New pathogens – particularly viruses – from animals remain unpredictable, continue to emerge and spread across countries, and have profoundly affected international travel, trade and tourism including in the WHO South-East Asia Region. The WHO Regional Office for South-East Asia has developed a Regional Strategic Framework for Prevention and Control of Zoonoses which aims to improve the health status and quality of life of the population by reducing the socioeconomic burden caused by zoonoses. Although an intersectoral coordination mechanism has been established at country level in the wake of the outbreak of avian influenza (H5N1), it is time to reorganize this mechanism to address broader aspects of surveillance, prevention and control of zoonotic diseases. A Regional Meeting on Zoonotic Diseases was organized to bring together all the stakeholders, review current status of zoonotic diseases, and discuss possible ways forward in combating zoonotic diseases in this changing context. The objectives of the meeting were to review the current status of zoonoses, to identify priority areas for national and regional coordination and response, and to share good practices in managing priority zoonoses. The meeting provided a platform for human health and animal health officials from Member States, experts and other stakeholders to discuss zoonotic influenza, rabies and antimicrobial resistance.
Regional meeting on zoonotic diseases

Report of the meeting
Chiang Mai, Thailand, 20–22 August 2013
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**Abbreviations and acronyms**

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<th>Description</th>
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<tr>
<td>AMR</td>
<td>antimicrobial resistance</td>
</tr>
<tr>
<td>APSED</td>
<td>Asia Pacific Strategy for Emerging Diseases</td>
</tr>
<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
</tr>
<tr>
<td>CCHF</td>
<td>Crimean–Congo haemorrhagic fever</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Diseases Control and Prevention</td>
</tr>
<tr>
<td>COMBI</td>
<td>communication for behavioural impact</td>
</tr>
<tr>
<td>ECTAD</td>
<td>Emergency Centre for Transboundary Animal Diseases</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
</tr>
<tr>
<td>HPED</td>
<td>Highly Pathogenic Emerging Diseases (project)</td>
</tr>
<tr>
<td>INFOSAN</td>
<td>International Network of Food Safety Authorities</td>
</tr>
<tr>
<td>MERS-CoV</td>
<td>Middle East respiratory syndrome coronavirus</td>
</tr>
<tr>
<td>OIE</td>
<td>World Organisation for Animal Health</td>
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<tr>
<td>PVS</td>
<td>performance of veterinary services</td>
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<tr>
<td>SARS</td>
<td>severe acute respiratory syndrome</td>
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<tr>
<td>SAARC</td>
<td>South Asian Association for Regional Cooperation</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>WSPA</td>
<td>World Society for the Protection of Animals</td>
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Executive summary

Considering the high burden of endemic zoonoses and greater vulnerability of countries in the Region, the WHO Regional Office for South-East Asia has developed a Regional Strategic Framework for the Prevention and Control of Zoonoses. The Framework envisions the control/elimination of zoonoses in the South-East Asia Region and aims to improve the health status and quality of life of the population by reducing the socioeconomic burden caused by endemic, emerging and re-emerging zoonoses. The Strategic Framework was discussed by Member States during the Regional Meeting on Zoonotic Diseases held in November 2007 in Jakarta, Indonesia. As per the Strategic Framework and recommendations of that meeting, the WHO Regional Office for South-East Asia developed a project proposal for strengthening surveillance and response to zoonoses and emerging diseases, which was funded by the European Union (EU). Since 2010, WHO has been working with the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE) as part of the EU-funded Highly Pathogenic and Emerging Diseases (HPED) project. A tripartite coordination mechanism has been established to support this work by strengthening collaboration in the prevention and control of zoonotic diseases at the regional and country levels.

Although an intersectoral coordination mechanism was established at the country level in the wake of the outbreak of avian influenza A(H5N1), it is time to reorganize this mechanism to address broader aspects of surveillance, prevention and control of zoonotic diseases. Recently there were outbreaks of avian influenza A(H7N9) in China, Crimean-Congo haemorrhagic fever in India, and novel coronavirus in the Middle East. It is therefore necessary to review the existing surveillance and response mechanisms for emerging diseases including zoonoses. Multisectoral coordination is needed to deal with biological, chemical and radionuclear hazards in order to implement the International Health Regulations (2005). In addition, national IHR focal points have to understand the role of the animal health sector and partner organizations in surveillance, prevention and control of zoonoses, food safety, and containment of antimicrobial resistance (AMR).
Report of the meeting

To bring together all the stakeholders and to review the current status of zoonotic diseases and discuss ways forward to combat zoonotic diseases in this changing context, a Regional Meeting on Zoonotic Diseases was organized in Chiang Mai, Thailand in August 2013. The objectives of the meeting were to review the current status of zoonoses; to identify priority areas for national and regional coordination and response; and, to share good practices in managing priority zoonoses.

The meeting was attended by public health and animal health officials responsible for zoonoses control as well as national IHR focal points from nine countries of the South-East Asia Region. Technical discussion was facilitated by experts from FAO, OIE, Centers for Disease Control and Prevention (CDC) Thailand and temporary advisers from Bangladesh, Bhutan, Indonesia, Nepal, Thailand and WHO collaborating centres based in Hong Kong Special Administrative Region (Hong Kong SAR), India and Thailand. A total of 47 participants attended the meeting. It provided a platform for human health and animal health officials from Member States, experts and other stakeholders to discuss zoonotic influenza, rabies and AMR, which require a holistic multidisciplinary and multisectoral approach at the human-animal interface. There were presentations on emerging zoonoses, the problem of AMR in the human health and animal health sectors, success stories on rabies control/elimination, lessons learnt from avian influenza A(H7N9), the international disease surveillance network for epidemic-prone human diseases, transboundary animal diseases, food safety and zoonotic events, media communication and community participation in zoonoses control. A template for poster presentation was provided to country participants and there was interactive discussion on priority zoonoses, intersectoral coordination, surveillance and response to zoonotic events, and good practices for zoonoses prevention and control. The major observations of the meeting were as follows.

- All countries have defined a national list of priority zoonotic diseases. Avian influenza, rabies, leptospirosis, brucellosis and anthrax have been identified as priorities by the majority of countries. Member States may wish to consider reviewing the lists of priority zoonoses that were previously agreed at the national level. In addition, the criteria discussed in this workshop can be used to facilitate consensus on a list of zoonotic diseases of regional importance.
All countries of the South-East Asia Region have phased out production and use of nerve-tissue vaccine for prophylaxis of rabies in humans. WHO has been advocating the introduction of cost-effective intradermal rabies vaccination to ensure availability, affordability and accessibility.

In 2012, a Strategic Framework for Elimination of Human Rabies Transmitted by Dogs in the South-East Asia Region was developed by WHO in consultation with rabies experts from countries of the Region. Some countries are already adapting the Framework to develop national strategies for the elimination of rabies. Success stories and lessons learnt for rabies control and subsequent elimination were shared by Bangladesh, Sri Lanka and Thailand.

The emergence of avian influenza A(H7N9) and Middle East respiratory syndrome coronavirus (MERS-CoV) are further reminders that infectious diseases continue to emerge globally and pose a threat to the South-East Asia Region. Preparedness for the possible spread of these diseases is a regional priority.

AMR is an emerging problem that has an important component related to the human-animal interface. There is a need for greater dialogue and advocacy, as well as awareness and education on the rational use of antimicrobial substances in both animal production, as well as in the treatment of infection in both humans and animals.

Control of zoonotic diseases can be strengthened by the active involvement of communities. A participatory approach can support event detection and outbreak response, including the application of appropriate interventions. In particular, the involvement of community leaders will help the development of strategies for communication that respect local knowledge, and deliver information to target populations using the most effective modalities.

Group discussions helped to formulate specific recommendations on the following thematic topics: prioritization of zoonotic diseases, surveillance and response for zoonotic events, intersectoral coordination, communication, and community participation for prevention and control of zoonoses.

Member States were requested to increase advocacy for intersectoral coordination for control of all priority zoonoses; review/update existing policies, legislations and regulations related to prevention and control of
zoonoses and develop joint policies where possible and necessary; develop multisectoral action plans for the control of AMR including both human and animal health sectors; and, develop an integrated multisectoral communication plan for the prevention and control of zoonotic diseases.

WHO and partner organizations were requested to develop a detailed roadmap for implementation of priority zoonosis activities with defined timelines and arrangements for monitoring and evaluation, using existing tools including those for IHR/APSED; and advocate for, and support development of, multisectoral national action plans for the control of AMR including both human and animal health sectors.
1. **Background**

Approximately 60% of all human infectious diseases and 70% of those reported in the last 30 years are likely to have originated in animals. New pathogens from animals, particularly viruses, remain unpredictable, continue to emerge and spread across countries, and have profoundly affected Member States of the WHO South-East Asia Region. Outbreaks of emerging diseases such as severe acute respiratory syndrome (SARS), avian influenza A(H5N1) and Nipah virus infection have caused widespread economic loss as well as being threats to public health.

Zoonotic infections increase in proportion to the number of animals and the intensity of their contact with human beings. The close continuous contact between humans and animals common in the Region provides ample opportunity for cross-species infection by microorganisms, as well as genetic modification and adaptation to the new host. This has been further exacerbated by the increasing population pressure, which has led to environmental degradation and the destruction of animal habitats. In addition, demand for meat production has also increased exponentially. The trade in animals and animal products as food is of enormous economic value; however, it remains largely unregulated and can be a potential source of major outbreaks.

The International Health Regulations (2005), a legal framework that binds Member States and WHO to certain obligations aimed at containing the spread of diseases between countries, is a potent tool to prevent the spread of emerging infectious diseases. Establishment of IHR core capacities, including for prevention and control of zoonoses, is a legal obligation for countries with a defined timeline (initially by 2014, but with a possible extension until 2016). Similarly, the IHR (2005) require WHO to support the development of these capacities, with a focus on those Member States where the need is greatest. Multisectoral coordination is necessary to deal with biological, chemical and radionuclear hazards in order to implement IHR (2005). In addition, national IHR focal points have to understand the role of the animal health sector and partner organizations in surveillance, prevention and control of zoonoses, food safety, and
containment of antimicrobial resistance (AMR). The WHO regional offices for South-East Asia and the Western Pacific have also developed a common Asia Pacific Strategy for Emerging Diseases (APSED), which is designed to support Member States to develop the core capacities required for full implementation of the IHR (2005). Zoonoses control is one the priority areas of the APSED, and establishment of a functional coordination mechanism for the prevention and control of zoonoses is a priority.

