

# Emerging infectious diseases: **Novel coronaviruses**

Report of a regional workshop  
*Colombo, Sri Lanka, 8–10 October 2013*



**World Health  
Organization**

Regional Office for South-East Asia

SEA-CD-297  
Distribution: General

# Emerging infectious diseases: Novel coronaviruses

*Report of a regional workshop  
Colombo, Sri Lanka, 8–10 October 2013*

© **World Health Organization 2014**

All rights reserved.

Requests for publications, or for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – can be obtained from SEARO Library, World Health Organization, Regional Office for South-East Asia, Indraprastha Estate, Mahatma Gandhi Marg, New Delhi 110 002, India (fax: +91 11 23370197; e-mail: [searolibrary@who.int](mailto:searolibrary@who.int)).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

This publication does not necessarily represent the decisions or policies of the World Health Organization.

Printed in India

# Contents

	<i>Page</i>
Acronyms .....	v
1. Introduction.....	1
2. Inaugural session and opening remarks .....	1
2. Objectives .....	2
3. Epidemiology of newly emerging infectious diseases .....	2
3.1 Overview: An update on emerging infectious diseases in the South-East Asia Region .....	2
3.2 Global overview of the Middle East respiratory syndrome coronavirus .....	4
3.3 Lessons learnt from the Middle East respiratory syndrome coronavirus .....	5
3.4 Influenza A(H7N9) .....	6
4. Country presentations .....	7
4.1 Bangladesh.....	7
4.2 Bhutan .....	8
4.3 Democratic People’s Republic of Korea.....	9
4.4 India .....	10
4.5 Indonesia .....	11
4.6 Maldives.....	11
4.7 Myanmar.....	12
4.8 Nepal.....	14
4.9 Sri Lanka .....	15
4.10 Thailand.....	16

5.	Emerging infectious diseases in the South-East Asia Region .....	16
5.1	Crimean-Congo haemorrhagic fever (CCHF) .....	16
5.2	Nipah virus .....	18
5.3	WHO interim guidance: Pandemic influenza risk management .....	18
6.	Operational planning .....	19
6.1	Panel: Surveillance and laboratory .....	19
6.2	Contribution of field epidemiology Training Programme to support public health emergency response .....	21
6.3	Risk communication .....	23
6.4	Case management and infection prevention and control.....	24
6.5	Mass gatherings.....	24
6.6	Contribution of WHO Collaborating Centres to support public health response to emerging infectious diseases.....	26
7.	Strengthening preparedness and response .....	27
8.	Conclusions and recommendations .....	40
9.	Closing session .....	43

### **Annexes**

1.	Agenda.....	44
2.	List of participants .....	45

## Acronyms

AFRIMS	Armed Force Research Institute of Medical Sciences, Bangkok, Thailand
ARI	acute respiratory infection
ASEAN	Association of South-east Asian Nations
BOE	Bureau of Epidemiology
BSL	biosafety level
CCHF	Crimean-Congo haemorrhagic fever
CEU	Central Epidemiology Unit
EDPLN	Emerging Dangerous Pathogen Laboratory Network
EIDs	Emerging infectious diseases
FAO	Food and Agriculture Organization
FETP	Field Epidemiology Training Programme
HPA	Health Protection Agency
IDSP	Integrated Disease Surveillance Project
IEC	Information, education and communication
IEDCR	Institute of Epidemiology, Disease Control and Research
IHR	International Health Regulations
ILI	influenza-like illness
IPC	infection prevention and control
MERS-CoV	Middle-East respiratory syndrome coronavirus
NCDC	National Centers for Disease Control, Atlanta, USA
nCoV	novel coronavirus
NIH	National Institute of Health, Bangkok, Thailand
NIV	National Institute of Virology, Pune, Maharashtra, India
PCR	polymerase chain reaction

PoE	points of entry
PPE	personal protective equipment
RRT	rapid response teams
RT-PCR	reverse transcription polymerase chain reaction
SARI	severe acute respiratory infection
SARS	severe acute respiratory syndrome
SOPs	standard operating procedures
SRRT	surveillance and rapid response team
UNICEF	United Nations Children's Emergency Fund
WHO	World Health Organization
WHO-HQ	WHO Headquarters

## **1. Introduction**

Since the 1970s, more than 40 new emerging infectious diseases (EIDs) have been identified globally. For the South-East Asia Region, the newly emerging infectious diseases – avian influenza A(H5N1), avian influenza A(H7N9) and Middle-East respiratory syndrome coronavirus (MERS-CoV) – pose serious public health threats, among many other diseases. To strengthen regional capacity to respond to these new diseases, WHO organized a regional workshop on emerging infectious diseases: novel coronaviruses, from 8 to 10 October 2013 in Colombo, Sri Lanka. This report summarizes the deliberations and highlights the need to develop and sustain IHR core capacities to strengthen national and regional health security.

## **2. Inaugural session and opening remarks**

The overall objective of the regional workshop was to strengthen regional capacity to respond to EID. The inaugural session included a welcome speech by Dr Nihal Jayathilaka, Secretary, Ministry of Health, Sri Lanka.

The opening address was delivered by Dr Samlee Plianbangchang, Regional Director, WHO Regional Office for South-East Asia. He highlighted that infectious diseases are spreading geographically much faster than in the past, while also noting the heightened concern over the emergence and potential spread of influenza A(H7N9) in the People's Republic of China and the Mediterranean respiratory syndrome coronavirus (MERS-CoV) in the Middle East. This highlights the need for Member States to strengthen their country core capacities in order to support full implementation of the International Health Regulations (IHR 2005).

The objectives of the regional workshop were explained by Dr Rajesh Bhatia, Director, Department of Communicable Diseases, WHO Regional Office for South-East Asia.



Dr Paba Palihawadana, Ministry of Health, Sri Lanka, Professor Be-Nazir Ahmed, Ministry of Health and Family Welfare, Bangladesh, and Dr Aishath Aroona Abdulla, Ministry of Health, Republic of Maldives were elected as Chair, Co-chair, and Rapporteur of the workshop, respectively. (See list of participants at Annex 1)

## **2. Objectives**

The overall objective of the meeting was to strengthen regional capacity to respond to EID.

The specific objectives were to:

- (1) discuss the epidemiology of new EID (novel corona and influenza viruses);
- (2) review national and regional preparedness in detection and response to new EID; and
- (3) identify and agree on public health actions to ensure effective management of events related to the new EID.

(See agenda at Annex 2)

## **3. Epidemiology of newly emerging infectious diseases**

### **3.1 Overview: An update on emerging infectious diseases in the South-East Asia Region**

The Asia–Pacific Region is an epicentre for EID and natural disasters, with an increasing incidence and recognition of public health events related to food, chemical and radiation safety, antimicrobial resistance, significant increases in regional travel and trade, and the impact of climate change.

Newly emerging infectious diseases including avian influenza A(H5N1), Nipah virus, avian influenza A(H7N9), and MERS-CoV pose serious public health threats to the Region. At the same time, other

outbreaks of diseases known to be epidemic-prone continue to occur, including for example, dengue; chikungunya; hand, foot–and mouth–disease; cholera; leptospirosis; typhoid; anthrax; meningococcal encephalitis and Japanese encephalitis.

In the South-East Asia Region, during 1 July 2012–15 July 2013, a number of significant public health events were reported, including Crimean-Congo haemorrhagic fever (CCHF), scrub typhus and acute jaundice syndrome in the Indian states of Gujarat, Rajasthan and Maharashtra, respectively; avian influenza in Indonesia; acute febrile syndrome in the states of Karen and Mon in Myanmar; cholera in Nepal; viral encephalitis in 13 districts of Bangladesh; and hand, foot and mouth disease in three provinces of Thailand, as well as diphtheria in seven provinces in the country.

The International Health Regulations (2005) are an internationally agreed instrument for global public health security and are legally binding for all WHO Member States since June 2007. IHR (2005) requires countries to report certain kinds of events and requires WHO to provide assistance should Member States request it. Countries are also required to establish capacities to detect and respond to public health events (according to a defined timeline). All South-East Asia Region Member States requested an extension until June 2014 to establish the core capacities.

The Asia–Pacific Strategy for Emerging Diseases is a common bi-regional strategy for managing threats from EID and guiding the strengthening of IHR core capacities.

In conclusion, 10 years after the emergence of severe acute respiratory syndrome (SARS), EID continue to occur globally and in the Asia–Pacific Region. New infectious diseases will continue to emerge and cause public health emergencies, with potential regional and global consequences. Therefore, country preparedness and intercountry collaboration are crucial to ensure health security in the Asia–Pacific Region.

### **3.2 Global overview of the Middle East respiratory syndrome coronavirus**

Many coronaviruses have been described in animals, but only four primary ones have been found in humans. The novel MERS-CoV was first reported in Saudi Arabia in a patient who died of acute respiratory distress syndrome and renal failure. The specimen was confirmed by a laboratory in the Netherlands. The second case was reported a week later in a patient from Qatar who also developed acute respiratory distress syndrome and renal failure and was transferred to the United Kingdom for treatment.

Globally, during September 2012–4 October 2013, WHO was informed of 136 laboratory-confirmed cases of infection with MERS-CoV, of which 58 resulted in death.

Human-to-human transmission clearly occurred in many clusters, but clusters do not appear to spread into the community. At this point, it was not possible to determine if the current transmission pattern is due to unrecognized transmission persisting in humans or an unrecognized animal reservoir with sporadic introductions. Recent genetic analysis supports multiple introductions with subsequent human-to-human clusters.

The source of the virus is yet to be identified. Serological testing in animals found MERS-CoV reactive antibody in camels. Bats were found to harbour large quantities of coronavirus and may be the ultimate reservoir species.

In summary, the transmission pattern of MERS-CoV is consistent, but the recent increase in sporadic cases concerns multiple sporadic cases associated with sizeable household and health-care facility outbreaks. Genomic data support multiple introductions rather than sustained human-to-human transmission but are not definitive. Cases in guest workers raise concerns about exportations to countries with limited capacity to detect and respond. There is an urgent need for improved infection control in health-care facilities and homes, including in countries with high numbers of visiting pilgrims and foreign workers. The current knowledge gaps place the world at risk; therefore, it is very important to investigate in order to identify exposures that result in infection.

### **3.3 Lessons learnt from the Middle East respiratory syndrome coronavirus**

In the Eastern Mediterranean Region, a number of emerging disease outbreaks were reported during 2010–2011, including avian influenza, cholera, meningococcal meningitis, dengue fever, chikungunya, CCHF, yellow fever, Ebola haemorrhagic fever, plague, West Nile virus and Rift Valley fever.

