Report of Health Security Scoping Mission in Southeast Asia

Department of Foreign Affairs and Trade
Indo-Pacific Centre for Health Security

Contents

Purpose

This report will inform the design of country partnership programs under Australia's Health Security Initiative for the Indo-Pacific region, to strengthen health systems and improve health security in Southeast Asia. It identifies partner government and stakeholder priorities, assesses countries' strengths, challenges, plans and partnerships for strengthening health security, and makes independent, evidence-based recommendations for potential areas of Department of Foreign Affairs (DFAT) investment in the region.

Background

Health Security Initiative for the Indo-Pacific region

The Indo-Pacific region includes many recognised hotspots for emerging infectious diseases, 75 per cent of which originate in animals. It is also experiencing growing antimicrobial drug resistance, including in tuberculosis and malaria with potential to reverse the scientific and medical gains of the last century

Australia's Health Security Initiative for the Indo-Pacific region contributes to avoiding and containing infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale. With funding of $300 million over five years from 2017, the Initiative is strengthening health security in our region through targeted regional and multi-country investments. The Indo-Pacific Centre for Health Security in DFAT is implementing the Initiative.

Scoping mission and report

In April and June 2018 a high-level scoping team visited Cambodia, Indonesia, Laos, Myanmar, the Philippines and Vietnam. The team comprised international experts in human and animal public health and senior DFAT officials. The team also visited Thailand to meet with regional staff from the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization (FAO) of the United Nations.

In each country, the team met with national ministries of health, agriculture, environment, finance/treasury and planning. The team also met with some of the civil society organizations including the Red Cross, bilateral partners working in those countries, such as the United States Agency for International Development (USAID) and United States Centres for Disease Control and Prevention (CDC), as well as multilateral regional institutions supporting health security, including the World Health Organization (WHO) Western Pacific Regional Office and the Asian Development Bank in Manila, regional offices of the Food and Agricultural Organization and OIE in Bangkok, and the Association of Southeast Asian Nations (ASEAN) Secretariat in Jakarta.

This report summarises the team's findings and recommendations for regional or multi-country activities that can contribute to greater health security by adding value to existing investments and activities, and filling identified gaps, and that are likely to be sustainable in the long-term, while resulting in short-term outcomes. While the report does not address the situation in the Philippines and Timor Leste (time constraints meant the team was unable to visit Timor Leste), some of the regional analysis and recommendations may also apply to these countries. See Annexes for details of the scoping team, visit programs and terms of reference.

Terms used in this report

Health security

Health security for purposes of this report is defined as all public health actions in the animal, human and environmental sectors required to decrease the risk and/or prevent the occurrence of major outbreaks caused by emerging or re-emerging infectious diseases, and to better detect and more rapidly respond if they do occur. Health security benefits both human and animal health, protects the environment and helps prevent the serious negative impact of epidemics and other health emergencies on national and regional economies.

International Health Regulations

The WHO International Health Regulations 2005 (IHR) are a legal framework to prevent, control and provide a public health response to the international spread of disease, while avoiding unnecessary interference with traffic and trade.[1] In force since June 2007, the IHR require countries to report certain disease outbreaks and public health events to WHO, as part of global disease surveillance, alert and response. WHO member states who have signed up to the IHR must have well established national surveillance and response infrastructure and capacities (see http://www.who.int/ihr/publications/9789241580496/en/ for more information).

Joint External Evaluation

The Joint External Evaluation (JEE) is a voluntary component of the IHR Monitoring and Evaluation Framework. At the time of the scoping team missions, JEE assessments had been completed in Cambodia, Laos, Indonesia, Myanmar, Thailand and Vietnam.[2] The JEE process involves countries undertaking both a self-evaluation and external assessment of 19 core capacities, and developing national plans to address identified gaps. DFAT supports and is co-chair of the JEE Alliance, a platform for facilitating multi-sectoral collaboration on health security capacity building and IHR implementation, including the JEE assessments.[3]

[1] http://www.emro.who.int/entity/international-health-regulations/index.html
[2] The Philippines completed its JEE in September 2018.
[3] https://www.jeealliance.org/

Performance of Veterinary Services' (PVS) Pathway

While the JEE assesses countries capacity in relation to zoonoses control and cross-sectoral responses, it also draws on the results of the OIE evaluation of countries 'Performance of Veterinary Services' (PVS) Pathway. This is a global program aiming to improve countries' compliance with OIE standards on the quality of veterinary services on a sustainable basis (see http://www.oie.int/en/solidarity/pvs-pathway/ for more details).