Considering the high burden of endemic zoonoses and the greater vulnerability of countries in the Region to emerging zoonoses, the WHO Regional Office for South-East Asia has developed a Regional Strategic Framework for Prevention and Control of Zoonoses. The Framework envisages the control/elimination of zoonoses in the Region, and thereby aims to improve the health status and quality of life of the population by reducing the socioeconomic burden caused by endemic, emerging and re-emerging zoonoses. The Regional Meeting on Zoonotic Diseases held in Jakarta, Indonesia in November 2007 endorsed the Regional Strategic Framework for Prevention and Control of Zoonoses. The Regional Office for South-East Asia designed a project proposal to implement the Strategic Framework and recommendations of the regional meeting. The project proposal was jointly submitted by the Food and Agricultural Organization of the United Nations (FAO), the World Organisation for Animal Health (OIE) and WHO to the European Union (EU), and was accepted. The three organizations are collaborating to implement the EU-funded Highly Pathogenic Emerging Diseases (HPED) project to establish a functional coordination mechanism and to build surveillance and response capacity for zoonoses across the Region.

Zoonoses control demands multisectoral coordination and collaboration and this can only be achieved if the health, agriculture, food safety and other sectors work together with common goals. Although an intersectoral coordination mechanism has been established at the country level in the wake of the outbreak of avian influenza A(H5N1), it is time to reorganize this mechanism to address broader aspects of surveillance, prevention and control of zoonotic diseases. Recently there were outbreaks of avian influenza A(H7N9) in China, Crimean-Congo haemorrhagic fever in India and novel coronavirus in Middle East countries, and it is necessary to review existing surveillance and response mechanisms for emerging diseases, including zoonoses, and to develop an action plan to address new challenges. A Regional Meeting on Zoonotic Diseases was organized to bring together all the stakeholders, review the current status of zoonotic...
diseases and discuss the possible way forward in combating zoonotic diseases in the changing context. The meeting had the following objectives:

- to review the current status of zoonoses in the South-East Asia Region in the context of the Regional Strategic Framework for the Prevention and Control of Zoonoses (2007);
- to identify priority areas for national and regional coordination and response;
- to share good practices in managing priority zoonoses at the human-animal interface;
- to develop the way forward with focus on the human-animal interface, rabies elimination, zoonotic influenza and AMR.

2. Inauguration

Dr Pasakorn Akarasewi delivered the welcome address on the behalf of the Ministry of Public Health, Royal Government of Thailand. He highlighted the importance of zoonotic diseases, especially in the context of new developments such as the emergence of avian influenza A(H7N9), Middle East respiratory syndrome coronavirus (MERS-CoV) and others. More than 75% of emerging infectious diseases are of zoonotic origin and therefore core capacity development for preparedness, surveillance and response to zoonotic events is important for implementation of the IHR (2005). In addition, zoonoses have a serious impact on food safety, livelihoods and international health security.

Dr Akarasewi said Thailand was working to prevent and control outbreaks of zoonotic diseases through five areas. Firstly, there was political commitment for achieving this, with a strategic plan being developed for zoonoses. Secondly, there was emphasis on building capacity in this area by training public health officials as well as entomologists. Thirdly, the country was working in collaboration with international agencies such as WHO, FAO and OIE. Capacity-building for surveillance and response to disease outbreaks in both animals and humans was another priority area for the country. Lastly, information exchange between the various sectors involved, research and development, and knowledge management were being encouraged. He emphasized that during the meeting, there were many
things that participants from each sector and area of expertise could learn from each other.

On behalf of the Chiang Mai Provincial Medical Office, Dr Susaring Visarutrath, Deputy Chief, welcomed all participants to the city of Chiang Mai and wished the meeting successful deliberations.

The message from Dr Samlee Plianbangchang, Regional Director, WHO Regional Office for South-East Asia, was delivered by Dr Richard Brown, Regional Adviser, Disease Surveillance and Epidemiology (DSE) unit. Reiterating that the prevention and control of zoonoses remains a priority in contemporary society, the Regional Director’s message noted that the emergence of new viruses such as A(H7N9) and MERS-CoV has led to considerable concern among the public health community as well as the general public. The outbreaks of SARS, avian influenza A(H5N1) and Nipah virus infection in Asian countries clearly demonstrated that new, highly infectious and/or highly pathogenic agents periodically emerge at the human-animal interface, and will continue to emerge in the future. The experience of countries in the South-East Asia Region with avian influenza A(H5N1) and pandemic (H1N1) 2009 has reinforced the need for sustained, well-coordinated, multisectoral, multidisciplinary, community-based actions to address emerging disease threats that arise at the human-animal interface.

Much needs to be done in this area. The APSED is a unique bi-regional strategy for strengthening capacity for communicable disease surveillance and response, jointly developed by the WHO regional offices for South-East Asia and the Western Pacific. In June 2007, the new IHR (2005) came into force and called upon countries and WHO to strengthen their capacity to detect, report and respond to acute public health events. APSED, therefore, also serves as a roadmap to ensure that all countries in the Region, without exception, are able to establish the capacity to fulfil the requirements of the IHR, thus ensuring regional health security and contributing towards international health security. The APSED (2010) is an updated strategy that builds on the progress made and lessons learnt over the previous 5 years, as well as the response to pandemic influenza (H1N1) 2009.

Considering the high burden of zoonoses in the South-East Asia Region, the Regional Office developed a Regional Strategic Framework for Prevention and Control of Zoonoses. Much progress has been made in
strengthening country capacity for prevention and control of zoonoses, but more needs to be done to enhance surveillance and response capacity to deal with future threats due to emerging zoonotic diseases.

Dog-mediated rabies is a major zoonotic disease of public health importance in most countries of the Region and much effort is needed to control dog rabies through multisectoral coordination and collaboration. WHO is working with Association of Southeast Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) communities to eliminate human rabies by 2020 through international partnership with the FAO, the OIE and animal welfare organizations. With high political commitment, and the innovative use of available tools, elimination of human rabies transmitted by dogs is an attainable goal.

Dr Samlee had expressed the hope that the meeting would provide a common platform to share good practices to improve coordination, collaboration and cooperation between the human and animal health sectors for prevention and control of zoonoses at the human-animal interface. He hoped that participants would be able to identify the optimum combination of actions and approaches to strengthen surveillance, and response to zoonotic events in line with IHR (2005) requirements.

Dr Subhash Morzaria, Regional Manager, Emergency Centre for Transboundary Animal Diseases (ECTAD), FAO Regional Office for Asia and the Pacific, Bangkok, Thailand, spoke about the role of FAO and how it works together with other sectors. The mandate, he emphasized, was food security. This included nutrition security, livelihood security and agriculture development. Livestock is an important component of nutrition security, and therefore FAO works closely with livestock farmers. Animals with disease result in lost livelihoods and affects food security. Animals play a very important role in food security and diseases in humans, so the attempt is to safeguard people working with animals from diseases. ECTAD now has a broad mandate for all diseases, including non-zoonotic diseases. To achieve this, a multisectoral and multidisciplinary approach needs to be promoted. He emphasised the need to follow the “One Health” concept – public health, animal health and environmental health – as a holistic approach.

Dr Mary Joy N Gordoncillo of OIE provided an overview of OIE’s role and work in the Region. OIE is involved in the improvement of veterinary
services, particularly the development of standards, as well as veterinary capacity and prevention and control of animal diseases. This is important as animal health influences human disease prevention and control. AMR, rabies, and avian influenza are among OIE’s priorities. It also works through the tripartite coordination mechanism.

3. Global and regional overview of zoonoses

The session on Global and regional overview of zoonoses was chaired by Dr Pasakorn Akarasewi and co-chaired by Dr Ram Krishna Khatiwada. The session provided updates on zoonotic diseases and transboundary animal diseases and familiarized participants with FAO, OIE and WHO collaborative activities for zoonoses prevention and control, including the IHR (2005) and performance of veterinary services (PVS).

The presentations on emerging zoonoses provided evidenced-based information on the emergence of viral zoonoses at the human-animal-ecosystems interface as well as updates on MERS-CoV in Middle East countries and CCHF outbreak investigation and lessons learnt in India.

3.1 Global and regional update on zoonoses

Dr Gyanendra Gongal

Asia is, unfortunately, an epicentre for emerging infectious diseases including those that cross the species barrier from animals to humans. More than 30 newly identified human pathogens in 30 years – approximately 75% of new emerging human infectious diseases – have been zoonotic. Currently, there are several newly emerging infectious diseases that pose serious public health threats: Nipah virus, avian influenza A(H5N1), pandemic influenza A(H1N1) 2009, avian influenza A(H7N9) and MERS-CoV. Concurrently, outbreaks of known epidemic-prone diseases continue to occur such as leptospirosis, CCHF and Japanese encephalitis. Risk factors involved in the emergence of such diseases, leading to outbreaks, were elaborated such as close human–animal relationship, intensification of livestock production.

Poultry outbreaks of highly pathogenic avian influenza A(H5N1) continue to be reported from many Asian countries causing huge
socioeconomic impact. Only a few human cases of A(H5N1) (who were exposed to sick or dead poultry) with a high case fatality rate have been reported from high-endemic countries; however, the issue of cocirculating avian influenza A(H5N1) and other influenza viruses, and the possibility of virus reassortment, remains. Avian influenza A(H7N9) is of public health concern because the human acts as sentinel as it is subclinical in poultry and birds. There is no evidence of sustained or ongoing person-to-person transmission.