As for MERS-CoV, the Region had been experiencing the emergence of a novel respiratory viral infection since 2012. The affected countries were Jordan, Qatar, Saudi Arabia, Tunisia and the United Arab Emirates. The virus is considered highly pathogenic, as it resulted in a high case-fatality rate and has the potential to evolve and spread: patients from the Middle East were reported in France, Germany, Italy and United Kingdom.

A technical consultative meeting on novel coronavirus (nCoV) infection was organized in Cairo, Egypt, 14-16 January 2013 to discuss the epidemiology of the disease, virological and animal investigation, the development of laboratory tests, and risk communication and preparedness.

An intercountry meeting on the Middle-East respiratory syndrome coronavirus (MERS-CoV) outbreak in the Eastern Mediterranean Region was organized from 24 to 26 June 2013 in Cairo to update Member States on the current level of preparedness, to share currently available scientific information, and to discuss practical steps on strengthening surveillance.

The primary recommendations from the meeting included enhancing surveillance and testing for early detection, developing and participating in free and open data sharing, furthering the development of diagnostic assays, and ensuring international cooperation and collaboration as envisaged by IHR (2005).

Information on MERS-CoV and other emerging infectious disease outbreaks in the Eastern Mediterranean Region was regularly published in the *Weekly Epidemiological Monitor Bulletin* produced by the WHO Eastern Mediterranean Regional Office (<http://www.emro.who.int/surveillance-forecasting-response/meeting-reports/>).

In order to widen laboratory-testing capabilities, three training sessions on laboratory diagnosis of MERS-CoV were organized. Countries that have insufficient capacity should send specimens to neighbouring countries with full laboratory capacity.

Based on the current assessment, there are some issues concerning sporadic infections that have no history of animal contact, multiple clusters (in families, as well as in health-care facilities), and a lack of adequate evidence for limited person-to-person transmission in some clusters.

The lessons learnt from the MERS-CoV outbreak with respect to early detection are to establish and/or strengthen active surveillance for severe acute respiratory infections (SARI) and expand the sentinel sites – e.g. to include intensive care units as well as to build testing capabilities and a network of laboratories within the Region for sample shipment, retesting, reference services, etc.

Evidence suggests that more effective approaches include collecting lower respiratory tract specimens (bronchoalveolar lavage, sputum) as opposed to upper respiratory tract specimens (nasal, nasopharyngeal or oropharyngeal swabs), as well as repeating and sequential testing of suspect cases whose initial upper respiratory specimens were negative for MERS-CoV and in patients with known aetiology and worsening illness. All negative samples including blood samples should be preserved, if possible, for future testing if needed.

Development of a risk communication strategy is required to alert communities at risk, health workers and the media.

### **3.4 Influenza A(H7N9)**

On 31 March 2013, China notified WHO of three cases (including two deaths) of human infection with avian influenza A(H7N9) virus. All three patients presented with respiratory tract infection with progression to severe pneumonia. As of 20 September 2013, a total of 135 cases of avian influenza A(H7N9) had been reported, including 45 deaths (case-fatality rate of 33%).

According to WHO risk assessment (as of 7 June 2013), further sporadic human infections of the influenza A(H7N9) virus were expected. There was no evidence of sustained human-to-human transmission. While it is possible that an infected person could travel to another country, extensive community spread is unlikely. WHO did not advise special screening at points of entry (POE), nor did it recommend any travel or trade restrictions.

## **4. Country presentations**

### **4.1 Bangladesh**

Efforts are being made in Bangladesh to strengthen surveillance, laboratory and outbreak investigation of EID in both human and animal sectors. The country has an effective surveillance system for influenza in place, including influenza-like illness (ILI) and SARI surveillance. Laboratory capacity for diagnosis of priority diseases such as polio, measles, Nipah virus and MERS-CoV is available in two biosafety level 3 (BSL-3) laboratories along with well-trained personnel. However, some of the remaining challenges include inadequate diagnostic service for patient care, inadequate number of diagnostic laboratories and inadequate laboratory personnel.

A national preparedness and response plan has been developed with the involvement of other sectors, and a coordination mechanism for response capacity and risk communication have been established. The plan includes identification of health-care providers and logistics arrangement during emergency event; i.e. drugs, vaccines, personal protective equipment (PPE), etc. A national strategy on specific diseases, action plans and guidelines were also developed. Isolation units and wards were established throughout the country and health-care personnel and health managers were trained on case management and infection prevention and control (IPC). Orientation and exercises on risk communication were conducted. Challenges are related to coordination between the surveillance mechanism and programmes (elimination/control) and funding support.

## **4.2 Bhutan**

Bhutan has a sentinel ILI and SARI surveillance system in place, with 11 sites chosen as ILI and SARI surveillance sites as per the geographical location, climatic condition, population and patient referral. The Public Health Laboratory is the national reference laboratory for influenza virological surveillance including influenza A(H7N9) and MERS-CoV, and provides diagnostic support to the regional and district laboratories. Clinicians in ILI and SARI surveillance sites have been trained in case identification. Laboratory technicians have been trained in sample collection, storage and transportation. Guidelines were developed and distributed to health workers. However, there are no focal units in hospitals for reporting, and samples from sentinel sites for influenza virological surveillance are often inadequate.

For surveillance activities in the livestock sector, all relevant stakeholders were sensitized on influenza A(H7N9) status; surveillance guidelines prepared; laboratory staff trained in sample collection, transportation and diagnosis; and surveillance and preparedness strategies integrated into the National Influenza Pandemic Preparedness Plan for influenza A(H5N1). Risk-based surveillance was undertaken in May and June 2013 for influenza A(H7N9) and the National Centre for Animal Health was designated as the national laboratory for influenza A(H7N9) diagnosis and surveillance.

For case management, influenza cases are managed as per guidelines and severe cases are managed at hospital settings. For the livestock sector, as per the Plan, the methods are culling, disposal, decontamination. Public awareness is raised through information, education and communication (IEC) methods such as audiovisual programmes, posters, radio, newspaper and sometime street shows. Assessment for IHR implementation at airports and some highway PoE has been carried out.

The main challenges are in human resource development for surveillance, risk assessment and laboratory diagnosis.

### **4.3 Democratic People's Republic of Korea**

Sentinel sites for influenza and SARI surveillance are set up at national, provincial and district levels. Health workers visit the sites once a week to collect data and specimens. Specimens are sent to and tested by the reference laboratory in the Central Hygiene and Anti-epidemic Institute.

In April 2013, a poultry outbreak of influenza A(H5N1) avian influenza was reported at Pyongyang Tudan Duck Plant. It resulted in the slaughtering of about 2000 breeding ducks, 42 000 fattening-up ducks and 120 000 ducklings. However, no human infection was found. So far, no human infection with MERS-CoV has been seen in the Democratic People's Republic of Korea.

The Central Hygiene and Anti-epidemic Institute has a BSL-2 laboratory for influenza, measles, rubella, polio and mumps. Handling and transport of specimens are performed in accordance with the guidelines of WHO.

A strategy for IHR (2005) implementation and general disease surveillance, as well as a control strategic plan, have been developed and implemented. The public health authority works in close collaboration with anti-epizootic, education sectors, the State Quality Supervision Board and social organizations. The State Quality Supervision Board is also responsible for surveillance and screening of commodities at POEs in airports, seaports and borders.

National guidelines for control of infectious diseases and for prevention of communicable diseases have been developed and implemented. Patients with acute respiratory infections (ARI) were cared for in isolation wards in central, provincial and county (district) health-care facilities. The Ministry of Public Health had developed educational materials, standard forms and guidelines for the implementation of IHR (2005). The general population obtains essential information about preventive measures, hygiene and other relevant issues through mass media (TV, radio).

Travellers from abroad (especially the Middle East) are requested to complete a health declaration form which is then examined by anti-



epidemic workers at PoEs in seaports, airports and ground crossings. Precautions and hygienic education are given to travellers who are going to the epidemic/endemic areas.

A regular national hygienic and anti-epidemic system has been further consolidated in the Democratic People's Republic of Korea. However, there is a shortage of equipment, diagnostic tools and testing reagents for surveillance. Public health and other sector authorities and workers did not receive WHO updated guidelines and forms in time.

#### **4.4 India**

In India, there are state and district surveillance officers in all 35 states and union territories under the Integrated Disease Surveillance Project (IDSP). ILI and SARI surveillance are in place, and reports on epidemic-prone diseases and outbreaks are published weekly. A situation review in the Joint Meeting Group on influenza A(H7N9) and expert group review for Hajj on MERS-CoV were also conducted.

There are also nodal officers at 15 designated POEs and at 12 and 27 laboratories under the National Centre for Disease Control and the Indian Council of Medical Research, respectively. Diagnostic capability and kits for influenza A(H7N9) and MERS-CoV are available at the national level. Hospitals and health facilities in states are alerted for early reporting and referral. Infection prevention guidelines were developed and are part of national plan.

Guidelines on MERS-CoV were developed and issued for the Hajj pilgrimage during departure, while in Saudi Arabia and during arrival, as well as for the Hajj committee, health units, immigration officials and airlines. Training of 135 medical officers accompanying pilgrims was conducted. Advice on self-reporting during arrival was developed for Hajj pilgrims. Hospitals and laboratories are linked to PoE to provide necessary medical services.

For risk communication, the Ministry of Health and Family Welfare established a 24/7 media-screening unit under the IDSP. The unit regularly communicates with media sources.

## **4.5 Indonesia**

The country established ILI sentinel surveillance sites in 30 primary health centres in 26 provinces, SARI sentinel surveillance sites in 12 hospitals in seven provinces, and a network of 44 laboratories in 21 provinces. For avian influenza, the ministries of health and agriculture coordinate on outbreak investigation and contact tracing.

A contingency plan and national guidelines on preparedness and response of MERS-CoV were developed and distributed to hospitals, port health offices, and laboratories in 33 provinces.

For case management, efforts were made to strengthen the capacity of national authority and local health-care facilities by supporting the national IPC committee and its network, facilitating standardized trainings on IPC and hospital acquired infection surveillance and providing of necessary supplies; i.e. PPE and drugs.

At several PoE, simulation exercises were conducted to test standard operating procedures (SOP) in each agency for handling outbreaks of influenza A(H1N1) and influenza A(H5N1) and reviewing the coordinating functions of relevant sectors. The main challenges are in sustaining coordination with other sectors and delivering continuous information to all travellers.