DFAT bilateral and regional development activities

In addition to supporting global programs, which address infectious diseases in our region, such as the WHO Health Emergency Program, Gavi Alliance, and the Global Fund to Fight Aids, Tuberculosis and Malaria (Global Fund), DFAT supports bilateral development activities related to health security in Indonesia and to broader health system strengthening in Cambodia and Timor Leste.

For example, in Indonesia there has been good progress in promoting One Health[4] and strengthening animal surveillance and reporting of animal diseases under the Australia Indonesia Partnership for Emerging Infectious Diseases. Building on these successes, and in conjunction with the Government of Indonesia, a new bilateral program is being designed. This will be a coordinated design, complementing and linked to regional activities under the Health Security Initiative.

At the regional level, Australia is also continuing to partner with USAID in funding a regional Live Animal Marketing and Production program managed by the FAO to reduce risk of Highly Pathogenic Avian Influenza in the Greater Mekong Sub-region.

There are benefits to ensuring any new regional investments under Australia's Health Security Initiative complement or leverage such existing activities to further strengthen health security capacities in the region.

Regional situation in health security

JEE findings

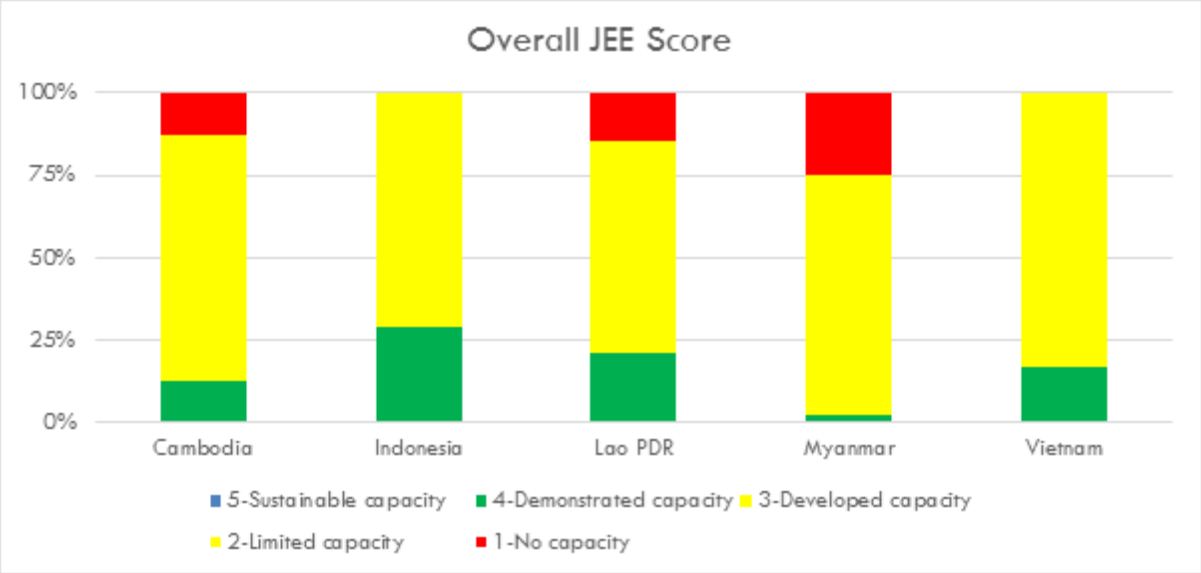
Countries in the region are fully aware of their obligations and need for strengthening their IHR core capacities in public health, including having an effective national IHR focal point institution for rapid information sharing and response coordination.