Another zoonotic public health threat is CCHF, which has been reported from India. Although CCHF has not yet been reported in other countries of the South-East Asia Region, the vectors responsible for transmission of CCHF are present. Leptospirosis, which occurs after floods, is also an emerging disease problem in a number of Asian countries.

Considering the high burden of endemic zoonoses and the growing threat of emerging zoonoses, the Regional Office for South-East Asia has developed regional initiatives for zoonoses control and rabies elimination. Zoonoses are also a priority area under APSED and the WHO regional offices for South-East Asia and the Western Pacific are jointly implementing the APSED workplan to build the capacity required for implementation of IHR (2005). WHO has been working in close partnership with OIE and FAO for zoonoses prevention and control, and a tripartite coordination mechanism has been established to support collaborative activities to build country capacity, implemented with funds from the EU’s Highly Pathogenic Emerging Diseases (HPED) project and USAID’s IDENTIFY project.

The emergence of new zoonotic pathogens highlights the need for enhanced surveillance, early diagnosis through laboratory testing, and close collaboration between the human and animal health sectors.

3.2 INFOSAN: sharing food safety concerns

Dr Gyanendra Gongal

The presentation provided a brief overview of food safety in the context of implementation of the IHR (2005) and elaborated the role of the International Food Safety Authorities Network (INFOSAN) in strengthening foodborne disease surveillance and response. Food safety issues can arise because of foodborne pathogens and the use of pesticides, antimicrobial
substances, veterinary drugs and chemicals during production, processing and preservation of food and food products. In addition, there is a potential threat of contamination of food due to chemical and radionuclear events and thus an “all-hazards” approach is needed for food safety. International foodborne disease outbreaks are reported frequently as a result of the globalization of food trade; resource-poor countries are more vulnerable as they have limited capacity for monitoring of food quality, contamination and surveillance of food safety events. The challenges for food safety are that infected animals often show no symptoms; contaminated food often looks, smells and tastes normal; and pathogens may not be killed by traditional preparation techniques.

Under the IHR (2005) countries are obligated to develop core capacities for potential biological, chemical and radiological hazards. Biological hazards could be infectious, zoonotic or foodborne. Hence, food safety is an IHR priority.

INFOSAN plays a critical role in reporting and alerting the national food safety authorities of food safety events and potential hazards. It is a global network of national food safety authorities, with 177 countries as members. It promotes the exchange of important food safety information globally, responds to international food safety events, and helps countries strengthen capacity to manage food safety risks with the goal of preventing its occurrence at each stage, from production to processing to transportation of food. INFOSAN plays a complementary role in IHR reporting. It is therefore important that multisectoral collaboration is used for IHR implementation, and national INFOSAN networks be built to increase their operational capacity. Communication between INFOSAN emergency contact points and national IHR focal points should also be enhanced.

### 3.3 Performance of veterinary services assessment and the World Animal Health Information System

*Dr Mary Joy N Gordoncillo*

An overview was given of OIE’s mandate and role, strategic objectives and standard-setting, as well as technical activities to facilitate the fair trade of animal products, international movement of animals and well-being of animals. OIE is an intergovernmental organization founded in 1924; there
are 174 member countries and numerous international organizations participating in OIE activities. The six strategic objectives of OIE are: international communication of animal disease information; development and implementation of scientific standards and guidelines; prevention, control and eradication of animal diseases; ensuring the scientific excellence of information and advice; capacity-building of national veterinary services; and strengthening policy design, applied research and governance. OIE works with governments, donors and stakeholders to build capacity through veterinary legislation, public/private partnerships, veterinary education and laboratories.

It was highlighted that veterinary services should be independent and objective in their activities, and decisions should be based on sound science and immune from political pressure. It is based on five pillars: trade, animal health, veterinary public health, veterinary laboratories, and management and regulatory services. OIE has developed a tool for the evaluation of performance of veterinary services (PVS) to assess national capacity, function and quality of veterinary services, and to make recommendations to improve national veterinary services as per international standards and OIE guidelines. The OIE PVS Pathway is a global programme for the sustainable improvement of a country's veterinary services' compliance with OIE standards on quality. A group of independent experts are assigned to conduct assessment in member countries on their request. The assessment has been completed in most countries of the South-East Asia Region. This is an important foundation for improving animal and public health and enhancing compliance with sanitary and phytosanitary standards at the national, regional and international level. OIE and WHO are working together to develop a joint assessment tool: the IHR/PVS assessment tool, to assess the quality of public health and veterinary services. Pilot testing will be done in Asia in 2014.

3.4 FAO activities for surveillance, response and control of transboundary animal disease and zoonoses

Dr Subhash Morzaria

The presentation focused on the tripartite collaboration between WHO, OIE and FAO for preparedness, surveillance and response to emerging infectious diseases including zoonoses at the human-animal interface, which has been increasingly active particularly in the Asia-Pacific region.
The collaboration has set the vision as a “world capable of preventing, detecting, containing, eliminating and responding to animal and public health risks attributable to zoonoses and animal diseases with an impact on food security through multi-sectoral cooperation and strong partnerships”. The tripartite collaboration has identified four strategic areas of work: provision of animal disease and zoonoses information; development and implementation of scientifically-based standards; prevention, control and eradication of animal diseases including zoonoses; and, good governance and veterinary science capacity-building.

A Global Early Warning and Response System has been established, combining and coordinating the alert and response mechanisms of OIE, FAO and WHO. This is used for forecasting, prevention and control of major animal diseases and zoonoses. FAO is working closely with OIE to develop and implement scientifically-based standards. FAO has published a number of position papers on transboundary animal diseases and zoonoses such as highly pathogenic avian influenza, foot and mouth disease, peste des petits ruminants, Rift Valley fever, rabies, brucellosis, contagious bovine pleuropneumonia and trypanosomiasis. FAO was at the forefront of rinderpest eradication; supported dog rabies control in Bali; and has developed the progressive control pathway for foot and mouth disease, which can be replicated for other priority diseases. There has also been a shift in approach, from a single-disease to a multi-disease approach. The importance of the value-chain approach in highly pathogenic avian influenza control was shared.

Many economically important livestock diseases are transboundary in nature, and major emphasis has been given to building epidemiological and surveillance capacities at the country level. The Field Epidemiology Training Programme for Veterinarians has been initiated in China and Thailand, and short field epidemiology training courses have been initiated in India and Nepal. FAO has been providing expertise for OIE PVS Pathway for efficient veterinary services. Ultimately, the goal of tripartite collaboration is to follow the One Health approach at the human-animal-ecosystems interface – internationally, regionally and nationally.

4. Emerging zoonoses

The session on Emerging zoonoses was chaired by Dr Pasakorn Akarasewi and co-chaired by Dr Ram Krishna Khatiwada. The presentations on
emerging zoonoses provided evidenced-based information on the emergence of viral zoonoses at the human-animal-ecosystems interface as well as updates on MERS-CoV in Middle East countries and CCHF outbreak investigation and lessons learnt in India.

4.1 Emerging zoonoses and challenges ahead

Professor Thiravat Hemachudha

The Director of the WHO Collaborating Centre for Research and Training on Viral Zoonoses in Bangkok, Thailand provided a brief overview of the evolution of zoonotic pathogens. Since the 1970s, a number of pathogens have crossed the species barrier thereby increasing the threat of pandemics. Factors determining the pandemic potential of pathogens include virulence, transmissibility, host range, host-receptor interaction and host susceptibility. Even when a pathogen crosses the species barrier, to replicate in humans it needs several preconditions to be fulfilled in the host including contact, entry, replication and spread within the human body. Then, there needs to be efficient human-to-human transmission, and the magnitude of severity depends on the immunologically naïve condition, age or pre-existing conditions.

In 50% of acute fever/encephalitis cases, the cause is unidentified as the search for pathogens may be too specific or there is too much reliance on the data of geography-specific pathogens. The biggest threats are from RNA- rather than DNA-viruses. Research has been done on the neurological complications of dengue virus infection. Dengue is a major cause of encephalitis even when there is no other symptom of dengue. Another emerging viral disease reported that leads to acute encephalitis is the Chandipura virus, which caused a large outbreak with high fatality rates in Andhra Pradesh in India in 2003. In Northern Viet Nam, a Litchie-associated acute encephalitis outbreak was reported between 2004 and 2009.

The clinical course taken by various cases of acute encephalitis and the evolution of various viruses of pandemic potential were also described. More research is needed to know the mechanisms for geographical spread and adaptability of viral pathogens in a number of host species.
4.2 Updates on MERS-CoV

Dr Richard Brown

In 2013, the world was experiencing an unusual global situation regarding emerging infectious diseases. Two new viruses were reported as infecting humans – MERS-CoV and avian influenza A(H7N9). They were unrelated viruses, but both caused severe acute respiratory illness. Not much was known about them, but both were considered to have the potential to evolve and spread.

Reports of a new virus were initially seen in the media in September 2012 in the Middle East, and WHO was notified on 22 September 2012. An outbreak of acute respiratory illness had occurred in April 2012 in Al Zarqa, Jordan. Eleven people were affected including 8 health care workers, and a nurse died. The cause of the outbreak was unknown at the time. In a retrospective investigation, the stored samples were retested in September 2012, and 2 cases were laboratory-confirmed as MERS-CoV. Since then, it has been reported in many countries in the Middle East and in Europe, particularly due to the airlift of patients for better hospital care and treatment.

Globally, as of 19 August 2013, there were 94 laboratory-confirmed cases of MERS-CoV. The median age was 50 years (range: 14 months–94 years). Of these, 55/90 were male (61%), and there were 47 deaths (50%). The affected countries were France, Germany, Italy, Jordan, Qatar, Saudi Arabia, Tunisia, the United Arab Emirates and the United Kingdom.

As of 7 June 2013, at least 8 clusters (42 cases) had been reported from six countries: France, Italy, Jordan, Saudi Arabia, Tunisia and the United Kingdom. There is clear evidence of limited human-to-human transmission. In a hospital outbreak of MERV-CoV in the eastern province of Saudi Arabia, 21 of 23 cases were acquired by person-to-person transmission in 3 different health-care facilities.