## **4.6 Maldives**

The country has established indicator-based surveillance including ARI, SARI, and other new emerging diseases (as notifiable diseases). Influenza and ILI surveillance are being strengthened. Event-based surveillance is not formally established.

Laboratory diagnosis capacity is available at the National Public Health laboratory and National Influenza Center. Both are BSL-2 laboratories. Networks with other reference laboratories are also established for transporting samples abroad under International Air Transport Association standards when tests cannot be done in Maldives.

The current national influenza preparedness plan was developed in 2009 and the vaccine deployment plan in 2011. The action plan for MERS-CoV preparedness was also developed and distributed in 2013. Training sessions on MERS-CoV were also organized for health personnel. Coordination mechanism with other sectors is through the IHR committee, which includes the Ministry of Agriculture, the Maldives National Defence Force and the Ministry of Environment. An action plan for MERS-CoV has been prepared and disseminated through training sessions. The roles of port health authorities at four international seaports and four international airports are defined in the national pandemic preparedness plan and staff are updated on the MERS-CoV situation and action plan. Information, education and communication materials for risk communication are developed for use during outbreaks.

Indira Gandhi Memorial Hospital is the main referral hospital that can efficiently handle serious and critical cases. However isolation facilities are limited and not ideal for critically ill patients. Universal precautions and hand hygiene are well practised and alcohol-based rubs are available throughout hospitals. National Infection Prevention and Control guidelines and a monitoring tool are being piloted. Medical supplies such as N95 masks, surgical masks, gloves and gowns are available, but there is no influenza vaccination policy for health workers. Management of hospital waste needs improvement.

The main challenge is to build human resources capacity for emergency preparedness and response, multisectoral coordination, hospital infection control and laboratory standards.

#### **4.7 Myanmar**

National legislation on EID in the context of IHR includes the Public Health Law (1974), the Prevention and Control of Communicable Disease Law (1995), and the Law Amending the Prevention and Control of Communicable Disease Law (2011).

In March 2003, the National Preparedness Plan for Prevention and Control of SARS was developed. Later in January 2004, a national pandemic preparedness plan was developed, then updated in 2010 and

2011. The Business Continuity Plan and Vaccine Deployment Plan were developed in 2012.

The national diseases surveillance system includes reports from both the government sector (i.e. human and animal health and agriculture), and private sector. There are 17 diseases under national surveillance. An early warning alert and response system (indicator-based surveillance system) and event-based surveillance, including media sources and rumours, provide immediate feedback from the periphery level (basic health staff, communities and nongovernmental organizations) to the Ministry of Health through the IHR focal point.

The surveillance system collaborates with international networks, including the Mekong Basin Disease Surveillance Network, the Greater Mekong Sub-region, the Association of Southeast Asian Nations +3 Field Epidemiology Network (ASEAN+3 FETN) and the ASEAN Infectious Diseases Network. Joint rapid response training was organized with neighbouring countries in 2013. A tabletop exercise was conducted in collaboration with the Livestock Breeding and Veterinary Department and other stakeholders. In order to strengthen the community-based surveillance system and response capacity by expanding rapid response teams (RRTs) at the township level, two weeks' training of field epidemiology was organized for 88 doctors, 175 nurses and 20 veterinarians during 2008–2013.

The National Influenza Centre was established in 2008 at the national health laboratory (BSL-2) for surveillance of seasonal influenza viruses as well as ILI and SARI. The laboratory received technical support from FluNet and other international reference laboratories.

The National Infection Control Committee was established in 2009. During 2006–2009, intensive care units and isolation wards in 18 hospitals were upgraded. Disease notification and surveillance information are now shared with hospitals and PoE.

Risk communication for significant events such as public health emergencies and disasters such as the Hajj and South-East Asian Games were provided through public media authorities. SOP are in place and IEC materials were developed and distributed.

Coordination and collaboration mechanisms with related authorities, e.g. immigration, custom, police and transport authorities, were established and assessed at designated POEs, including two airports, one seaport and five ground crossings.

## **4.8 Nepal**

A number of surveillance systems are established in the country, such as early warning and reporting system, vaccine-preventable diseases surveillance and ILI/SARI surveillance by the National Influenza Surveillance Network and other vertical programme surveillance systems. In 2013, a policy on integration of disease surveillance was developed to harmonize the national surveillance system. The National Public Health Laboratories established a BSL-2 laboratory as the national influenza centre for surveillance of influenza virus and other EID including MERS-CoV. However, improving diagnosis of priority EID requires strengthening and networking of laboratories.

Rapid response teams at different levels of the health system exist for emergency response during outbreaks of communicable diseases and other public health emergencies of national and international concern. Prepositioning and buffer stock of logistics and drugs (antibiotics, antivirals, etc.) are part of the regular programme of the ministry of health.

Protocols as well as treatment guidelines are available for management of many communicable diseases of public health importance. A hospital IPC committee exists at the national level, but it needs reactivation. Surge capacity during outbreaks and emergencies also needs to be established.

The National Health Education and Communication Center is the national focal point for developing risk communication messages and works jointly with the Epidemiology and Disease Control Division to develop IEC materials and disseminate them through different channels.

Nine strategic PoE (eight ground crossings with India and China and one international airport) have been assigned based on the flow of people and goods through them. Multisectoral meetings with involvement of

relevant ministries have been held. The Ministry of Veterinary and Agriculture have quarantine units at strategic border crossings.

## **4.9 Sri Lanka**

Human disease surveillance (epidemiological and laboratory components) is established at 19 selected sentinel sites for ILI and three sites for SARI. Animal disease surveillance (routine and outbreak) is carried out by the Department of Animal Production and Health of the Ministry of Livestock. The Medical Research Institute and Veterinary Research Institute are laboratory counterparts with capacity for reverse transcription polymerase chain reaction (RT-PCR) testing for influenza viruses, including influenza A(H7N9).

Awareness of EID was heightened among Hajj-Umrah pilgrims and Middle-East workers through an informative leaflet distributed through mosques and travel agencies. The Foreign Employment Bureau carried out a similar awareness-raising campaign among people going to work in the Middle-East.

The national preparedness and response plan was developed in 2004 in collaboration with the Ministry of Livestock Development and was guided by respective national plans, the National Influenza Preparedness Plan of the Ministry of Health and the Sri Lanka Exotic Disease Emergency Plan of the Department of Animal Production and Health. The Plan is supervised and coordinated by the National Technical Committee, which has representatives of all stakeholders as members. Business continuity plans are being developed in non-health sectors.

Case management and infection control protocols were developed for all relevant EID and distributed to all hospitals. Public awareness on relevant EID of various target audiences was enhanced through appropriate communication channels including mass media, printed materials and websites. Finally, relevant airport and seaport staff at PoE were trained on IHR (2005), and voluntary screening of certain diseases (e.g. malaria) was established.

## **4.10 Thailand**

Integrated indicator-based surveillance, and event-based surveillance, including ILI surveillance, exist, albeit without specific surveillance for SARI is conducted. New emerging diseases such as influenza A(H7N9), influenza A(H5N1) and MERS-CoV are included. Surveillance and rapid response teams (RRT) and communities were oriented on follow-up of all illness conditions in pilgrims returning from the Hajj.

The Asia-Pacific Strategy for Emerging Diseases and one health concept have been integrated in the current national preparedness and response plan to EIDs (2013–2016). The plan covers EID such as avian influenza, pandemic influenza A(H1N1), influenza A(H7N9) and MERS-CoV. A national simulation exercise on MERS-CoV preparedness was conducted on 6 September 2013, with participation of representatives from relevant sectors.

Hospital preparedness for EID includes capacity-building and surge capacity (i.e. training of staff, list of special clinicians and stockpile of essential medical supplies).

The Ministry of Public Health changed its risk communication strategy from a reactive approach to a more proactive one, whereby all announcements, advice, situation updates and technical information were released by the appointed spokesman and also disseminated to the public via mass media. Multi-languages health advice for travellers, including Arabic and Chinese language version, are available at major PoE.

## **5. Emerging infectious diseases in the South-East Asia Region**

### **5.1 Crimean-Congo haemorrhagic fever (CCHF)**

CCHF is a fatal, zoonotic, tick-borne viral haemorrhagic fever caused by Nairovirus. The disease was first found in Crimea in 1944–1945 (Whitehouse et. al., 2004) and in the Democratic Republic of the Congo in 1969. The disease has epidemic potential including nosocomial outbreaks

and a high case-fatality rate (10–40%), and is endemic in many countries in Africa, Europe and the Middle East. Outbreaks are reported from more than 30 countries. Humans are the only known host of the CCHF virus in which disease is manifested.

In January 2011, there was a report of two deaths in India with unusual clinical presentation from a hospital in Ahmedabad, Gujarat. A total of 14 cases of CCHF were identified, out of which 10 were positive for CCHF virus, two were negative for CCHF virus and in two instances, samples could not be taken because of early deaths. The case-fatality rate was 35.71% (5 deaths). Cases were reported in the middle-age group only. Environmental investigation also confirmed the presence of CCHF virus in ticks.

During July–September 2013, seven outbreaks had been reported from four districts of Gujarat State, including Amreli, Kutch, Patan and Surendranagar.

The prevention and control measures instituted included the following:

- (1) Agricultural workers and others working with animals took protective measures such as wearing gloves or other protective clothing and use of insect repellents containing *N*-Diethyl-*meta*-toluamide to prevent skin contact.
- (2) Patients with suspected or confirmed CCHF were isolated and cared for, using nursing barrier techniques.
- (3) People living in endemic areas used personal protective measures and insect repellents.
- (4) Specimens of blood or tissues taken from patients for diagnostic purposes were collected and handled using universal precautions.
- (5) Health workers used proper infection control precautions to prevent occupational exposure.
- (6) Efforts were made to raise awareness among the community and medical professionals.



The experiences suggested that early reporting, proper case management and timely institution of prevention and control measures with an intersectoral approach contributed to the success in preventing the further spread of disease.

## **5.2 Nipah virus**

Nipah virus is a new emerging viral zoonotic disease. The first outbreak of Nipah virus was identified in Nipah village, Malaysia in 1998. Almost all patients had a history of contact with sick pigs and presented primarily with clinical signs and symptoms of encephalitis; 39% of patients died from the disease. Bats were found to be the reservoir and pigs were likely the amplifying host. Nipah virus has been reported from four countries in the world including Australia, Bangladesh, India and Malaysia.

