathogens detection. The informal consultation is planned to take place in October 2014.

9. To enhance the efficiency of efforts to support Member States through strengthened biregional collaboration. The Regional Offices for South-East Asia and the Western Pacific have been collaborating in certain areas of work from the outset of APSED implementation. Annually, the NIC and zoonoses meetings are held biregionally.

Recently, as a result of the last biregional APSED/TAG meeting in Nepal and the informal consultation on M&E for APSED, an improved M&E system for APSED has been adopted by both regions.
The Regional Meeting of the Asia Pacific Technical Advisory Group on the APSED (2010) was held in Manila, Philippines, from 15 to 17 July 2014. The following are the conclusions and recommendations from the meeting.

**Conclusions**

1. Member States in the Western Pacific Region have progressed well in the implementation of the Asia Pacific Strategy for Emerging Diseases (APSED), as demonstrated in a number of investigations of, and responses to, outbreaks and other public health emergencies. It is heartening that progress towards achieving an integrated system of International Health Regulations (IHR) core capacities/APSED focus areas has continued.

2. Given the challenging time frame for meeting IHR core capacity requirements, nine out of 27 countries in the Western Pacific Region have sought to take advantage of the opportunity for a second extension until 15 June 2016 to achieve the core capacities. The commitment to meet the requirements by 15 June 2016 is reaffirmed through the development of plans to achieve these core capacities.

3. With Member States now past the mid-point of the five-year APSED (2010) work programme, it is time to review progress towards collective objectives for health security and prepare for the ongoing development and maintenance of core capacities to further enhance health security beyond 2016.

4. Recognizing the experiences with emerging and re-emerging diseases in the Western Pacific Region, such as SARS, avian influenza, hand, foot and mouth disease, dengue, measles, Middle East respiratory syndrome coronavirus (MERS-CoV) and other acute public health emergencies, participants reaffirmed the importance of strengthening vigilance, preparedness and response through APSED implementation.

5. Although substantial progress has been made over the past year, a number of focus areas still require further strengthening before the Region can benefit from a strongly functioning system of collective health security. Focus areas needing additional strengthening in some Member States include public health emergency preparedness for non-emerging infectious disease (EID) events such as chemical and radiological emergencies, and capacity-building at points of entry.

6. Participants have recognized the significant efforts and collaboration among governments and development partners (including WHO and other technical, operational and investment partners) to enhance cross-cutting capacity and foster cross-sectoral collaboration under IHR (2005) through APSED implementation. The importance of strengthening existing partnerships and building new partnerships is recognized.
7. Member States have recognized that continuous improvement and maintenance of core capacities is crucial. Systematic and well documented outbreak reviews by Member States provide an opportunity for sharing best practices and lessons learnt, and improving both national and regional preparedness.

8. APSED continues to provide a useful collective framework for addressing public health threats across the Region, and serves as a key tool for mobilizing resources.

Recommendations

To Member States

1. In light of the June 2016 deadline for achievement of IHR core capacities, Member States which have sought IHR (2005) extensions should accelerate implementation of their national workplans towards meeting these capacities, including specific plans to address identified gaps.

2. Those Member States which have not sought extensions should:
   - maintain and, as possible, enhance their existing capacities; and
   - where possible, and upon request, directly support the Member States that have sought extensions to meet their capacity requirements.

3. Member States are strongly encouraged to review their response plans in line with the WHO frameworks for action on avian influenza A(H7N9) and MERS-CoV, and to keep themselves, their health services and the public informed about other potential health security threats such as Ebola virus disease. Specific areas of focus are recommended:
   - Strengthening public health emergency preparedness, including development of all-hazards public health emergency plans, building on pandemic influenza and other existing plans.
   - Strengthening infection prevention and control, clinical management and health service awareness, preparedness and response, in light of the potential for EIDs such as MERS-CoV to cause nosocomial infections and amplify their transmission in health care settings.
   - Strengthening and maintaining IHR capacities at points of entry, and ensuring that points of entry are part of the overall national and local systems for public health emergency event detection and response.

4. Member States should ensure that EID managers and/or National IHR Focal Points have established linkages and arrangements with sectors which contribute to health security, including animal health, environmental health (including chemical and radiological safety), food safety, and emergency management (to address the public health consequences of natural and technological disasters). This should include multisectoral emergency preparedness plans and exercises as appropriate.
5. To demonstrate effectiveness and promote learning, Member States are encouraged to implement the APSED monitoring and evaluation guide, with its emphasis on:

- utilizing the APSED annual planning and review process;
- conducting outbreak reviews as a key tool to illustrate the successful functioning of the integrated system; and
- participating in the upcoming APSED evaluation.

6. Member States should continue to mobilize resources internally and with partners in order to sustain core capacity obligations and achievements.

To WHO

7. In order to effectively support Member States in the implementation of their workplans, WHO should maintain and strengthen its support to countries, particularly those that have requested deadline extensions, to further implement IHR core capacity development through APSED (2010). Specific areas of support should include:

- finalizing and distributing its emergency operations centres (EOC) guide, and supporting Member States’ requests to assess progress in EOC capacity development where possible;
- continuing to conduct the annual IHR communication exercise “Crystal” to test and improve NFP functionality and intersectoral collaboration;
- assisting with the annual IHR/APSED review process at country level; and
- assisting with preparation and conduct of outbreak reviews to demonstrate the effectiveness of the integrated system.

8. WHO should conduct a participatory evaluation with Member States, and utilize the outcomes for the strengthening and maintenance of IHR core capacities.

9. WHO should enhance its readiness to perform alert and response functions, in particular to the ongoing threats of avian influenza, MERS-CoV, and Ebola virus disease; and be prepared to fulfil its WHO Emergency Response Framework requirements.

10. WHO should strengthen interregional collaboration to improve vigilance, information exchange and coordination for emerging threats.

11. WHO should encourage investment partners to reaffirm their commitment to supporting regional health security.