Clinical findings showed that in a study of 55 cases, all patients had respiratory symptoms, 84% had pre-existing conditions, 97% required hospitalization, and cases also had fever and gastrointestinal symptoms. However, asymptomatic or mild cases of MERS-CoV have also been reported. The incubation period of the virus appears to be between 1–13 days. The mode of transmission is through contact and respiratory
droplets. Genetically, the virus seems most closely related to the bat coronavirus first isolated in 2006. Multiple studies have now found high prevalence of antibodies in camels. However, there are inadequate data to determine the source of the virus and the geographical extent of the virus is still poorly understood.

WHO’s current risk assessment is that further cases of MERS-CoV are expected and WHO encourages all Member States to continue their surveillance for severe acute respiratory infections and to carefully review any unusual patterns. WHO does not advise special screening at points of entry with regard to these events nor does it currently recommend the application of any travel or trade restrictions. However, the situation is continually under review.

4.3 Crimean-Congo haemorrhagic fever in India

Dr Veena Mittal

Crimean-Congo haemorrhagic fever (CCHF) is considered a public health threat because of its epidemic potential, high case fatality, nosocomial outbreaks, and difficulties in treatment and prevention. Outbreaks of CCHF have been reported from more than 30 countries, but the first case of the disease reported in the South-East Asia Region was from Gujarat, India in 2011.

CCHF is asymptomatic in infected animals, and has a wide range of hosts. Numerous wild and domestic animals such as cattle, goats, sheep and hares serve as amplifying hosts for the virus. Ixodid (hard) ticks are both reservoir and vector for the CCHF virus. Transmission to humans is through the bite of an infected tick, contact with infected animal blood and tissues, or contact with infectious blood or body fluids of a patient. It has been documented that spread of CCHF has also occurred in hospitals due to improper sterilization of medical equipment, reuse of injection needles, and contamination of medical supplies.

The experience and lessons learnt from outbreak investigation of human cases in Gujarat, India was shared. A multidisciplinary team consisting of an epidemiologist, microbiologist, veterinary public health specialist, entomologist, representative from the Department of Animal Husbandry and a clinician investigated the deaths. Contact tracing was
conducted and epidemiological linkages were followed. The Department of Animal Husbandry and the Government of Gujarat, along with the High Security Animal Disease Laboratory in Bhopal, Madhya Pradesh, collected 251 animal sera predominantly from buffaloes followed by cattle, goat and sheep. Environmental investigation also confirmed the presence of CCHF virus in ticks. Suspected or diagnosed patients with CCHF were admitted only in the designated hospitals with isolation facilities. Serological/tick surveillance in domestic animals was carried out in and around the area to detect the prevalence of CCHF. Risk communication activities included health education in the community about the cause of disease and transmission through tick bites and prevention. Media briefings were regularly carried out by state health officials to keep the public informed.

Early clinical case reporting, laboratory confirmation, clinical case management and timely institution of prevention and control measures, involving all sectors, have helped in the prevention of further spread of disease and outbreak containment.

4.4 Poster session: intersectoral coordination for the prevention and control of zoonoses

Member States identified their priority diseases among zoonoses, and outlined their intersectoral collaboration activities and the main challenges.

Prioritization of diseases is a complex exercise that is influenced by associated risks, such as infectious agent (morbidity, mortality and case fatality ratio), disease trend (endemicity, epidemic potential, potential to be introduced) and control measures (treatment, vaccine, depopulation). Socioeconomic impacts also need to be considered, such as employment and livelihood, consumer confidence, compensation and trade restrictions. The priority diseases selected by the countries are listed in Table 1.
Most countries prioritized zoonoses by considering their epidemic potential, economic and/or public health importance, and perceived risk or impact. Some countries informed that the priority diseases were different for the human and animal health sectors. Leptospirosis may be important for the public health sector, whereas brucellosis may be important for the animal health sector as it affects livestock productivity. It was difficult to understand how hydatidosis, toxoplasmosis, brucellosis and leptospirosis were considered as priority zoonoses in Nepal when the magnitude of the disease problem and socioeconomic impact of selected diseases were not known.

In all countries, key intersectoral activities include national plans and committees involving all sectors; good surveillance systems being in place involving all sectors; and systems being in place at ground level for human and animal health sector collaboration.

Table 1: Country-wise list of priority zoonoses

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<th>Rabies</th>
<th>Avian influenza</th>
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The challenges faced by all countries in the prevention and control of zoonoses include resource constraints, both human and financial; the need for greater political commitment; and increased advocacy to policy-makers. Although coordination between the animal and human health sectors is improving, much needs to be done and there is still scope for greater collaboration between the two sectors.

5. Antimicrobial resistance

This technical session was chaired by Dr Shiba Kumar Rai and co-chaired by Dr Wantana Paveen Kittiporn. It focused on the problem of AMR due to extensive use of antimicrobial substances in human health, animal health and food safety.

5.1 AMR and human health

*Dr Wantana Paveen Kittiporn*

The Director of the WHO Collaborating Centre for Antimicrobial Resistance Surveillance and Training, National Institute of Health, Bangkok made a presentation on the status of AMR and shared surveillance activities in Thailand.

National AMR surveillance was established in 1997 and expanded in two phases. The National Institute of Health was designated a WHO Collaborating Centre for Antimicrobial Resistance Surveillance and Training in 2005. Its main objectives were to: monitor the magnitude and trend of AMR among bacteria isolated from humans; standardize laboratory techniques; and, strengthen/support quality assessment in clinical microbiology laboratories. Ultimately, evidence-based information related to AMR was disseminated to advocate prudent use of antimicrobial substances and containment of AMR. Today, the surveillance network consists of 23 hospitals collecting specimens of all organisms from patients of all ages, continuously, to monitor AMR. Strict standards are in place to ensure the highest levels of quality.

The number of isolates received and analysed through this network has increased from 114,155 records in 2001 to 176,999 records in 2011. The leading resistant pathogens found are: vancomycin-resistant
enterococci, methicillin-resistant *Staphylococcus aureus* (MRSA), penicillin-resistant *Streptococcus pneumoniae* (PRSP), *Acinetobacter spp.*, *Pseudomonas aeruginosa*, *Stenotrophomonas maltophilia*, extended-spectrum beta-lactamase-producing gram-negative bacteria such as *Klebsiella pneumoniae*, *Escherichia coli* and carbapenem-resistant Enterobacteriaceae.

The results and impact of vancomycin-resistant enterococci, MRSA, antimicrobial-resistant *S. pneumonia* and imipenem-resistant *Acinetobacter spp.* were described. Vancomycin-resistant enterococci have acquired resistance either through intrinsic resistance genes or through plasmids. They spread mainly in health-care settings and therefore pose a high risk in a low immunity, multiple antibiotics approach, and in long-term therapy. It was highlighted that the rate of vancomycin resistance has decreased since 1999 when avoparcin was banned. MRSA is seen in much higher rates in patients (30–40%) compared to healthy individuals (0.8–3.5%). It is resistant to penicillin and cephalosporin, and it spreads from health-care settings to community settings. Antimicrobial-resistant *S. pneumonia* poses a risk when a multiple antibiotics approach to treatment is taken, in long-term health care, and also in recent respiratory infections. The rate of infection with imipenem-resistant *Acinetobacter spp.* increased from 14.4% in 2000 to 68.6% in 2012. These bacteria are usually seen in hospital infections in intensive care unit settings.

Information on antibiotic resistance has been disseminated through websites, annual reports and the media. A system of alerting or signalling stakeholders on AMR has also been established.

In order to contain AMR at the national level, it is essential that national policy on AMR is in place and a national monitor system for rational use of antibiotics is in place at all levels of health facilities.

### 5.2 AMR, animal health and food safety

*Dr Mary Joy N Gordoncillo*

Since the 1940s, the number of novel antimicrobials has decreased and investment in development has decreased; meanwhile, the level of AMR has increased. This poses a serious threat to both human and animal health.
Antibiotics are used in the animal health sector for both therapeutic and nontherapeutic purposes. This builds up resistance to the drugs. Consequently, there has been an increase in morbidity and mortality as well as reduction in the efficacy of antibiotics, resulting in increased health-care cost in animals. There has been an increase in the carriage of the resistance genes and their dissemination, all of which has facilitated the emergence of AMR in humans as well.

As countries begin to bring serious diseases under control, veterinary services have broadened to address production diseases of livestock, where control leads to more efficient production and/or better quality animal products. Arising from its mandate for the protection of animal health and food safety, the OIE developed guidelines for member countries to contain AMR risks in the animal health sector including: guidance for harmonization of national AMR surveillance and monitoring programmes; monitoring of quantities used for animal husbandry; and, responsible and prudent use of antimicrobials in veterinary medicine.

All countries of the WHO South-East Asia Region were given the opportunity to share country experience on rational use of antimicrobial substances, coordination and collaboration between human and animal health sectors, and major challenges in containment of AMR. Discussion was focused on existing antimicrobial policies in human and animal health. Bangladesh has a plan and an intersectoral coordination committee on this issue. In Myanmar, selling of veterinary drugs is not restricted, leading to challenges. A committee is going to be established to train drug-sellers on the issue. Indonesia has banned the use of antibiotics in animal feed, with some exceptions. There will be research on levels of awareness among general practitioners. In India, a monitoring committee for AMR has been constituted, and AMR policy is in place. The policy has now been revised and made functional, and is being implemented. It covers different drugs under different groups and includes infection control practices in hospitals. A project is being undertaken to have uniform antibiotic-susceptibility testing and reporting of results. Thailand also has a policy in place. Timor-Leste does not have the capacity to identify AMR. The Maldives has national infection control guidelines and monitoring tools, but no AMR surveillance. Nepal has an AMR surveillance reference laboratory. All countries suggested FAO, OIE and WHO to work together to advocate rational use of antimicrobial substances in human and animal health sectors and animal production at the country level.
6. Rabies elimination in South-East Asia

This technical session was chaired by Dr Be-Nazir Ahmed and co-chaired by Dr Veena Mittal. The session was designed to provide an overview of regional initiatives taken for rabies elimination, and to share country experience and good practices for rabies control/elimination.