Most countries in the region have volunteered to undertake JEEs to assess 19 indicators for the eight IHR core capacities in public health. Most have also had PVS Pathway assessments

[4] A term to signify collaboration among animal, human and environmental sectors in the areas of disease surveillance and risk assessment of emerging infections at the human/animal interface, and in the area of prevention and control of outbreaks caused by emerging infections.

of human, physical and financial resources, technical authority and capability, interaction with stakeholders, and access to markets. The graph below summarises each country's capacity in relation to health security and IHR implementation, as assessed through the JEE.[5]

JEE Scores by Country, as of August 2018



Source: World Bank, complied from the national JEE reports.

See further details in country-specific JEE assessment graphs in Annex 4.

The JEE assessments conducted in Cambodia, Indonesia, Lao PDR, Myanmar and Vietnam during 2016–17 identified the most urgent needs within each country's health security system. These needs were taken into account in the country scoping missions and reports that accompany this mission report. Summaries of findings by country are provided below.

Cambodia

In Cambodia, the JEE identified insufficient human resources and training to fulfil public health functions as a to a challenge to implementation of the IHR (2005).While Cambodia's *Health Workforce Development Plan 2016–2020* focuses on staffing for curative services, public health professionals were not identified as a separate and important workforce. The JEE also identified major gaps in preparedness and emergency operations. To a lesser extent, gaps were identified in antimicrobial resistance, the national laboratory system including biosafety and biosecurity, and in the areas of medical countermeasures and personnel deployment.

Indonesia

As a large country spread over 17,000 islands, Indonesia's size, population and vulnerability to natural disasters, as well as its social, economic and administrative diversity, pose unique

[5] Full JEE reports are available at WHO portal for Strategic Partnership for IHR (2005) and Health Security (SPH): https://extranet.who.int/sph/ihr-monitoring-evaluation/jee/343

challenges to public health. The JEE outcomes demonstrated capacity in linking public health and security authorities, medical countermeasures and personnel deployment as well as risk communication. However, significant weaknesses were acknowledged in antimicrobial resistance, zoonotic diseases and real-time surveillance.

Lao PDR

Although Lao PDR has made good progress, many technical capacities related to detecting, preventing and rapidly responding to emerging diseases and public health emergencies remain under development, while capacities at national and sub-national levels differ greatly. The JEE identified several overarching challenges including sustainable financing for health security, human resources capacity, inter-sectoral collaboration and coordination, and formalisation and documentation of procedures.

Myanmar

In Myanmar the availability of a qualified and experienced workforce was recognised as crucial in addressing most of the JEE recommendations. In this respect, priority recommendations included conducting a comprehensive training needs assessment. Major gaps identified in Myanmar included national legislation, inter-sectoral coordination, antimicrobial resistance, biosafety and biosecurity, risk communication, preparedness and emergency response.

Vietnam

The JEE identified clear strengths in Vietnam and high political commitment, reflected in strong legislative and regulatory frameworks at national and local levels. Although coordination between animal and human health sectors seems effective, coordination between sectors was identified as a common theme requiring improvement. Particular Vietnam strengths were identified in zoonotic diseases, immunisation, syndromic surveillance and Field Epidemiology Training Programs. Areas for substantial improvement included antimicrobial resistance, preparedness, linking public health and security authorities, medical countermeasures, personnel deployment, and communication engagement with affected communities.

All countries

Beyond the public health risks posed by epidemic-prone diseases, in all countries JEE outcomes highlighted significant gaps in mechanisms for chemical events and radiation emergencies.

Other countries not yet assessed

At the time of the mission, JEEs had not yet been conducted in the Philippines and Timor-Leste, although WHO reports that assessments are in the pipeline for these countries.

PVS Pathway assessments

Unlike the JEE assessments, the PVS Pathway assessments are not generally made public, and these were not easily accessible to the scoping team at the time of assessment. However, these assessments will be an important guide going forward, particularly for establishing any future bilateral agreements.[6]

The following table summarises status of PVS Pathway assessments in relevant countries.