Bangladesh is the only country that currently reports Nipah virus. Outbreak was reported as seasonal (December–May). Many patients had a history of drinking contaminated date palm juice or fruit partially eaten by bats. There were also reports of human-to-human transmission (between patient and health worker and during handling of the deceased).

Currently, strategies for prevention of Nipah virus transmission include early case detection through various surveillance systems, outbreak investigation, improved case management and infection prevention, and control measures at the household/community/hospital levels, as well as a public awareness-raising campaign.

## **5.3 WHO interim guidance: Pandemic influenza risk management**

With the emergence of new respiratory pathogens, flexible plans that can apply to other hazards are needed. WHO is shifting toward an all-hazards, multisectoral approach, including emergency risk management.

The 2013 guidance promotes an all-hazards approach, provides guidance on risk assessment (including severity), introduces flexibility in planning and response based on national risk assessment, and unlinks response from phases. It builds upon IHR core capacity development,

incorporates new developments such as the Pandemic Influenza Preparedness Framework, strengthens the whole-of-government and society approach, and use global phases as a tool for communication.

In summary, the revised guidance is based on a risk assessment approach that will require individual national governments to assess the risk. Each country will likely be in a different stage of involvement at any point in time. WHO will provide risk assessment based on data gathered from Member States and the WHO risk assessment will provide a profile of the event describing critical features needed for assessment.

## **6. Operational planning**

### **6.1 Panel: Surveillance and laboratory**

#### ***Laboratory support for surveillance – National Institute of Virology, Pune, India***

The National Institute of Virology in Pune, India is a BSL-3 laboratory, and a member of the national laboratory surveillance networks for influenza, measles, hepatitis and enteric diseases. The institute participates in other collaborative global activities of WHO; i.e. the WHO Collaborating Centre for Emerging Infectious Diseases, the WHO Collaborating Centre for viral haemorrhagic fevers and arbovirus infections, the WHO H5 Reference Laboratory Network, and the WHO Emerging and Dangerous Pathogens Laboratory Network (EDPLN).

The Institute supports the surveillance system by providing quick diagnoses and capabilities for pursuing further work for identifying unknown etiological agents, providing laboratory data that can serve as an early warning signal, and notifying concerned authorities of any unusual findings or outbreaks.

At present, the laboratory surveillance networks are able to provide resources needed for diagnosis of new EID (primers, probes and controls) in a timely manner for early detection and characterization of viruses, as well as information-sharing. Such sharing can also help with clinical

management, logistics, workload distribution among the laboratories and institution of public health policies. The network is strengthened through training and instant online support for troubleshooting.

***Laboratory preparedness – National Institute of Health, Bangkok, Thailand***

In response to MERS-CoV outbreak, the Thai Ministry of Public Health organized a meeting on 26 September 2012 to assess the situation and make preliminary recommendations. Each public health sector was assigned responsibilities to prepare necessary guidelines, including (1) guidelines for surveillance and risk assessment, case definitions, specimen collection and transportation, laboratory diagnosis, (2) public health intervention and risk communication, 3) health advice for travellers to the affected region (e.g. pilgrims to the Hajj, Thai workers in the Middle East) and (4) clinical management and IPC.

The laboratory, located at the Department of Medical Science, Ministry of Public Health, Thailand has facilities for polymerase chain reaction (PCR) testing, virus isolation, and gene sequencing. Among the 14 regional centres/laboratories of the laboratory network, all laboratories have PCR facilities and 2 laboratories have gene-sequencing facilities. Fact sheets and guidelines for real-time RT-PCR detection, reagents and positive control were distributed to all regional centres.

Challenges included setting up of confirmatory tests for patients with a very clear epidemiological linkage but negative PCR results, false positives from cross-reaction within the genus, and surge capacity.

***Information sharing and network collaboration – Armed Force Research Institute of Medical Sciences, Bangkok, Thailand***

The Armed Force Research Institute of Medical Sciences (AFRIMS) is a WHO Collaborating Centre for diagnostic reference, training and investigation of EID. The Institute was founded as the result of a mutual agreement between the Thai and United States governments to battle a widespread cholera epidemic in Bangkok and Thonburi during 1958–1959.

AFRIMS develops and attempts to improve surveillance system/networks throughout South and South-East Asia to monitor a number of infectious diseases, including respiratory illness (especially influenza), malaria, enteric pathogens and febrile illness. In the South-East Asia Region, it collaborates with the Royal Thai Army, the ministries of public health and agriculture of Thailand, the Ministry of Health, the Republic of Maldives, the Ministry of Health and population of Nepal and the WHO Regional Office for South-East Asia.

Surveillance findings from AFRIMS collaborative projects are routinely provided to the respective health, agriculture and defence ministries of host countries, as well as to WHO.

## **6.2 Contribution of field epidemiology Training Programme to support public health emergency response**

### ***Bangladesh***

In collaboration with the Centers for Disease Control and Prevention, Atlanta, USA and with the support of the US government, the Institute of Epidemiology and Disease Control Research, Bangladesh launched a two-year Field Epidemiology Training Programme (FETP) in 2013. The initial focus was on government physicians, with plans to include veterinarians, laboratory technicians and others in the future. Trainees would spend approximately 20% in the classroom and 80% in a field placement. A total of five candidates were recruited in the first batch. The programme was seeking university affiliation to confer a Masters of Applied Epidemiology.

### ***India***

There are two FETPs in India conducted by the National Centre for Disease Control in Delhi and the National Institute of Epidemiology in Chennai.

The National Centre for Disease Control has been a WHO Collaborating Centre for Epidemiology and Training for South-East Asia Region since 1996. The institute provided field epidemiology training of various durations for different public health personnel, i.e. a two-year Master of Public Health (MPH, Field Epidemiology) with Guru Gobind

Singh Indraprastha University, a three-month regional field epidemiology training session for medical doctors, a four-week field epidemiology training session for paramedics and a two-week field epidemiology training session for IDSP nodal officers.

The Master of Public Health programme (MPH, Field Epidemiology) started in 2005. The programme was assignment-based, and trainees had opportunities to experience real-time outbreak situations and were closely mentored by scholars. Over 60% of the programme involved field work.

FETP provided the country with public health personnel with a high degree of technical competence. Many held senior positions in national health programmes at different levels, in medical colleges and international health organizations and particularly in the areas related to management of surveillance programmes, outbreak investigations and disaster management.

### ***Indonesia***

Indonesia started an FETP in 1982. As interest in the programme decreased, it was revised in 2007 through a revitalization programme. A secretariat office was created to manage the programme and a curriculum was developed to re-emphasize field placement with a 70:30 field-to-classroom ratio. Provincial health offices would co-pay the cost of the training. Efforts were made to recognize epidemiology as a profession. Currently the training is provided by the University of Indonesia in Jakarta and University of Gadjah Mada in Yogyakarta.

During 2008–2011, a total of 107 students were recruited and, as of 2012, 74 had graduated. The graduates were holding positions at central and provincial levels (18 provinces) and had an important role in public health emergency response, both as a front line for early detection of outbreaks and by providing appropriate responses.

### ***Thailand***

FETP in Thailand was established at the Ministry of Public Health in 1981. The programme was later approved as part of a three-year resident programme for the Board of Preventive Medicine. In 1998, FETP became an international programme and began to accept foreign trainees from

countries in the region. In 2001, the programme was designated as a WHO Collaborating Centre for Field Epidemiology. Currently there are two separate field epidemiology training programmes for medical doctors and veterinarians.

Trainees are regularly involved in outbreak investigations and public health responses, such as in the case of the SARS, pandemic influenza A(H1N1) outbreaks and the 2004 Indian Ocean tsunami.

In summary, both current FETP trainees and graduates play a tremendous role in responding to public health emergencies in Thailand. Despite its long history, FETP training is proving to be a worthwhile investment and has become an important asset of the country.

### **6.3 Risk communication**

The situation during an emerging of outbreak/emergency public health event is often uncertain, as it evolves so rapidly. Constraints include limited options for control measures, lack of effective vaccine or treatment, and limited resources and complexity due to involvement of multiple players in the process. Communication skills enable people in technical areas to better identify the appropriate interventions and manage the different stages of an emergency. Communication practices between teams, disciplines and different levels of the health system must be established, such as when to share information, so that people can make decisions about which resources and activities are needed. It must be ensured that the right communication strategies and interventions are being used to motivate those who are affected and at risk to adopt risk-reduction and protective action behaviours.

During a health emergency, quick dissemination of accurate information is crucial for smooth command and coordination. Communication can lead to active prevention of outbreaks through positive behaviour changes and/or social mobilization.

Good risk communication is usually community-owned and -driven, where people are engaged as equal partners. It must also be sustainable and bottom-up, based on understanding the views of the target audience, rather than top-down. Messages are interpreted by people based on their

own experiences; therefore, it is important to ensure that they are received as intended.

WHO has published a number of documents on communication; e.g. “Outbreak communication planning guide”, “Best practices for communicating with the public during an outbreak”, and “Communication for behavioural impact”.

## **6.4 Case management and infection prevention and control**

There is currently no specific treatment for MERS-CoV; therefore, treatment is supportive. Clinical management is very similar for any severe case of influenza, with the exception that early administration of antiviral drugs is recommended for this disease. It is important to support clinicians in early case recognition. In collaboration with WHO regional and country offices, over 250 doctors worldwide have been trained in critical care for SARI management.

Member States are recommended to reinforce the establishment of an IPC programme to ensure that health-care facilities are prepared to provide safe care to patients with ARIs, including MERS-CoV (and thereby prevent amplification of the disease), and support collaborative investigations and research to better understand the risk of health-care-associated transmission of MERS-CoV and its mechanisms. Current IPC guidance for MERS Co-V is the same as for SARS, as well as for seasonal and avian influenza.

## **6.5 Mass gatherings**

Mass gatherings are “events attended by a sufficient number of people to strain the planning and response resources of a community, state or nation” according to WHO’s communicable disease alert and response for mass gatherings, June 2008.

Risk factors for enhanced transmission of communicable diseases in mass gatherings include: (1) population movement, duration of stay and physical exhaustion; (2) overstressed health systems leading to impeded access to health care; (3) poor access to safe water and sanitation services;

(4) inadequate surveillance and early warning and response system; and (5) overcrowding and (6) extreme heat and other climatic factors.

For mass gatherings preparedness, WHO aims to have a positive impact through: (1) improved medical and hospital services (better ambulatory system and hospital preparedness); (2) strengthened public health system (enhanced surveillance system with laboratory integration); (3) enhanced living environment (cleaner air/water and pedestrian walkways); and (4) increased health awareness (improved diet and awareness of particular diseases).