6.1 Regional initiatives for rabies elimination

Dr Gyanendra Gongal

An overview of the rabies situation in Member States was presented, and WHO initiatives and international partnerships for rabies elimination were highlighted. Rabies is a major zoonotic disease of regional importance, as 8 of 11 Member States are rabies-endemic with a population of 1.5 billion at risk. The South-East Asia Region contributes 45% of the global burden of human rabies. Dog-mediated rabies is responsible for most human rabies cases, and there is a large stray dog population in the Region. The disease also has an economic impact on livestock productivity. However, rabies is not a notifiable disease in most countries, and many have no comprehensive rabies control programme.

The goal of elimination has been set because rabies is a 100% fatal but preventable disease. Children in the 5–15 years age group represent about 40% of people exposed to dog bites in rabies-endemic areas. Each year, more than 4 million people receive anti-rabies vaccination. Experiences from South America show that with tight control, the number of rabies cases can be reduced significantly. Rabies elimination programmes that focus mainly on mass vaccination of dogs are largely justified and logical.

The Strategic Framework for Elimination of Human Rabies Transmitted by Dogs in the South-East Asia Region has been developed by the Regional Office, with the goals of eliminating human rabies in endemic countries and verifying and maintaining rabies-free status in those areas free from the disease. Elimination of human rabies transmitted by dogs is defined as the “absence of any human rabies case following a bite or other exposure to an indigenous dog for a period of two years in an area where: dog rabies virus circulation between dogs has been stopped by immunization and other means; and, an effective system for human and dog rabies surveillance and
diagnosis is in place.” It is desirable that a regionally-coordinated rabies elimination programme is initiated before 2014 and elimination of human rabies transmitted by dogs is achieved by 2020. However, country-specific epidemiological situations should determine the target.

Activities planned to achieve this goal include:

- promoting a regionally-coordinated rabies elimination programme through ASEAN and SAARC initiatives;
- advocating ministries of health to develop consensus on dog rabies control at the national level and coordinate funding of an anti-rabies drive;
- promoting responsible dog ownership, and wound washing after a dog bite;
- promoting intradermal rabies vaccination in all endemic countries;
- improving rabies diagnosis through the introduction of a simple and practical diagnostic tool, i.e. direct rapid immunohistochemistry test (dRIT);
- supporting pilot projects and operational research for rabies control and elimination.

Intercountry collaboration is essential to sustain the progress made in rabies control.

6.2 Experience in rabies elimination in Thailand

Dr Apirom Puanghat

The presentation focused on progress made in rabies control and the national strategic plan to eliminate rabies in Thailand by 2020. Rabies is an important zoonotic disease that still causes a public health problem in Thailand, and the Government spends approximately US$ 30 million per year to control rabies in humans and animals. Each year approximately 400,000 people receive post-exposure rabies prophylaxis after an animal bite. There were four reported human rabies deaths in 2012. Dogs are the primary reservoir and source of rabies in humans and animals; dog bites are
Since 1992, the Ministry of Agriculture and Cooperatives, the Ministry of Public Health and relevant departments have been working together to implement a comprehensive rabies control programme. The number of human and animal rabies cases is declining through the promotion of responsible dog ownership and mass dog vaccination campaigns. Surveillance, laboratory diagnostic and dog rabies control activities are carried out by both ministries. Many districts have remained rabies-free for many years and these districts are encouraged to maintain the same status through competition. A manual for defining rabies-free areas, which is based on WHO/OIE guidelines, was developed in 2009. As per criteria for certification as a rabies-free area, there must be no reports of human or animal rabies cases for 2 consecutive years with active surveillance and effective animal movement control. Rabies control areas have been divided into three levels: presence of both human and animal rabies, absence of human rabies, and absence of human and animal rabies.

Thailand has developed a strategic plan for rabies elimination by 2020, and a memorandum of understanding on rabies elimination was signed between key stakeholders (i.e. human health, animal health and local government sectors). Five core strategies have been spelled out in the strategic plan: improve public awareness and education, enhance multisectoral engagement and public participation, establish active surveillance, increase role and responsibility of provincial/local administrative organizations, and promote efficient management and an integrated approach for rabies prevention and control.

### 6.3 National initiative for rabies elimination in Sri Lanka

**Dr Jagath Amarasekera**

The presentation focused on the changing epidemiology of rabies and challenges to achieving rabies elimination in Sri Lanka. From 1970 to 2012, there has been a decline in human rabies incidence in Sri Lanka. The
district-wise distribution of human rabies demonstrates that the incidence rate is variable. Of 25 districts, most cases are from 1 district.

An analysis of 38 human rabies cases recorded in 2012 showed that 68% were due to dog bites, whereas the source of exposure could not be explained in 21% of cases. The male to female ratio was 4:1. Farmers, labourers and students had succumbed to rabies and the majority were bitten by free-roaming dogs. None had approached health-care facilities for post-exposure rabies prophylaxis.

Animal brain samples are routinely sent to the Medical Research Institute in Colombo, and dog and cat samples constitute 88% of total samples collected for rabies diagnosis. In 2012, 63% of dog samples and 78% of cow samples tested positive, whereas 84% of human samples were confirmed as positive.

The nationwide dog vaccination campaign is coordinated by the Public Health Veterinary Services. Each district is divided into smaller divisions and the community is educated about the importance of vaccinating dogs. A place is identified for owners to bring their dogs for vaccination. An auto-plunger is used to vaccinate ownerless dogs as they are difficult to restrain. Dog population management is carried out through proper garbage disposal and animal birth control. Although surgical sterilization is the primary means of animal birth control, temporary measures such as chemical sterilization are used to check seasonal breeding.

Sri Lanka has developed a national strategic plan for rabies elimination in line with the regional strategic framework for elimination of human rabies transmitted by dogs. Involvement of the animal health sector, academic institutions, professional associations and animal welfare organizations is crucial for rabies elimination and a national coordination committee has been institutionalized. It is planned to strengthen active surveillance of dog rabies at the district level through capacity-building and logistic support.
6.4 Progress in rabies control in Bangladesh

*Dr Be-Nazir Ahmed*

The presentation focused on initiatives taken by the Government to institutionalize the rabies control programme in Bangladesh in recent years, and challenges in moving towards rabies elimination in the future. Rabies was a big burden in the past, as no systematic and effective measures were taken to control the stray dog population and dog vaccination was not practiced. People were not aware of the serious consequences of a dog bite and there was no effective rabies vaccine available in public hospitals. It was estimated that more than 2000 people died of rabies annually.

Rabies has been identified as a priority zoonotic disease in Bangladesh, and the Ministry of Health and Family Welfare took a lead role in developing a national rabies control programme in 2010 with the involvement of the Ministry of Fisheries and Livestock and the Ministry of Local Government, Rural Development and Cooperatives. It is important that local municipalities provide funding support for rabies control and public awareness. Mass dog vaccination campaigns have been launched on World Rabies Day. The cost-effective intradermal rabies vaccination has been introduced with support from WHO, which helped to phase out production and use of nerve-tissue rabies vaccine by September 2012. A pilot project on rabies control was launched in Cox’s Bazar in 2011, with the involvement of the local authority and WHO support, which was instrumental in bringing on board partners such as the World Society for Protection of Animals (WSPA). Today, most hospital staff have been trained on the use of intradermal rabies vaccination, and public hospitals provide modern rabies vaccine and rabies immunoglobulin for dog bite victims. The implementation of mass dog vaccination in urban areas, together with the availability of modern rabies vaccine, has changed the scenario of rabies. Consequently, the number of people coming for dog bite management has been increasing, and the number of rabies cases has been decreasing. It is now a rural disease, with 85% of human rabies cases reported from rural areas.

Bangladesh has developed a national strategy for rabies elimination in line with the regional strategic framework, which envisages the expansion of mass dog vaccinations and the availability of intradermal rabies vaccination and rabies immunoglobulin throughout the country. The ultimate goal is to eliminate human rabies by 2020, and it is planned to
reduce the number of human rabies cases by 90% by 2015. A strategic and resource mobilization plan for rabies elimination is in place. Institutional arrangements have been made to support the national strategic plan at different levels including a national steering committee, joint coordination committee and technical working group.

6.5 Outcomes of the group discussion

Three groups discussed the prioritization of zoonotic diseases, surveillance and response to zoonotic events, and intersectoral coordination for the prevention and control of zoonotic diseases. The outcomes of the discussion are summarized below.

1. Prioritization of zoonotic diseases

Different methods for prioritization of zoonotic diseases were presented to facilitate discussion on establishing criteria. The purpose of prioritization is important as priority diseases for surveillance, control, elimination and research may be different, and sometimes may be influenced by the availability of funds and resources. Criteria may be linked to associated risks (virulence and pathogenicity, persistence of the infectious agent), mode of transmission (infectivity, portal of entry, contagiousness, potential for nosocomial transmission), available control measures (treatment, vaccination or depopulation), or socioeconomic impact (livelihood, compensation, trade restriction, cost of public health intervention). The burden of disease may be a good criterion, but it is rarely available. There were concerns that the availability of funds may determine the prioritization process, whereas the country’s actual priority may be different. It was agreed that a scoring method would be used to prioritize zoonotic diseases.

The group exercise was based on the following criteria: mode of transmission (potential for animal to human transmission, potential for human to human transmission or pandemic potential), outcome of infection (mortality, morbidity, severity), availability of surveillance, diagnosis, treatment, prophylaxis and burden of disease (medical, socioeconomic). Based on these criteria, priority zoonotic diseases were identified considering country and regional situation, as follows.

(1) Rabies
(2) Avian influenza
(3) Leptospirosis
(4) Anthrax
(5) Japanese encephalitis

The group also made recommendations for consideration, as follows.
(6) Multisectoral coordination for disease detection, joint outbreak investigation, surveillance and response to priority zoonoses at all levels including capacity-building.
(7) Promoting information, education and communication and community participation relating to priority zoonoses.