PVS Pathway assessments completion status

Country	Evaluation (status)	Gap analysis (status)	Follow-up Evaluation	Laboratory	Veterinary legislation
Cambodia	July 2007 (pd)	Jan 2011 (pd)			May 2007
Indonesia	May 2007 (pd)	Jul 2011 (pd)			
Lao PDR	Mar 2007 (pd)	Jun 2012 (pd)	Aug 2011(pd)	Nov 2012	Jan 2012
Malaysia	Feb 2016 (pd)				
Myanmar	Oct 2009 (pd)	Dec 2012 (pd)	Jan 2015 (conf)	Mar 2016	
Philippines	May 2008 (pd)	Jul 2010 (conf)			
Thailand	Mar 2012 (conf)	Jan 2012 (conf)			
Vietnam	Oct 2006 (pub)	Jun 2010 (pub)	Mar 2012 (pub)		Aug 2009

Key: conf = confidential, pub = public, pd = partners and donors

Post-JEE action plans

After these assessments a number of countries have developed post-JEE national action plans for capacity strengthening. However, bilateral/multilateral support has been slow to flow into these plans and, where it has begun, it has been piecemeal with the potential to distort overall planning and budgets. In the Indo-Pacific, Laos and Cambodia have produced national action plans following the JEE[7], while a draft plan is being finalised in Myanmar.

Field Epidemiology Training Programs

Most countries visited collaborate with the United States CDC to conduct and manage Field Epidemiology Training Programs (FETPs). There is a regional network of epidemiology training programs (SAFETYNET)—part of the global network of Field Epidemiology Training Programs (TEPHINET)—to which most Field Epidemiology Training Programs in the region belong. Field Epidemiology Training Programs have led to well-trained epidemiologists, and

[6] When countries, such as Vietnam, do authorise the OIE to make their full PVS Pathway report public, they are published at http://www.oie.int/en/solidarity/pvs-evaluations/pvs-evaluation-reports/.
[7] In Laos: the National Emerging Infectious Diseases, Public Health Emergencies and Health Security Workplan 2016-2020, updated in 2017; and in Cambodia: the Cambodian National Work Plan for Emerging Diseases and Public Health Emergencies 2016-2020, approved in 2017.

stronger/better coordinated surveillance and early alert warning and response systems in many countries, including Australia and the United States. However, there has been no specific post-training evaluation of capacities of trainees in the countries in the Southeast Asia region.

In addition to public health professionals, a few veterinarians enter the Field Epidemiology Training Programs each year, and specific Field Epidemiology Training Programs for veterinarians are currently being set up and/or strengthened with support from FAO/OIE and United States CDC. However, surveillance systems for livestock, poultry and fish/aquaculture are inadequate in most countries.

One Health

One Health recognises that the health of humans, animals and ecosystems are interconnected. Countries are establishing One Health platforms to better coordinate activities in human and animal public health, but they have not yet established functional regular processes such as linked surveillance and joint risk assessment.

Public health and veterinary laboratories in the region are of varying quality and reliability, and are not well linked with surveillance and epidemiological services. Some countries have established formal agreements, often through WHO or FAO/OIE, for diagnostic confirmation services from a reference laboratory elsewhere in the region or further abroad.

Disease outbreaks

In recent years, with the continued threat of Avian Influenza and other novel influenza viruses, and past outbreaks such as SARS in 2003 and pandemic H1N1 influenza in 2009, all countries of the region have committed to implement the WHO Asia Pacific Strategy for Emerging Diseases (APSED III). Most have established an Emergency Operations Centre to control and command the national surveillance and response system during an outbreak, to help better coordinate national activities across different government sectors. However, many Emergency Operations Centres are not staffed on a day-to-day basis and are generally activated only at the time of an outbreak.

Many countries have also established an inter-ministerial committee for inter-sectoral coordination. Some countries have established, with international support, a BSL-3 laboratory for the diagnosis of highly pathogenic infectious agents, or aspire to do so, although sustainability is in question. (Bio-Safety Level - 3 refers to a set of precautions in a laboratory that prevents transmission of dangerous biological agents.)