Operational challenges in mass gatherings include: (1) stretched health systems to surge capacity; (2) intense media scrutiny; (3) business-as-usual behavioural health measures that make it difficult/impossible to implement the preparedness plan; and (4) multisectoral approaches to risk mitigation across disciplines/ministries and difficult intercultural communication.

On 25 July 2013, WHO issued an interim travel advice on MERS-CoV for pilgrimages to the Kingdom of Saudi Arabia. It provided guidance for the prevention, detection and management of imported cases of MERS-CoV to national authorities of countries from which pilgrims often travel for Umrah and the Hajj.

According to the available surveillance data, during the Hajj and Umrah, there was no case reported by Saudi Arabia or other Member States among pilgrims, during or after Ramadan. There was only one case of a resident of United Kingdom who stopped through Saudi Arabia to attend Umrah in January 2013.

Current Saudi Arabia recommendations to reduce respiratory infections during the Hajj 2013 include:

- covering the nose and mouth during sneezing;
- using handkerchiefs to cover the nose and mouth when coughing or sneezing;
- maintaining respiratory hygiene- not touching eyes, nose or heads with the hands until after washing them well;



- using a face mask, especially in crowded places;
- greeting others by shaking hands only (avoiding close contact);
- vaccinating against seasonal influenza (recommended); and
- vaccinating against meningococcal meningitis: quadrivalent vaccine (A, C, Y, and W135) is required.

## 6.6 Contribution of WHO Collaborating Centres to support public health response to emerging infectious diseases

WHO collaborating centres are institutions, such as research institutes, parts of universities and academies, which are designated by the WHO Director-General to carry out activities in support of the Organization's programmes in providing technical support to countries. Currently, there are 830 collaborating centres in 80 countries, with 94 centres in the South-East Asia Region.

*Table 1. Summary of resources and possible technical support from EIDs related WHO collaborating centres in the South-East Asia Region*

Institutions	Resources and possible technical support
<p><b>Armed Force Research Institute of Medical Sciences (AFRIMS), Bangkok, Thailand</b></p> <p>- WHO Collaborating Centre for Diagnostic Reference, Training and Investigation of EID</p>	<p>Laboratory diagnosis, training and outbreak investigation</p> <p>Current priority diseases include dengue, malaria, influenza and HIV/AIDS vaccine development</p>
<p><b>National Institute of Virology, Pune, India</b></p> <p>- WHO Collaborating Centre for Strengthening Capacity for EID</p> <p>- WHO Collaborating Centre for Viral Haemorrhagic Fevers and Arboviral Infections</p> <p>- Global Influenza H5 Reference Laboratory</p> <p>- Regional Emerging Dangerous Pathogen laboratory Network</p>	<p>Laboratory diagnostic capability for many viral diseases, including new EID</p> <p>(Priority diseases: influenza, measles, hepatitis and enteric diseases)</p> <p>Laboratory biosafety (two BSL-3 laboratories and recently commissioned BSL-4)</p>

Institutions	Resources and possible technical support
(EDPLN)	
<b>Chulalongkorn University, Bangkok, Thailand</b> - WHO Collaborating Centre for Research and Training on Viral Zoonoses	Veterinary sciences, basic sciences, rabies, zoonotic diseases, neurology, neuropathology and a training programme for medical neurologists
<b>National Institute of Health, Nonthaburi, Thailand</b> - WHO Regional Influenza Reference Laboratory	Antimicrobial drug resistance, training on cell culture isolation, sequencing, diagnostics services with pre-established assays
<b>National Centre for Disease Control, Delhi, India</b> - WHO Collaborating Centre for Epidemiology and Training in EID	Field epidemiology training, outbreak investigation and training modules using past outbreak investigations
<b>Bureau of Epidemiology, Ministry of Public Health, Nonthaburi, Thailand</b> - WHO Collaborating Centre for Field Epidemiology	Field epidemiology training and outbreak investigation
<b>Institute of Epidemiology, Disease Control and Research, Dhaka, Bangladesh</b> - National Centre of Excellence for Nipah	Outbreak investigation, research methodology for study of morbidity, mortality of bacterial and viral diseases and calculation of study sample size

## 7. Strengthening preparedness and response

A group work session was organized to identify what needs to be in place to strengthen preparedness and response for MERS-CoV and influenza A(H7N9). Three groups came up with suggestions on how this could be achieved and reported back to the meeting which is summarized in a tabulated form.

**Group 1 – Surveillance and risk assessment**

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
Epidemiological surveillance	Standard case definition at country level	Advocacy meeting, government commitment	Ministry of Health, Epidemiology unit, national public health laboratory, clinicians, immigration, transport, tourism, etc.	
	Provide information to public and encourage people who are going abroad or coming back to report if they have fever (e.g. and from travel to the Middle East)	Through respective agencies, tourism, immigration, transport, health providers, doctors and nurses accompanied the pilgrims etc.	Same as above	
	SARI surveillance: a regular number of samples are collected from sentinel hospitals and sent for laboratory testing	National public health laboratory and National Influenza Center	Hospitals, clinics	
	Encourage reporting by private hospitals and clinics	Ministry of Health absorbs the cost of the test and facilitate shipment	Sectors beyond health should consider developing policies that have a bearing on health in general and EID in particular ('health in all' policies)	
	Fever screening at PoE depending on country preference	Personnel and equipment	Immigration, Ministry of Health	

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
	Disseminate information to hospitals and their personnel Event-based surveillance to early detect cluster of cases or outbreak	Circulars, information, education and communication materials sent from Ministry of Health SMS, hotlines, etc.	Ministry of Health, government and private sectors	
Laboratory surveillance	Laboratory capacity for testing (commercial primer and probes are available. Positive controls can be requested from Bonn Laboratory Germany: BSL-2 laboratory certification is requested by the supplier)	Situation analysis Capacity-building (organism detection and characterization, quality, biosafety) Develop and strengthen collaboration of referral network both in the country and regional level (WHO can provide technical support and guidelines, facilitate shipment of specimens to reference laboratories and WHO collaborating centres, and non-commercial reagents from WHO collaborating centres can be requested)	Ministry of Health and other relevant sectors having bearing on health and EID National public health laboratory reference laboratory WHO collaborating centres other partners and stakeholders	
	Referral network at national and regional levels	Advocate the government to provide necessary funding	Ministry of Health, other stakeholders	
	Certified Biosafety BSL-2 (QC, QA, waste management, etc.)	Advocate the government to provide necessary funding	Ministry of Health, other stakeholders	
	Adequate supply of PPEs, disinfectants, biosafety bags, etc.	Advocate the government to provide necessary funding	Ministry of Health, other stakeholders	

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
	Specimen collections materials and appropriate shipment facilities	Advocate the government to provide necessary funding	Ministry of Health, other stakeholders	
Risk assessment	Information (data) on the number people travelling to or arriving from the Middle East	Advocate and meeting with respective sectors Training	Ministry of Health and respective sectors and other stakeholders	
	Country capacity to respond to outbreaks; political commitment, surveillance, laboratory diagnosis, case management, IPC facilities and supplies	Advocate and meeting with respective sectors Training	Ministry of Health and respective sectors and other stakeholders	
Others	Strengthening of health system as a whole for good governance, health information system including laboratory for EID	Advocacy and resource mobilization	Ministry of Health, donors	

**Group 2 – Public health intervention and risk communication**

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
Case investigation	Establish case definition	Follow WHO guidelines, case definition to be set, adapted to local context	Epidemiologists, clinicians, veterinarians, laboratory experts	Initiate immediately (2013)
	Established RRT	<ul style="list-style-type: none"> <li>• Already established in most countries</li> <li>• Review the constitution of the RRT for each country.</li> <li>• should be</li> </ul>	<ul style="list-style-type: none"> <li>• RRT members at different levels</li> <li>• Responsible national level agencies: National Centers for Disease Control (India); Institute of</li> </ul>	Initiate immediately (2013)

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
		<p>oriented for MERS-CoV.</p> <ul style="list-style-type: none"> <li>• Train RRT: simulation or table top exercises, etc</li> </ul>	<p>Epidemiology, Disease Control and Research (Bangladesh); Central Epidemiology Unit (Myanmar); Health Protection Agency Surveillance Unit (Maldives); Epidemiology unit (Sri Lanka); Bureau of Epidemiology (Thailand);</p> <ul style="list-style-type: none"> <li>• Respective units in other countries</li> </ul>	
	<p>Case investigation protocols</p>	<ul style="list-style-type: none"> <li>• Adopt/adapt existing WHO / Centres for Disease Control and Prevention protocols in consultation with epidemiologists, clinicians, veterinarians, laboratory experts and institutions responsible for outbreak investigation and response</li> <li>• Should include both human and animal field investigation</li> <li>• Laboratory investigation: human and animal</li> <li>• Anthropological</li> </ul>	<p>Epidemiologists, clinicians, veterinarians, laboratory experts and institutions responsible for outbreak investigation and response</p>	<p>Initiate immediately (2013)</p>

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
		investigation		
	Logistic supplies	<ul style="list-style-type: none"> <li>• Prepare list of logistic supplies, pharmaceutical and non-pharmaceutical, required for the centre, field and laboratory activities</li> <li>• List of supplies required for case management include critical care</li> <li>• List to be prepared for each level</li> <li>• Ensure supply chain</li> <li>• Resource tracking</li> </ul>	<ul style="list-style-type: none"> <li>• Policy-makers</li> <li>• Ministry of Finance</li> <li>• Ministry of Health</li> <li>• Disaster management agencies</li> <li>• Donor agencies/development partners</li> <li>• WHO, UNICEF, FAO</li> </ul>	<ul style="list-style-type: none"> <li>• Initiate immediately (2013)</li> <li>• Review periodically</li> </ul>
Risk communication	Risk communication coordination focal point (can be independent of IHR focal point)	Ministry of Health policy-makers	Ministry of Health	Initiate immediately (2013)
	Nominate official spokesperson(s) for MERS-CoV	Ministry of Health policy-makers	Ministry of Health	Initiate immediately (2013)
	Assess affected community and public communication needs/perceptions on MERS-CoV/influenza and develop messages accordingly	<ul style="list-style-type: none"> <li>• Assessment</li> <li>• Expert group meeting (include community leaders, selected media persons)</li> <li>• developing community-appropriate</li> </ul>	<ul style="list-style-type: none"> <li>• Risk communication focal point</li> <li>• Communication experts</li> <li>• Community leaders</li> <li>• Epidemiologists</li> </ul>	Initiate immediately (2013)