2. Surveillance and response to zoonotic events

The group discussion focused on criteria for selection of zoonotic diseases for surveillance purposes and establishment of event-based surveillance systems in human and animal health sectors. Criteria were set for selection of priority zoonotic diseases for surveillance, as follows.

(1) Burden
(2) Morbidity/mortality
(3) Incidence/prevalence (but may not be known!)
(4) Availability of interventions (opportunity for health gain)
(5) Outbreak potential
(6) Socioeconomic impact
(7) Emerging problem/potential for international spread
(8) Joint animal/human health problem (common interest)
(9) Public concern/perception.

It was noted that an additional scoring system was probably needed to give different “weight” to some criteria. It was also noted that there should be separate priority lists at national and regional levels.
From the regional perspective, rabies and zoonotic influenza are important as there are common priorities for human and animal disease surveillance. Areas for joint surveillance depend on the relative priority given to the infectious agent by different sectors. Areas of common concern may include emerging diseases, AMR and foodborne diseases.

In terms of surveillance systems, event-based surveillance is probably more important for zoonoses with outbreak potential and may be feasible for the animal health sector. Event-based surveillance should be sensitive to any significant public health event (all-hazards approach), but design may allow a focus on zoonoses. It is difficult to advocate for joint indicator-based surveillance for zoonotic infections that do not cause disease in animals.

3. Intersectoral coordination for prevention and control of zoonotic diseases

The group discussion focused on the modality of a functional coordination mechanism for zoonoses prevention and control, based on countries’ experience and lessons learnt. The participants agreed that attempts should be made to reorganize the existing coordination mechanism for avian influenza into a broader one covering priority zoonotic diseases. Most countries have a functional coordination mechanism at the national level whereas it is weak at the subnational level. Coordination between the human and animal health sectors is effective during a crisis or emergency, whereas it is inactive during peace time. It is a challenging task to engage an intersectoral coordination committee to be active in peace time.

The group made recommendations for establishing functional intersectoral collaboration at the national level, as follows.

- To set up the coordinating body at the national level to decide on strategies and policies for zoonoses control.
- To identify basic multisectoral stakeholders (in both private and government sectors, including ministries of health, agriculture, livestock, trade, forestry and wildlife, universities, local government and nongovernmental organizations).
- To establish a body based on the existing system (for example, the national zoonoses commission/committee or emerging infectious diseases committee).

- To identify the role and responsibilities of each stakeholder.

- To identify or formulate the powers of the coordinating body.

Similar structures should exist at the subnational level (provincial/state/district level) to execute the decisions of the central body.

Priority areas of work should be identified; there should be pooling of resources and information sharing, and planning for resource mobilization.

When there is no outbreak, there should be regular meetings, dissemination of monthly reports to all stakeholders, establishment of a collaborative surveillance programme, and information exchange among all stakeholders.

Existing laws and regulations should be enforced. Implementation of existing policies, legislations and regulations should be evaluated and monitored.

For advocacy and resource mobilization for One Health, a budget should be secured from each sector, and provision should be made in all stakeholders’ budgets for implementation of One Health-related activities.

Public awareness and advocacy with policy-makers should be given due priority.

7. **Influenza at the human–animal interface**

This technical session was chaired by Dr Jagath Amarasekera and co-chaired by Dr Wantana Paveenkittiporn. It provided updates on zoonotic influenza viruses that have emerged at the human–animal interface, and shared good practices in the prevention and control of avian influenza A(H7N9) in China and A(H5N1) in Indonesia.
7.1 Human infection with novel influenza viruses

Professor Malik Peiris

The presentation focused on the virological and epidemiological characteristics of avian influenza A(H7N9) and A(H5N1), and the impact of managing live bird markets on avian influenza virus transmission and human infection in China and Hong Kong SAR. The first human case with avian influenza A(H7N9) was identified in China in March 2013, which led to the investigation of a cluster of severe/fatal pneumonia. More than 130 human cases were reported up to mid-August among residents of urban areas. The comparative epidemiology of human infection with A(H7N9) and A(H5N1) clearly showed that H7N9 infection was common in the male, older, urban population with underlying medical conditions, whereas H5N1 infection was common in younger populations with exposure to sick or dead poultry. Influenza-like illness surveillance was sufficient to pick up H5N1 human infection, whereas H7N9 infection was identified among hospitalized patients with severe acute respiratory infection. The clinical characteristics of human infection with H7N9 were elaborated.

It has been established that live bird markets maintain, amplify and disseminate avian influenza viruses and may be a source of human infection. Systematic active surveillance of avian influenza viruses in live poultry markets demonstrated that the virus isolation rate declines in summer. Evidence-based information has been generated through the introduction of rest days and a ban on holding live poultry overnight in the live poultry markets. Live poultry market closure reduced bird-to-human transmission by more than 90% during H7N9 outbreaks in China.

7.2 Laboratory-based surveillance system for avian influenza A(H5N1) in Indonesia

Dr Pretty Sesono

The presentation focused on national policies and strategies for strengthening laboratory-based surveillance of avian influenza A(H5N1) and activities related to laboratory network management in Indonesia. It highlighted the importance of surveillance of zoonotic influenza at the human-animal interface as a part of global health security, pandemic
preparedness, and development of core capacities required for implementation of the IHR (2005).

The outbreak of avian influenza A(H5N1) in poultry was reported in Indonesia in 2004. Since then, it has had a serious impact on poultry production and consumption, and the national economy. The first human A(H5N1) case was confirmed in July 2005. Only 1 out of 33 provinces has never reported an outbreak of avian influenza A(H5N1) in poultry, and a total of 193 human cases with an 83.4% case fatality rate were reported from 15 provinces up to July 2013.

A national avian influenza committee (KOMNAS) was established to better coordinate intersectoral cooperation and collaboration for avian influenza surveillance, prevention and control. Reducing exposure to avian influenza A(H5N1) and the high case fatality rate were the priorities for management of human A(H5N1) infection. Indonesia has strengthened surveillance, response, laboratory diagnostic and case management facilities and intersectoral collaboration in the wake of the avian influenza A(H5N1) outbreak. Today, there are 100 referral hospitals in 31 provinces for admission of suspected human A(H5N1) cases and 42 referral laboratories for avian influenza diagnosis. The National Institute of Health, Research and Development is a national reference laboratory for avian influenza as well as a national influenza centre. Strategies and activities to strengthen and sustain laboratory network management in Indonesia have been put in place. The avian influenza coordinating committee was reorganized into a national zoonosis commission in 2011 to address endemic and emerging zoonotic diseases in Indonesia, and ensuring functional intersectoral coordination is a great challenge.

8. **Media and risk communication, and community participation to prevent and control communicable diseases**

This technical session was chaired by Dr Dorji Wangchuk and co-chaired by Dr Andi Muhadir. It discussed the increasing role of the mass media in shaping public opinion during disease outbreaks, and the use of various communication strategies and tools for risk communication and community involvement in emerging infectious diseases/zoonoses prevention and control.
8.1 Media and risk communication

Dr Supriya Bezbaruah, WHO SEARO

The presentation focused on the role of media in shaping public opinion, and the policy-making process and risk communication strategy during disease outbreaks. Participants were reminded of the mysterious deaths of tourists in hotels in Chiang Mai, Thailand in 2011, and its impact on international media and public health concerns. Today, television is the primary source of information for the general public, while social media (such as Twitter, Facebook and YouTube) are becoming game-changers in terms of interpersonal and mass communications.

Risk communication during an outbreak of emerging infectious disease is a real challenge as it is an unexpected, uncertain event and there is limited information regarding the causative agent, source of infection, mode of transmission, treatment and preventive measures. More than 75% of emerging infectious diseases in the last three decades were of animal origin; this is very difficult to manage as it may have serious implications for consumer confidence, livelihoods, local economies and trade. Proactive communication is necessary to better inform the public and mass media, so that the socioeconomic impact of emerging infectious diseases can be minimized. Considering its vast experience in dealing with outbreaks of zoonotic influenza, Ebola haemorrhagic fever and other emerging infectious diseases across the world, as well as lessons learnt from outbreak communication, WHO has developed the communication for behavioural impact (COMBI) toolkit. The Regional Office for South-East Asia has been promoting the use of this toolkit through adaptation of training modules and training activities at the country level.

Lessons learnt from outbreak communication of pandemic influenza (H1N1) 2009 was shared. It is important to understand the increasing role of social media in communicating with the public and to be well prepared before media briefings. Tips for better communication and handling of media personnel were elaborated.

The Regional Office for South-East Asia is engaged in mapping of risk communication capacity in the Region and is working with partners to document good practices and lessons learnt from recent outbreaks.
8.2 Communication and community participation to prevent and control communicable diseases

Dr Suvajee Good

The presentation focused on various communication strategies for disease prevention and control, the significance of community participation in communication, and the lessons learnt from communication during outbreaks of anthrax, leptospirosis and avian influenza.

It is always best to define the purpose of communication and clearly spell out what to communicate (content/message), when to communicate (before, during and after the outbreak), with whom to communicate (target population) and how to communicate (method of communication). Better planning ensures better and more effective communication. Good communication that helps to achieve public health goals is derived from using a mix of epidemiological and social science research. Epidemiological data tell where the problem lies; social research tells the “why” of the problem (e.g. why people behave the way they do).

Strategic communication is an evidence-based, results-oriented process, undertaken in consultation with participant groups, intrinsically linked to other programme elements, cognizant to local context, and favouring a multiplicity of communication approaches to stimulate positive and measurable behavioural and social change. Good communication strategies should: use concepts from psycho-social learning theories for behaviour and social change; address knowledge, attitudes, and practices of individuals; understand role modelling and identifying through mass media; and use various communication approaches suitable for the situation, content, and target groups.