In all countries, activities in surveillance and laboratory diagnosis of antimicrobial resistance are fledgling, and mainly in the human sector. Infection control in health and agriculture facilities is of varying quality. In places where infection control is weak, this is likely to facilitate transmission of infectious agents and selection of antimicrobial-resistant strains.

There is concern about the practice of prescribing antibiotics, which can often be bought over the counter, in both the human and animal sectors. However, this behaviour is not yet fully understood, and prescribing and dispensing regulations are often not enforced.

Gender and Health Security

Researchers have noted that the roles of women in small-scale animal production and food preparation, in protecting the health of their families, and in the health workforce, mean that gender is a significant factor in exposure and vulnerability to emerging infectious diseases[8]. Women are particularly involved in the poultry industry as smallholder producers and traders in Southeast Asia and consequently are more exposed to diseases such as avian influenza[9]. For example, of the seven human cases of highly pathogenic avian influenza recorded in Cambodia between 2004 and 2008, five out of seven (or 71%) cases occurred in females, reflecting the role of women in the sector.

Gender is a cross –cutting issue for DFAT and should be reflected across the recommended activities. An example of how gender issues can be addressed at activity level is the DFAT/USAID funded LAMP activity managed by FAO. This aims to ensure gender equality is addressed in the employment and training of project staff; that women's groups and/or associations are engaged and participate in field level activities and the development of relevant and operational policy advice; and that gender-disaggregated data is collected for project monitoring and evaluation.

Development assistance for health security in the region

Several development agencies and banks, regional organisations, funding mechanisms and philanthropic foundations are involved in ongoing or future development programs that contribute to health security in the region. These include the:

- Asian Development Bank
- World Bank
- ASEAN
- WHO
- FAO
- OIE
- International Federation of Red Cross,
- United States CDC
- USAID
- United States Defence Threat Reduction Agency
- Bill and Melinda Gates Foundation

[8] Department of Foreign Affairs and Trade (2017) Evaluating a decade of Australia's efforts to combat pandemics and emerging infectious diseases in Asia and the Pacific 2006 – 2015: are health systems stronger? Retrieved from https://dfat.gov.au/aid/how-we-measure-performance/ode/strategic-evaluations/Documents/ode-peid-evaluation-final-report.pdf

[9] McLeod, A. (2007). Social impacts of structural change in the poultry sector. *Poultry in the 21st Century—Avian Influenza and Beyond.* Retrieved from http://www.fao.org/AG/againfo/home/events/bangkok2007/docs/part1/1_12.pdf

- Global Fund to Fight AIDS, Tuberculosis and Malaria
- Unitaid
- Gavi the Vaccine Alliance
- Fleming Fund
- Ending Pandemics Organization
- Pasteur International Network
- Doherty Institute
- Wellcome Trust Laboratories
- Oxford University
- French Development Agency
- United Kingdom Department for International Development
- German Technical Cooperation Agency
- Japan International Cooperation Agency
- Republic of Korea International Cooperation Agency.

Development agencies, funding mechanisms and some foundations also specifically support surveillance and laboratory services in structured and focused national programs for malaria and tuberculosis, and the expanded program on immunisation. Advanced research laboratories, such as National Institute of Hygiene and Epidemiology in Vietnam, the United States Army Laboratory in Thailand, the Wellcome Trust, and the Pasteur Institute in Cambodia, Lao PDR and Myanmar, are important de-facto resources for disease surveillance and laboratory support.

Recommendations

This report provides high-level recommendations for regional support that reflects country needs, maximises opportunities to leverage other investments by donors and development partners in the region, and uses Australia's comparative advantage in areas of technical expertise.

The recommendations, based on the IHR and PVS Pathway assessments, focus on five capacity strengthening areas:

1. surveillance, alert and response
2. health workforce
3. health facilities including laboratories
4. community resilience
5. health policy and regulation of drugs and diagnostics.

This report will be followed by a series of detailed designs in these five recommended priority areas to address the most pressing needs and to identify appropriate international and Australian partners and support implementation.