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
		messages	<ul style="list-style-type: none"> <li>• Clinicians</li> <li>• Veterinarians</li> <li>• Laboratory experts</li> <li>• Media persons</li> <li>• Anthropologists</li> <li>• UNICEF, WHO, FAO</li> </ul>	
	Procedures for information dissemination to the media, public, and high-risk groups including engagement through social media	<ul style="list-style-type: none"> <li>• Risk communication focal and technical experts develop key talking points/info products</li> <li>• Approval processes to be identified</li> <li>• Channels of communication to be identified</li> <li>• Frequency of communication (changes according to situation)</li> </ul>	Agencies involved in outbreak investigation in their respective countries	Initiate immediately (2013)
	Procedures for information dissemination for health workers	<ul style="list-style-type: none"> <li>• Assess needs and gaps</li> <li>• Prepare messages</li> <li>• Train/inform relevant health workers according</li> </ul>	Agencies involved in outbreak investigation in their respective countries, health workers	Initiate immediately (2013)
	Procedures for information sharing with other stakeholders/ sectoral partners	<ul style="list-style-type: none"> <li>• Assign responsible person for developing products</li> <li>• Approval</li> </ul>	<ul style="list-style-type: none"> <li>• Agencies involved in outbreak investigation in their respective countries,</li> </ul>	Initiate immediately (2013)



Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
		<p>processes to be identified</p> <ul style="list-style-type: none"> <li>• Channels of communication to be identified</li> <li>• Frequency of communication (changes according to situation)</li> </ul>	<ul style="list-style-type: none"> <li>• Representatives of other stakeholders.</li> </ul>	
	Update policy-makers on a regular basis	Daily situation reports for policy-makers	The national focal points for response.	Initiate immediately (2013)
	Training of spokespersons for the media	Hold training sessions	Media trainers	Initiate immediately (2013)
	Media awareness on MERS-CoV and influenza/EIDs	<ul style="list-style-type: none"> <li>• Develop information material</li> <li>• Hold media workshop</li> </ul>	Technical experts and risk communication focal point	Initiate immediately (2013)
Points of entry and travellers	Assessment of core capacities at PoE	Assess gaps and needs of PoE	Ministry of Health and other relevant ministries depending on the country, designated IHR focal point for POE	Initiate immediately (2013)
	<p>Surveillance of suspected cases among travellers from affected areas</p> <ol style="list-style-type: none"> <li>1. Hajj/Umr ah pilgrims</li> <li>2. Migrant workers</li> </ol>	<ul style="list-style-type: none"> <li>• Display information on where to go if they have symptoms at PoE</li> <li>• SOP in place for detecting, directing them on health care, communication in</li> </ul>	Ministry of Health and other relevant ministries depending on the country, designated IHR focal point for PoE	Initiate immediately (2013)

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
		<p>the port, referral to hospital</p> <ul style="list-style-type: none"> <li>•</li> </ul>		
	Strengthen health units at POEs	Develop protocol	Ministry of Health and other relevant ministries depending on the country, designated IHR focal point for PoE	Initiate immediately (2013)
	Designate hospital and public health laboratory to each PoE	<ul style="list-style-type: none"> <li>• Designate hospital</li> <li>• Equip hospital</li> <li>• Train staff</li> </ul>	Ministry of Health and other relevant ministries depending on the country, designated IHR focal point for PoE	Initiate immediately (2013)
Crisis management centre	Crisis management centre	<ul style="list-style-type: none"> <li>• Established/designated in most countries</li> <li>• Need to be prepared for MERS-CoV response</li> </ul>	Ministry of Health and all members of the crisis management centre	As and when
Operational research	Operational research	Strengthening of current operational research activities	<ul style="list-style-type: none"> <li>• Member Countries Focal Points</li> <li>• WHO, FAO and other Agencies</li> <li>• Research institutions</li> </ul>	Initiate immediately (2013)
Lessons learnt briefing/ workshop	Debriefing after return of Hajj health team	Hold debriefing	Ministry of Health, Hajj health team	Nov/Dec 2013

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
Regional laboratories network	Regional reference laboratories	Develop link with regional labs	Ministry of Health, Regional Office for South-East Asia	Initiate immediately (2013)

**Group 3 – Clinical management, Infection prevention and control**

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
Management of cases in hospitals	Sensitization of clinicians to occurrence of cases and clusters	Develop and disseminate a clinical case description	Public health, clinicians at all level of the system	2013
	Case definition, i.e. probable/confirmed case	Technical/expert group meetings	Specialist doctors and experts	2013
	Evidence-based treatment guidelines/protocols	Technical/expert group meetings	Specialist doctors and experts	2013
	Dissemination of treatment	Training workshops, video/audio conference	Clinical network, Ministry of Health	
	Case-reporting and information exchange between clinicians and public health authorities	Case reporting form, linking clinicians to surveillance arrangements, networking between clinicians	Public health, clinicians at all levels of the system	2013
	Information exchange on clinical management between countries and with WHO	Access to clinical network	Public health, clinicians	2013
	Drugs, equipment and other logistics	Internal advocacy, fund allocation	Ministry of Health	

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
	Enabling access to health care	Messages to travellers, overseas workers, pilgrims and communities	Clinicians, public health, communications experts, communities, religious leaders	2013
Infection Prevention and Control Programme in Hospital	Evidence-based guidelines including outbreak investigation	Technical experts to draft and disseminate	Clinicians, nurses, microbiologists, public health	
	High level, policy, regulation, accreditation	Internal advocacy, identify champions, evidence of cost effectiveness of IPC programme	Policy-makers, clinicians, nurses, microbiologists, public health, hospital managers	2014
	Adequate numbers of trained staff, infection control committee with dedicated staff	Internal advocacy in health-care setting, identify champions, establish infection control committee and programme, training materials,	Clinicians, nurses, microbiologists, hospital managers	2014
	Availability of hand washing stations/ alcohol rub, logistic supplies (PPE)	Advocacy in health-care setting, procurement	hospital managers, clinicians, nurses, microbiologists,	2014
	Isolation facilities with arrangements for surge capacity	Advocacy in health-care setting, health-care facility preparedness plan, allocation of	Clinicians, nurses, microbiologists, hospital managers	2014

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
	Monitoring and evaluation (surveillance of compliance with practice)	Development of methodology and protocols, dedicated staff, capacity to analyse data	Clinicians, nurses, microbiologists, hospital managers	2014
	Cleaning, and decontamination, safe disposal clinical waste	Development guidelines, protocols and SoPs	Clinicians, nurses, microbiologists, hospital managers,	2013
	Surveillance HAI (including data collection and analysis)	Development guidelines and protocols, identification of funds	Clinicians, nurses, microbiologists, public health	2014
	Occupational health programme, including vaccination and staff illness (+)	Advocacy in health-care setting, dedicated staff, identification of funds	Clinicians, nurses, microbiologists, hospital managers, public health	2014
	Laboratory capacity to support IPC programme	Advocacy in health-care setting	Clinicians, nurses, microbiologists	2014
	Guidance for reporting to public health authorities	Advocacy, development of guidelines and protocols	Clinicians, nurses, microbiologists, public health	2013
Infection control in community settings	Community members able to deliver basic health care without risk of	Guidelines, education, logistic supplies	Clinicians, nurses, microbiologists, public health, community	2014
Health-care facility preparedness for outbreaks	Health-care facility preparedness plan	Development of plan by all stakeholders, mechanism to coordinate different hospital plans	Clinicians, nurses, microbiologists, hospital managers, public health	2014

Topic	What needs to be in place?	How do we make it happen?	Who needs to be involved?	Priority (2013 or 2014)
	Mechanism for testing the plan	Regular exercises (table top / simulation)	Clinicians, nurses, microbiologists, hospital managers, public health	2014
	Committee, incident command system (hospital level and higher level)	Clear definition of roles and responsibilities, development of terms of reference and SoPs (all as part of the plan)	Clinicians, nurses, microbiologists, hospital managers, public health	2014
	Arrangements for surge capacity staff, laboratory, clinical management (including symptomatic well), supplies		Clinicians, nurses, microbiologists, hospital managers, military, communities	2014
	Triage and referral system	Part of plan (internal hospital arrangements)	Clinicians, nurses, microbiologists, hospital managers	2014
	Risk communication (operational, media, to communities)	Identify spokespersons, develop messages, monitor media and adjust	Communications experts, clinicians, nurses, microbiologists, hospital managers, public health, community	2014
	Networking of health-care facilities	Arrangements needed at higher level (i.e. district or province) to monitor bed/intensive care unit occupancy	Clinicians, nurses, microbiologists, hospital managers, public health	2014
	Outbreak control team	Identify members, develop protocols, deliver basic training	Clinicians, nurses, microbiologists	2014
Other topics	Private health care as a cross-cutting issue			

## **8. Conclusions and recommendations**

The South-East Asia Region is vulnerable to numerous threats to public health, including EIDs such as influenza A(H5N1), CCHF and Nipah virus.

The recent emergence of influenza A(H7N9) in China and MERS-CoV in the Middle East also serve to remind us that novel infectious agents continue to appear and present risks to national and regional health security: they can also provide a focus for efforts to strengthen health system capacities for preparedness and response, including the following measures:

- strengthening event-based and indicator-based surveillance to detect events of public health significance, including clusters and cases of ILI and SARI, as well as novel infectious diseases;
- enhancing arrangements for the safe collection, transportation and laboratory detection and characterization of clinical specimens, including shipment of samples to networks of reference laboratories, when appropriate;
- supporting health-care settings and facilities in the effective clinical management of SARI, including strengthening clinical case recognition;
- establishing systematic IPC policies and practices at all levels, including arrangements to provide surge capacity during outbreaks;
- ensuring effective communication of risk messages to target audiences, including policy-makers, travellers, health workers and the public; and
- advocating for the updating/revision of pandemic preparedness plans.

In the context of MERS-CoV and influenza A(H7N9), vigilance is required from the South-East Asia Region countries in order to prevent infections and ensure detection of imported cases in travellers, overseas workers and pilgrims.

For countries that may require an additional two-year extension for the implementation of IHR core capacities, the requirement to submit a request in February 2014, accompanied by an implementation plan, means that the national review and planning process should start in the fourth quarter of 2013.

The need to develop and sustain IHR core capacities also presents an opportunity for States Parties, WHO and partners to work collectively to strengthen national and regional health security. Advocacy and resource mobilization to support implementation of capacities for preparedness and response continues to be important.