The strategic communication model and paradigm shifts in contemporary communication were elaborated. Entertainment education is a research-based communication process/strategy of deliberately designing and implementing a programme to entertain while it educates, to increase an audience’s knowledge about the issue, create favourable attitudes, shift social norms, and change overt behaviour. Entertainment education strategy can successfully integrate intersectoral partnership to widen its reach, provide services and to monitor and evaluate its impact. Participatory development communication is a community-based approach and it uses communication to build relationships with the community and
facilitate collective action. It relies on effective facilitation by a development worker with good communication skills. COMBI is a process that strategically blends a variety of societal/personal influences and communication interventions to encourage people to adopt and maintain recommended healthy behaviours. It recognizes that there is no single magical communication intervention, and instead relies on strategic combination.

The development of an integrated communication plan for zoonoses prevention and control with multisectoral partners including communities, and community participation in all stages of the development and implementation of the strategy, was suggested.

9. **Review of progress made in implementing recommendations of the Regional Meeting on Zoonotic Diseases, Jakarta, Indonesia, 6–8 November 2007**

Participants were briefed on the implementation of recommendations made in the previous zoonoses meeting. Dr Gongal informed that a concept note was developed immediately after the meeting to implement the regional strategic framework and recommendations of the meeting, and submitted to the EU for consideration. The EU requested FAO, OIE and WHO to develop a joint project proposal to strengthen surveillance and response capacity for highly pathogenic emerging diseases, including zoonoses and transboundary animal diseases at the human-animal interface. The three international organizations have been working together to implement the project since 2010. The progress made towards implementation of the recommendations is summarized below.

1. **Prioritize zoonotic diseases at the country and regional levels**

   Member States have prioritized zoonotic diseases of national importance and developed action plans for their surveillance, prevention and control. WHO supported prioritization of zoonoses at the country level. Avian influenza, rabies, leptospirosis, Japanese encephalitis and anthrax were identified as priority zoonoses that may provide a basis for collaborative activities between human health and animal health sectors.
2. **Support strategic planning at country level based on the Regional Strategic Framework for prevention and control of zoonoses with relevant stakeholders**

WHO regional offices for South-East Asia and the Western Pacific have developed a bi-regional strategy called the Asia Pacific Strategy for Emerging Diseases (APSED), which has identified zoonoses control as one of the focus areas. The APSED provides guidance to WHO, Member States and partners for planning, resource mobilization and partnership.

WHO supported national zoonoses and/or One Health workshops in Member States to review legal frameworks, intersectoral cooperation, surveillance, and prevention and control of zoonoses of national importance, and to develop a strategic plan accordingly. The One Health workshop was designed to define “One Health” within the country context and formulate a vision, mission and action plan.

3. **Establish intersectoral committees based on existing coordinating mechanisms**

Member States were encouraged to reorganize existing national avian influenza coordination committees into national coordinating committees for the prevention and control of priority zoonoses.

A guide to establishing intersectoral collaboration between human health and animal health sectors was developed by WHO in collaboration with FAO and OIE, and distributed to national authorities for consideration. APSED (2010) envisages the establishment of a functional coordination mechanism for zoonoses control by 2015.

4. **Strengthen capacity-building for outbreak response and containment of zoonotic diseases**

WHO has been supporting capacity-building for surveillance, laboratory diagnosis and public awareness for zoonoses prevention and control through field epidemiology training, hands-on training for laboratory diagnosis and training of rapid response teams.

WHO has been providing technical support to develop national guidelines, strategy and protocol for priority zoonoses, as required.
WHO has been supporting joint training of human health and animal health professionals for zoonoses prevention and control. A training module has been developed for clinical recognition, case management and control of emerging infectious diseases/zoonoses, which has been adapted by Member States according to country needs. The training programme has been supported in a number of countries.

5. **Promote cross-border collaboration for prevention and control for zoonoses**

WHO has been supporting ASEAN and SAARC initiatives for cross-border collaboration, particularly at ground-crossing points.

6. **Strengthen international collaboration through coordination and cooperation with FAO, OIE and other related agencies at the regional levels**

A functional tripartite coordination mechanism has been established at the regional level and annual workshops for multisectoral collaboration for prevention and control of zoonoses has been organized by the tripartite group.

Three organizations are implementing the EU-funded HPED project and the USAID-funded IDENTIFY project.

7. **Establish linkage of the national coordination mechanism with international agencies through communication with respective country offices**

FAO and WHO country offices are supporting intersectoral meetings/workshops to share information at the national level and sponsor participation of human health and animal health officials in regional meetings and workshops.

8. **Recognize the role of nongovernmental organizations, and academic and research institutions in zoonoses control**

Research needs for priority zoonotic diseases have been identified and operational research activities have been supported.
9. **Establish M&E mechanism for implementation of the Regional Strategic Framework.**

APSED monitoring and evaluation tools and the IHR questionnaire for assessment of core capacities development for implementation of IHR (2005) are in use. In addition, a questionnaire survey is carried out to assess progress in zoonoses control and operationalization of One Health at the country level as a part of the annual FAO/OIE/WHO tripartite workshop.

10. **WHO requested to take a lead role in implementation of the Regional Strategic Framework in coordination with FAO, OIE and related agencies.**

WHO has been working together with donor and partner organizations to support capacity-building for surveillance and response to zoonotic events.

FAO, OIE and WHO have been working together to strengthen laboratory capacity, surveillance and response to zoonotic influenza (H5N1, H7N9) and rabies at the regional and country level.

FAO, OIE and WHO are coordinating One Health activities at the regional level and zoonotic influenza, rabies and AMR have been identified as priority issues for operationalization of One Health at the country level.

Since 2010, FAO, OIE and WHO have been hosting annual workshops to provide a platform for human health, animal health and other sectors to share experiences and learn from each other for zoonoses prevention and control. Three workshops have been organized by WHO, FAO and OIE, on a rotational basis:

- Regional Workshop on Collaboration for Zoonoses Prevention and Control, December 2010 held in Sapporo, Japan;
- Regional Meeting for Zoonotic Diseases, January 2012 held in Chiang Mai, Thailand (planned for November 2011 in Bangkok and postponed due to flooding);
10. Closing session

Draft conclusions and recommendations were agreed on a consensus basis. The recommendations were made for Member States, WHO and partner organizations for consideration. It was agreed they would be sent to all participants for further comment and finalized by 30 September 2014.

The participants expressed sincere thanks to WHO for organizing the meeting. It was timely to review recommendations of the previous meeting and to develop strategic actions for strengthening surveillance and response capacity in line with IHR (2005) requirements. The meeting provided a platform to discuss intersectoral collaboration for zoonoses prevention and control, and understand the role of FAO, OIE and WHO for strengthening regional and country capacities for better surveillance and response to zoonotic events. The participants received up-to-date information on avian influenza A(H7N9), MERS-CoV, AMR, INFOSAN and media communication. The poster session provided an opportunity to share country experiences and lessons learnt in surveillance, prevention and control of zoonoses. The prioritization of zoonoses was a good exercise to understand the criteria for priority-setting and to exercise a scoring method for practical use.

11. Conclusions and recommendations

Avian influenza A(H5N1), Nipah virus, and Crimean-Congo haemorrhagic fever are endemic emerging infectious diseases/zoonoses that continue to be of regional concern.

FAO, OIE and WHO have established a functional coordination mechanism at the regional level to support the prevention and control of zoonoses. The three organizations are working together to implement a number of initiatives designed to strengthen country capacities for risk reduction, surveillance and response to zoonotic events.

Implementation of the IHR (2005) is an important priority for WHO; similarly, strengthening the performance of veterinary services is an important initiative for FAO and OIE.
INFOSAN is a global network of food safety authorities that facilitates the exchange of information on food safety events. It also supports countries to strengthen their capacity to manage such events, with the goal of preventing the international spread of foodborne disease. It is important that national focal points for IHR and INFOSAN work in close collaboration to ensure timely monitoring, reporting and assessment of food safety events.

All countries have defined a national list of priority zoonotic diseases. Avian influenza, rabies, leptospirosis, brucellosis and anthrax have been identified as priorities by the majority of countries.

AMR is an emerging problem that has an important component related to the human-animal interface. There is a need for greater dialogue and advocacy, and awareness and education, on the rational use of antimicrobial agents in animal production as well as in the treatment of infection in both humans and animals.

All Member States of the South-East Asia Region have phased out production and use of nerve-tissue vaccine for prophylaxis of rabies in humans and WHO has been advocating introduction of cost-effective intradermal rabies vaccination to ensure availability, affordability and accessibility.

In 2012, a Strategic Framework for the Elimination of Human Rabies Transmitted by Dogs in South-East Asia was developed by WHO, in consultation with rabies experts from countries of the Region. Some countries are already adapting the Framework to develop national strategies for the elimination of rabies. However, rabies is not a notifiable disease in most countries of the South-East Asia Region; neither is it included in the list of animal and human diseases under surveillance in many countries.

Accumulated information on avian influenza A(H5N1), H9N2 and H7N9 appears to demonstrate that live bird markets play an important part in maintaining, amplifying and disseminating these viruses. Live bird market closure appears to have significantly reduced human infections during the H7N9 outbreak in China.

The emergence of avian influenza A(H7N9) and MERS-CoV are further reminders that infectious diseases continue to emerge globally and pose a threat to the South-East Asia Region. Preparedness for the possible spread of these diseases is a regional priority.
Member States may wish to consider reviewing the lists of priority zoonoses that were previously agreed at national level. In addition, the criteria discussed in this workshop can be used to facilitate consensus on a list of zoonotic diseases of regional importance.

Control of zoonotic diseases can be strengthened by the active involvement of communities. A participatory approach can support event detection and outbreak response, including the application of appropriate interventions. In particular, the involvement of community leaders will help in the development of strategies for communication that respect local knowledge, and that deliver information to target populations using the most effective modalities.

**Recommendations**

**To Member States**

- Increase advocacy for intersectoral/multisectoral coordination for control of all priority zoonoses, including the following activities:
  - establish/expand the scope of a suitably empowered high-level intersectoral/multisectoral committee or “body” with responsibility for policy development/directives and implementation;
  - establish equivalent subnational intersectoral/multisectoral committees/bodies;
  - joint planning and implementation of surveillance, including laboratory confirmation, risk assessment, outbreak investigation and response.