### ***Recommendations for Member States***

- (1) In the context of the recent emergence of MERS-CoV and influenza A(H7N9), there is a need to urgently strengthen health system capacities in the following technical areas:
  - enhancing event-based and indicator-based surveillance to detect events of public health significance, including clusters and cases of ILI and SARI, as well as novel infectious diseases;
  - establishing or strengthening/revitalising RRT and programmes for field epidemiology training in order to support national and international outbreak response;
  - enhancing arrangements for the safe collection, transportation and laboratory detection and characterization of pathogens in clinical specimens, including arrangements to ship samples to networks of reference laboratories when appropriate;
  - supporting health-care settings and facilities in the effective clinical management of SARI, including strengthening clinical case identification and arrangements to provide surge capacity during outbreaks;
  - developing/strengthening systematic IPC policies and practices at all levels, including arrangements to provide surge capacity during outbreaks;



- ensuring effective communication of risk messages to target audiences, including policy-makers, media, travellers, health workers and the public; and
  - strengthening the functional coordination mechanism between human health, animal health and other sectors.
- (2) The scope of current national influenza pandemic preparedness plans should be expanded in a stepwise manner to eventually cover all EIDs, and strengthen emergency preparedness and response capacities.
  - (3) Arrangements should be made to facilitate the prevention and detection of imported cases of MERS-CoV and influenza A(H7N9) in travellers, migrant workers and pilgrims. Measures should include strengthened capacities at PoE and the dissemination of advice to these risk groups on preventive measures, as well as on accessing health care in the event of illness.
  - (4) Engagement and technical support of relevant WHO collaborating centres and other regional centres of excellence should be ensured when developing and implementing plans to enhance capacities for preparedness and response to EID.
  - (5) Collaborative arrangements should be, strengthen similarly to enhance synergies and access the capacities of national stakeholders and partners to strengthen preparedness and response for EID.
  - (6) Countries anticipating a request in February 2014 for an additional two-year extension until 2016 for the establishment of IHR core capacities, should undertake a timely assessment of the current status and develop a strong and feasible two-year implementation plan based on identified gaps and priorities, including an estimate of the resources required.

### ***Recommendations for WHO***

- (1) Support to Member States to enhance surveillance, laboratories, preparedness and response for MERS-CoV, avian influenza A(H7N9) and other novel influenza viruses and EID,

should be maintained and strengthened including the dissemination of new scientific findings and guidance.

- (2) The Timely assessment of national IHR core capacities and the development of implementation plans that would be required to accompany a request for an extension until 2016 should be facilitated.
- (3) Intercountry and interregional collaboration should be facilitated, including sharing information and resources, and strengthening technical networks, in order to address identified national and regional capacity gaps.
- (4) WHO should advocate for and work with partners to mobilize technical and financial support to strengthen preparedness and response for EID, including implementation of plans to strengthen IHR core capacities.

## **9. Closing session**

Dr Rajesh Bhatia, Director, Department of Communicable Diseases, WHO Regional Office for South-East Asia expressed his gratitude to the work of Chairman, Co-chair, Rapporteur and participants for their active participation and contribution and WHO secretariat team for their support to the regional workshop, and then closed the meeting.

## **Annex 1**

# **Agenda**

- (1) Objectives
- (2) Country presentations:
- (3) Progress under selected core capacity requirements under IHR (2005) to address EID:
  - Surveillance
  - Laboratory
  - Preparedness and response
  - Risk communication
  - Clinical management
  - Infection prevention and control
- (4) Updates:
  - Pandemic Influenza Preparedness
  - MERS-CoV
  - Other EIDs: H7N9, Nipah, CCHF
- (5) Strategies and approaches to strengthen core capacities to address EIDs with special emphasis on MERS-CoV
- (6) Closing

## Annex 2

# List of participants

### **Bangladesh**

Professor Be-Nazir Ahmed  
Director, Disease Control  
Line Director, Communicable Disease Control  
Directorate-General of Health Services (DGHS)  
Ministry of Health and Family Welfare  
Dhaka

Dr Md. Ashraful Alam  
Senior Scientific Officer  
Institute of Epidemiology Disease Control and  
Research (IEDCR)  
Dhaka

Dr Khondoker Mahbuba Jamil  
Virologist  
Polio and Measles Laboratory  
Institute of Public Health  
Dhaka

### **Bhutan**

Dr Kinzang Dukpa  
Programme Director  
National Centre for Animal Health  
Department of Livestock  
Ministry of Agriculture and Forests  
Thimphu

Mr Adeep Monger  
Laboratory Technologist  
Jigme Dorji Wangchuk National Referral  
Hospital  
Thimphu

Mr Sonam Gyeltshen  
Medical Technologist  
Influenza Molecular Laboratory  
Public Health Laboratory  
Department of Public Health  
Ministry of Health  
Thimphu

### **Democratic People's Republic of Korea**

Dr Hong Sun Kwang  
Vice President  
State Hygiene and Inspection Board  
Ministry of Public Health  
Pyongyang

Dr Ko Yong Zun  
Director  
Pyongyang City People's Hospital No. 1  
Pyongyang

Dr Kim Tong Il  
Vice Director  
Pyongyang City Hepatitis Prevention Hospital  
Pyongyang

Mr Jang Song Chol  
Interpreter  
Ministry of Public Health  
Pyongyang

### **India**

Dr Sujeet Kumar Singh  
Deputy Director-General (MH&IH)  
Public Health Specialist  
Ministry of Health and Family Welfare  
Directorate-General of Health Services  
New Delhi

### **Indonesia**

Dr M. Vivi Setyawati  
Chief  
Virology Laboratory  
Center of Biomedical and Basic Technology  
of Health  
National Institute of Health Research and  
Development (NIHRD)  
Ministry of Health  
Jakarta

Dr N.L.P Indi Dharmayanti  
Head of Research Group of Virology  
Laboratorium

Indonesian Research Center for Veterinary  
Science, IAARD  
Ministry of Agriculture  
Jl RM Martadinana No 30  
Bogor, West Java

Dr Soitawati  
Sub-Directorate of Surveillance and Outbreak  
Response  
Directorate-General of Diseases Control and  
Environmental Health  
Ministry of Health  
Jakarta

Mr Kuncahyo  
Head of Administration Division  
Directorate of Surveillance, Immunization  
Quarantine and Matra Health

### **Maldives**

Dr Aishath Aroona Abdulla  
Epidemiologist  
Health Protection Agency  
Malé

Dr Fathimath Nadhiya  
Consultant in Internal Medicine  
Indira Gandhi Memorial Hospital  
Malé

Mr Abdul Latheef  
Senior Laboratory Technologist  
Indira Gandhi Memorial Hospital  
Malé

### **Myanmar**

Dr Khin Yi Oo  
Deputy Director  
National Health Laboratory  
Department of Health  
Yangon

Dr Nyan Win Myint  
Assistant Director (CEU)  
Department of Health  
Nay Pyi Taw

Dr Win Lwin  
State Health Director

Kachin State Health Department  
Myitgyina

### **Nepal**

Dr Babu Ram Marasini  
Senior Health Administrator  
Ministry of Health and Population  
Kathmandu

Dr Duk Bahadur Chhetri  
Senior Consultant Pathologist  
Western Regional Hospital  
Ministry of Health and Population  
Pokhara

Mr Mohamed Daud  
Chief  
District Health Office  
Dhading

### **Sri Lanka**

Dr Sarath Amunugama  
Deputy Director-General (PHS) I  
Ministry of Health  
Colombo

Dr L.B.H. Denuwara  
Director – Quarantine  
Ministry of Health  
Colombo

Dr Paba Palihawadana  
Chief Epidemiologist  
Epidemiological Unit  
Colombo

Dr Jude Jayamaha  
Consultant Virologist  
Medical Research Institute  
Colombo

Dr Vasu Jayasinghe  
Medical Officer  
Epidemiological Unit  
Colombo

### **Thailand**

Dr Potjaman Sirirayapon  
Medical Officer, Senior Professional Level

Bureau of Epidemiology  
Department of Disease Control  
Ministry of Public Health  
Nonthaburi

Dr Witthawat Wiriyarat  
Deputy Dean for Research and Innovation  
Faculty of Veterinary Science  
Mahidol University  
Ministry of Education  
Bangkok

Ms Sunthareeya Waicharoen  
Medical Scientist, Senior Professional Level  
National Institute of Health  
Department of Medical Sciences  
Ministry of Public Health  
Nonthaburi

### **South-East Asian Public Health Education Institutes Network participants**

#### **Bangladesh**

Professor Dr Md. Mahfuzar Rahman  
Professor and Head, Department of Community  
Medicine Anwer Khan Modern Medical  
College,  
Dhaka

Dr Shamim Ara Hoque  
Department of Obstetrics and Gynaecology  
Dhaka

Professor Muzaherul Huq  
Chairman, Public Health Foundation of  
Bangladesh  
Dhaka

Professor Dr Sharmeen Yasmeen  
Professor and Head,  
Department of Community Medicine  
CEO, Public Health Foundation of Bangladesh

Dr Ehsaan Ul-Alam Chowdhury  
Member, Public Health Foundation of  
Bangladesh  
Registrar, Department of Paediatrics,  
Bangladesh Medical College  
Dhaka

Dr Sharmila Huda  
Member, Public Health Foundation of  
Bangladesh; Assistant Professor of Department  
of Pharmacology,  
Bangladesh Medical College  
Dhaka

Ms Nahid Shahana  
Member, Public Health Foundation of  
Bangladesh, Associate Professor Department of  
Anatomy  
Dhaka

Professor Dr Md. Abdur Rahman  
Professor and Chairman,  
Department of Public Health and Informatics  
Dhaka

Professor Dr Md. Amirul Hassan  
Head, Department of Public Health and  
Hospital Administration, National Institute of  
Preventive and Social Medicine (NIPSOM),  
Dhaka

Professor Dr G.U Ahsan  
Chairman of Department of Public Health  
North South University  
Dhaka

Dr Md Abdul Khaleque  
Associate Professor  
Department. of Biochemistry and Microbiology  
North South University  
Dhaka

#### **Bhutan**

Dr Neyzang Wangmo  
Dean, Research and External Linkages  
Royal Institute of Health Sciences, Department  
of Community Health  
Royal University of Bhutan  
Thimphu

Dr Chencho  
Director, Royal Institute of Health Sciences  
Royal Institute of Health Sciences  
Royal University of Bhutan  
Thimphu