- Review/update existing policies, legislations and regulations related to prevention and control of zoonoses and develop joint policies where possible and necessary.

- Strengthen arrangements for coordination and monitoring the implementation of activities for the prevention and control of zoonoses.

- Develop multisectoral action plans for the control of AMR including both the human and animal health sectors.
Regional meeting on zoonotic diseases

- Develop an integrated multisectoral communication plan for the prevention and control of zoonotic diseases.
- Enhance communication between the INFOSAN emergency contact point and the national IHR focal point.
- Promote community involvement in prevention and control of zoonotic diseases.

To WHO and partner organizations

- Develop a detailed roadmap for the implementation of priority zoonosis activities with defined timelines and arrangements for monitoring and evaluation using existing tools including those for IHR/APSED.
- Support Member States in the prevention and control of zoonoses, in line with One Health and the IHR/APSED plan.
- Coordinate international partnerships and technical support for rabies elimination activities in endemic countries.
- Advocate for, and support development of, multisectoral national action plans for the control of AMR including both the human and animal health sectors.
- Develop a list of zoonotic diseases that are a priority for prevention and control activities at the regional level.
- Develop guidance for communities on communication in relation to zoonotic diseases.
Annex 1

Agenda

(1) Opening
(2) Global and regional overview of zoonoses
(3) Sharing of country experiences and best practices for prevention and control of zoonoses
(4) Prioritization of zoonoses
(5) Multisectoral coordination and cooperation at the human-animal interface
(6) Group work on establishment of a functional coordination mechanism, disease surveillance, joint programme for zoonoses prevention and control
(7) Summary recommendations and way forward
(8) Closing
Annex 2

List of participants

Country participants

Bhutan
Dr Karma Wangmo
Veterinary Officer
Dzongkhag Livestock Sector
Samtse

Mr Kencho Wangdi
Program Officer
International Health Regulations (IHR)
Department of Public Health
Ministry of Health
Thimphu

Mr Jigme Dukpa
Clinical Officer
Gelephu Central Regional Referral Hospital
Gelephu

India
Shri Vikas Arya
Director (PH)
Ministry of Health and Family Welfare
New Delhi

Dr Kamal Akhilesh
Director (I & C)
Department of Animal Husbandry,
Dairying and Fisheries
Ministry of Agriculture
New Delhi

Indonesia
Dr Yuni Yupiana
Head of Animal Disease Eradication Section
Sub-Directorate of Animal Disease Control
Directorate General of Livestock and Animal Health Services
Jakarta

Dr Andi Muhadir
Director of Vector Born Disease Control, DG DC & EH, MOH
Jakarta

Mrs Rosliany Gunathan
Chief Section for Guidance and Evaluation,
Sub Directorate of Surveillance,
Directorate Surveillance, Immunization,
Quarantine and Matra Health, DG DC & EH, MOH RI
Jakarta

Maldives
Dr Aishath Aroona Abdulla
Epidemiologist
Health Protection Agency
Male’

Ms Fathimath Rasheeda
Public Health Programme Officer
Centre for Community Health and Disease Control
Male’

Ms Jeneena Naseem
Deputy Manager
Ministry of Fisheries and Agriculture
Male’

Myanmar
Dr Nu Nu Kyi (Ms)
Deputy Director (CEU)
Department of Health
Naypyitaw

Dr Phyo Phyo Kyaw (Ms)
Epidemiologist
Regional Health Department
Yangon Region
Report of the meeting

Dr Min Thein Maw (Mr)
Research Officer
Livestock Breeding and Veterinary
Department

Nepal
Dr Ram Krishna Khatiwada
Deputy Director General
Department of Veterinary Service
Ministry of Agricultural Development
Kathmandu
Dr Jeetendra Man Shrestha
Zoonotic Disease Control Officer
Epidemiology and Disease Control Division
Department of Health Services
Ministry of Health and Population
Teku
Kathmandu
Mr Bihari Mahato
Zoonotic Officer
Epidemiology and Disease Control Division
Department of Health Services
Ministry of Health and Population
Teku
Kathmandu

Sri Lanka
Dr Jagath Amarasekera
Assistant Epidemiologist
Epidemiological Unit
Colombo
Sri Lanka
Dr P Samitha Ginige
Assistant Epidemiologist
Epidemiological Unit
Colombo
Dr M A M Z Aboobubker
Assistant Director-Veterinary Regulatory and
Animal Welfare
Department of Animal Production and Health
Paradeniya

Thailand
Dr Pasakorn Akarasewi
Director, Bureau of Epidemiology
Department of Disease Control
Ministry of Public Health
Nonthaburi
Mrs Apirom Puanghat
Public Health Technical Officer, Expert Level
Bureau of General Communicable Diseases
Department of Disease Control
Ministry of Public Health
Nonthaburi
Dr Wirongrong Hoonsuwan
Veterinarian, Expert Level
Bureau of Disease Control and
Veterinary Services
Department of Livestock Development
Ministry of Agriculture and Cooperatives
Bangkok

Timor-Leste
Dr Mario Francisco Amaral
Head of Quarantine Laboratory Department
National Directorate for Quarantine and
Biosecurity
Ministry of Agriculture and Fisheries
Dili
Ms Maria Angela Varela Niha
Surveillance Unit
Ministry of Health
Dili
Mr Jose Liu Fernandes
Neglected Tropical Diseases Unit
Ministry of Health
Dili

Temporary advisers
Professor Be-Nazir Ahmed
Director, DC and Line Director, CDC
Mohakhali
Dhaka
Bangladesh
Regional meeting on zoonotic diseases

Dr Dorji Wangchuk
Director
Department of Public Health
Thimphu
Bhutan

Dr Veena Mittal
Director
Division of Zoonoses
WHO Collaborating Centre for Rabies Epidemiology
Delhi
India

Dr Pretty Sesono
Director
BTDK, National Institute of Health, Research and Development
Jakarta
Indonesia

Professor Shiba Kumar Rai
Head
Department of Medical Microbiology
Shi-Gan International College of Science and Technology
Kathmandu
Nepal

Dr Thiravat Hemachudha
Professor of Neurology
Department of Medicine (Neurology) and Neuroscience Centre for Research and Development
WHO Collaborating Centre for Research and Training on Viral Zoonoses
Chulalongkorn University Hospital
Bangkok
Thailand

Ms Wantana Paveenkitiporn
Director
WHO Collaborating Centre for Antimicrobial Resistance
National Institute of Health
Nonthaburi
Thailand

Dr Malik Peiris
Director
Global H5 Reference Laboratory
University of Hong Kong
Hong Kong SAR, China

Observers
Dr Pawin Padungtod
Director
Animal-Human Interface Program
Thai Ministry of Public Health – US CDC Collaboration

Other agencies
Food and Agriculture Organization of the United Nations (FAO)
Dr Subhash Morzaria
Regional Manager
Emergency Centre for Transboundary Animal Diseases
FAO Regional Office for Asia and the Pacific
Bangkok
Thailand

World Organisation for Animal Health (OIE)
Dr Mary Joy N Godoncillo
Science and One Health Coordinator
OIE Sub-Regional Representation for South-East Asia
Ratchathewi
Bangkok
Thailand

Dr Jaruwan Kampa
IDENTIFY Programme Coordinator
OIE Sub-Regional Representation for South-East Asia
Ratchathewi
Bangkok
Thailand

Secretariat
WHO Regional Office for the Western Pacific
Dr Erica Dueger
Epidemiologist (Influenza)
Emerging Infectious Diseases Unit
Division of Health Security and Emergencies
WHO Regional Office for the Western Pacific
Manila
Report of the meeting

Dr Do Thi Hong Hien  
Epidemiologist (Communicable Diseases)  
Emerging Infectious Diseases Unit  
Division of Health Security and Emergencies  
WHO Country Office in Viet Nam

WHO Thailand

Dr Dubravka Minet Selenic  
Technical Officer  
WHO Country Office for Thailand  
Bangkok  
Thailand

Ms Sibunya Putthesiraapakorn  
National Professional Officer

WHO Regional Office for South-East Asia

Dr Richard Brown  
Regional Adviser  
Disease Surveillance and Epidemiology (DSE)  
Department of Communicable Diseases  
WHO Regional Office for South-East Asia  
New Delhi

Dr Suvajee Good  
Programme Coordinator (Health Promotion)  
Department of Sustainable Development and Environment (SDE)  
WHO Regional Office for South-East Asia  
New Delhi

Dr Gyanendra Gongal  
Scientist (VPH)  
Disease Surveillance and Epidemiology (DSE)  
Communicable Diseases Department  
WHO Regional Office for South-East Asia  
New Delhi

Dr Supriya Bezbaruah  
Communication Officer  
Disease Surveillance and Epidemiology (DSE)  
Communicable Diseases Department  
WHO Regional Office for South-East Asia  
New Delhi

Mr Sunil Kumar Singh Rajput  
Clerk I  
Disease Surveillance and Epidemiology (DSE)  
Communicable Diseases Department  
WHO Regional Office for South-East Asia  
New Delhi
New pathogens, particularly viruses, from animals remain unpredictable, continue to emerge and spread across countries, and have profoundly affected international travel, trade, and tourism, including in the WHO South-East Asia Region. The WHO Regional Office for South-East Asia has developed a Regional Strategic Framework for Prevention and Control of Zoonoses which aims to improve the health status and quality of life of the population by reducing the socioeconomic burden caused by zoonoses. Although an intersectoral coordination mechanism has been established at country level in the wake of the outbreak of avian influenza (H5N1), it is time to reorganize this mechanism to address broader aspects of surveillance, prevention, and control of zoonotic diseases. A Regional Meeting on Zoonotic Diseases was organized to bring together all the stakeholders, review the current status of zoonotic diseases, and discuss possible ways forward in combating zoonotic diseases in this changing context. The objectives of the meeting were to review the current status of zoonoses, to identify priority areas for national and regional coordination and response, and to share good practices in managing priority zoonoses. The meeting provided a platform for human health and animal health officials from Member States, experts, and other stakeholders to discuss zoonotic influenza, rabies, and antimicrobial resistance.