## India

Dr S.D. Gupta  
Director, Indian Institute of Health  
Management Research; SEAPHEIN Secretary  
Indian Institute of Health Management  
Research  
Jaipur, Rajasthan

Dr P.R. Sodani  
Professor and Dean (Training)  
Indian Institute of Health Management  
Research  
Jaipur, Rajasthan

Professor Ramachandra Kamath  
Professor and Head, Department of Public  
Health  
Manipal University  
Manipal, Karnataka

## Indonesia

Dr Sho'im Hidayat  
Vice Dean II  
Faculty of Public Health  
Universitas Air langga  
Surabaya, East Java

Dr Bambang Wispriyono  
Dean, Faculty of Public Health  
Faculty of Public Health  
University of Indonesia  
Fakultas Kesehatan Masyarakat, Universitas  
Indonesia, West Java (Jawa Barat)

Dr Irvan Afriandi  
Lecturer  
Faculty of Medicine, Department of Public  
Health  
University of Padjadjaran  
Bandung, West Java

## Myanmar

Professor Dr Myo Oo  
Former Professor/ Head, Department of  
Preventive and Social Medicine  
University of Medicine  
Yangon

Professor Dr Win Myint Oo  
Professor and Head, Department of Preventive  
and Social Medicine  
University of Medicine  
Department of Preventive and Social Medicine  
Yangon

Dr Soe Tun  
Lecturer  
University of Medicine  
Department of Preventive and Social Medicine  
Yangon

Professor Dr Hla Hla Win  
Professor/ Head of Department Department of  
Preventive and Social Medicine  
University of Medicine 2  
University of Public Health  
Yangon

Dr Htay Aung  
Head, Senior Lecturer, Preventive and Social  
Medicine Department  
University of Medicine, Magway  
Magway

Dr San San Htay  
Head, Department of Preventive and Social  
Medicine  
University of Medicine,  
Mandalay

Professor Dr Nay Soe Maung  
University of Public Health,  
Yangon

## Nepal

Dr Rajendra P. Koju  
Associate Dean  
Kathmandu University School of Medical  
Sciences  
Department of Community Medicine  
Dhulikhel Hospital  
Kavre

## Sri Lanka

Professor Rohini Senevirante  
Professor and Director, WHO Collaborating  
Centre for Training and Research in  
Occupational Health

University of Colombo  
Faculty of Medicine, Department of  
Community Medicine  
Colombo, Western Province

Professor Rajitha Wickremasinghe  
Dean, Faculty of Public Health,  
Professor of Public Health  
University of Kelaniya  
Faculty of Medicine, Department of  
Public Health  
Ragama

### **Thailand**

Professor Dr Vasuton Tanwatanakul  
Dean, Faculty of Public Health  
Burapha University  
Faculty of Public Health  
Chonburi

Professor Dr Surasak Taneepanichsakul  
Dean, College of Public Health Sciences  
Chulalongkorn University  
College of Public Health Sciences  
Bangkok

Associate Professor Dr Sathirakorn Pongpanich  
Deputy Dean of College of Public Health  
Sciences  
Chulalongkorn University  
College of Public Health Sciences  
Bangkok

Professor Dr Somjit Supannatas  
President of HEPA  
Health Education Professional Association  
(HEPA)  
Mahidol University  
Bangkok

Mr Thirdpong Srisukphun  
Assistant Dean, Faculty of Public and  
Environmental Health  
Huachiew Chalearnprakit University  
Faculty of Public and Environmental Health,  
Department of Environmental Health  
Bangkok

Dr Songkramchai Leethongdee  
Dean, Faculty of Public Health

Maharakham University  
Faculty of Public Health

Dr Aroonsri Mongkolchati  
Lecturer, Program Director for Primary Health  
Care Management Masters Degree  
Mahidol University  
ASEAN Institute For Health Development  
Nakornprathom

Professor Supa Pengpid Director,  
ASEAN Institute for Health Development  
Mahidol University  
ASEAN Institute For Health Development  
Nakornprathom

Dr Prayoon Fongsatitkul  
Mahidol University  
SEAPHEIN Secretariat; Faculty of Public Health  
Bangkok

Dr Doungjai Buntup  
Lecturer, Addiction Studies Programme  
Mahidol University  
ASEAN Institute For Health Development

Dr Roongsiri Kamtrakul  
Lecturer, Faculty of Public Health  
Ramkhamhaeng University  
Faculty of Public Health  
Bang Bua Thong, Nonthaburi

Dr Orawan Kaewboonchoo  
SEAPHEIN; Mahidol University  
Bangkok

Mr Isaac Olson  
SEAPHEIN Coordinator  
SEAPHEIN; Mahidol University  
Bangkok

Ms Napaporn Muangsakul  
SEAPHEIN; Mahidol University  
Bangkok

Ms Saijai Potisubsuk  
SEAPHEIN; Mahidol University  
Bangkok

Ms Ketwaree Punyatham  
SEAPHEIN; Mahidol University  
Bangkok



Ms Chenchira Natathong  
SEAPHEIN; Mahidol University  
Bangkok

Associate Professor Dr Phitaya Charupoonphol  
Dean, Faculty of Public Health  
SEAPHEIN; Mahidol University  
Bangkok

Dr Jarueyporn Suparp  
SEAPHEIN; Mahidol University  
Bangkok

Dr Orapin Singhadej  
SEAPHEIN; Mahidol University  
Bangkok

Asst. Professor Ponsawat Srisawat  
Associate Dean, Assistant Professor  
Sukhothai Thammathirat Open University  
School of Health Sciences  
Pakkred, Nonthaburi

### **Viet Nam**

Associate Professor Nguyen Do Nguyen  
Senior Lecturer, Department of Epidemiology  
Ho Chi Minh City University of Medicine and  
Pharmacy  
Faculty of Public Health, Department of  
Epidemiology, Ho Chi Minh City

Dr Thuan Tran Thien  
Deputy Dean, Faculty of Public Health  
Head, Department of Health Education  
Ho Chi Minh City University of Medicine  
and Pharmacy  
Faculty of Public Health, Department  
of Health Education, Ho Chi Minh City

### **Temporary Advisers**

Major General Prasong Lomtong, MD  
Director General  
Armed Forces Research Institute of Medical  
Sciences (AFRIMS)  
Bangkok

Dr D.T. Mourya  
Director  
National Institute of Virology,  
Pune  
Maharashtra

Professor Mahmudur Rahman  
Director  
Institute of Epidemiology  
Disease Control and Research (IEDCR) and  
National Influenza Centre (NIC), Bangladesh  
Dhaka

Dr Henry Wilde  
Professor of Medicine  
WHO Collaborating Centre for Research and  
Training on Zoonoses  
Faculty of Medicine  
Chulalongkorn University  
Bangkok

Ms Malinee Chittaganpitch  
Chief of Respiratory Virus Section, Thai NIC  
National Institute of Health  
Department of Medical Sciences  
Ministry of Public Health  
Nonthaburi

### **UN agencies and other partners**

Mr Mohinder Oberoi  
Sub Regional Manager  
Emergency Centre for Transboundary Animal  
Diseases (ECTAD) /  
Regional Support Unit for SAARC countries  
Food and Agriculture Organization of the  
United Nations  
Kathmandu

Dr Christopher Gregory  
Epidemiology Activity Lead  
International Emerging Infections Program  
Global Disease Detection Center  
Thailand Ministry of Public Health – US CDC  
Collaboration  
Ministry of Public Health  
Nonthaburi

### **Secretariat**

#### **WHO Headquarters**

Dr Anthony Mounts  
Medical Officer, PED/HIP  
Influenza, Hepatitis and PIP Framework  
Health Security and Environment (HSE)

World Health Organization  
Geneva, Switzerland

**WHO Regional Office for the Eastern  
Mediterranean**

Dr S.K. Md. Mamunur Malik  
Ag. Regional Adviser  
Pandemic and Epidemic Diseases  
Department of Communicable Disease  
Prevention and Control  
World Health Organization  
Regional Office for the Eastern Mediterranean  
Monazamet El Seha El Alamia Street  
Extension of Abdel Razak El Sanhoury Street  
Cairo, Egypt

**WHO Regional Office for the Western  
Pacific**

Dr Chin Kei Lee  
Team Leader  
Emerging Disease Surveillance and Response  
Division of Health Security and Emergencies  
World Health Organization  
Regional Office for the Western Pacific  
Manila 1000, Philippines

**WHO Country Office for Bangladesh,  
Dhaka**

Dr M K Zaman Biswas  
National Professional Officer (Epidemiology)  
Communicable Diseases Surveillance and IHR

**WHO Country Office for Sri Lanka,  
Colombo**

Dr Firdosi Rustom Mehta  
WHO Representative to Sri Lanka

Dr Navaratnasingam Janakan  
National Professional Officer  
Communicable Diseases Surveillance

Mr Norbu Wangchuk  
Administrative Officer

**WHO Regional Office for South-East Asia,  
New Delhi**

Dr N. Kumara Rai  
Senior Adviser to the Regional Director

Dr Rajesh Bhatia  
Director  
Department of Communicable Diseases

Dr Richard Brown  
Regional Adviser  
Disease Surveillance and Epidemiology (DSE)  
Department of Communicable Diseases

Dr Aparna Singh Shah  
Regional Adviser  
Blood Safety and Laboratory Technology (BLT)  
Department of Communicable Diseases

Dr Vason Pinyowiwat  
Technical Officer – DSE  
Disease Surveillance and Epidemiology (DSE)  
Department of Communicable Diseases

Dr Supriya Bezbaruah  
Communication Specialist  
Disease Surveillance and Epidemiology (DSE)  
Department of Communicable Diseases

Since the 1970s more than 40 new Emerging Infectious Diseases (EIDs) have been identified globally. For the South-East Asia Region, the newly emerging infectious diseases, among many important infectious diseases, avian influenza A (H5N1), avian influenza A (H7N9) and Middle East Respiratory Syndrome coronavirus (MERS-CoV) pose serious public health threats. To strengthen regional capacity to respond to EIDs, the Regional Workshop on Emerging Infectious Diseases: Novel Corona Viruses was organized during 8-10 October 2013, in Colombo, Sri Lanka. The report provides the summary of the deliberations of the workshop and outlines the need to develop and sustain IHR core capacities to strengthen national and regional health security.



**World Health  
Organization**

Regional Office for South-East Asia  
World Health House  
Indraprastha Estate,  
Mahatma Gandhi Marg,  
New Delhi-110002, India  
Website: [www.searo.who.int](http://www.searo.who.int)



SEA-CD-297