1. Surveillance, alert and response

Situation analysis

Effective surveillance, alert and response systems are crucial to provide early warnings of impending public health risks and quickly manage outbreaks and other public health events if they occur. In the case of the 2014–15 Ebola outbreak in West Africa, WHO guidance highlighted the importance of time-to-detection of the first case in a new community or country as critical to preventing or controlling an outbreak.[10]

Surveillance and Early Warning Alert and Response System (EWARS) activities are underway in all countries visited, both in the human and the animal sectors. Surveillance, alert and risk assessment capacity is being strengthened through training programs such as the Field Epidemiology Training Programs for both the human and veterinary health sectors.

An investment by the Rockefeller Foundation in the late 1990s helped establish cross-border collaboration for the detection and response for outbreaks of human disease in the Mekong River Basin (the Mekong Basin Disease Surveillance Network, or MBDSN). There has also been sustainable joint collaboration to establish surveillance and patient management activities at the Thai/Myanmar border since the late 1990s. More recently, support from other funders has helped establish the ASEAN Coordinating Centre for Animal Health and Zoonoses. Such collaborative models have potential to benefit all countries in the region.

The non-discriminate use of antimicrobials in humans, animal production and aquaculture is considered a great risk for the development of antimicrobial resistance within health facilities, in the community and in the food chain. Some understanding regarding the use of antimicrobials in humans has been gained through projects such as the Antibiotics Smart Use Project in Thailand, and the Antibiotic Situational Analysis Project in Vietnam. However, understanding about the distribution to and use of antibiotics in the livestock and aquaculture sectors is not yet sufficient.

DFAT bilateral support has helped countries establish early warning systems for outbreaks of zoonotic diseases. An example is iSIKHNAS in Indonesia, an integrated real-time information system for collecting, managing, reporting and using data to support animal health and production in Indonesia. Sehat Satli, also in Indonesia, is another example. This is a web-based wildlife health surveillance and reporting system (established largely with support from USAID via FAO). There are also effective telephone hotlines such as the Cambodian Disease Reporting Hotline for clusters of human disease, the Participatory One Health Disease Detection Project for reporting outbreaks in farm animals in Thailand, and the hotline set up in Lao PDR in 2005 for reporting Avian Influenza.

[10] *Risk of importation and economic consequences of Ebola in the Asia Pacific Region*, McBryde,E., et al, 2015

These disease surveillance and detection systems are operating at various levels of effectiveness in both human and veterinary sectors. It would be beneficial to improve communication and coordination between the systems, which only rarely conduct joint risk assessment activities when a cluster of disease is detected or risk factors are identified in either sector. An example of coordination is the response to the threat from H5N1 and other Avian Influenza viruses, and during and after the West African Ebola outbreak in 2014 and 2015, when countries in the region, (except Myanmar) developed Emergency Operation Centres to coordinate surveillance and response across government sectors. The Emergency Operation Centres are in various states of activity, but tend not to be fully utilised or staffed during periods when there is no outbreak activity.

At the same time, limited information is being collected on antibiotic residua and antimicrobial-resistant organisms in the human/animal/fish/aquaculture environment, or on the behaviour of antimicrobial distributors, dispensers and users in both sectors. This limits understanding of the risks for development of antimicrobial resistance, which has been linked to overuse of antibiotics in these sectors and the risks of transferring resistant organisms through the food chain.

Likewise, most countries do not have routine event-based surveillance or systematic surveillance of mosquito vectors. This is required for better risk assessment and forecasting for diseases such as Dengue and Zika. There is also limited understanding of the levels of resistance to the commonly used insecticides, with the exception of malaria vector species and insecticide resistance.[11]

Desired outcomes from investment related to surveillance, alert and response

The following goals for DFAT regional support are based on the informed opinions of the scoping team members following the scoping mission country visits:

1. Prevention and/or earlier detection and response to human and animal infectious disease outbreaks, with joint risk assessment at regular intervals to ensure better preparedness and cross-sector working.
2. Understanding of the prevalence of antimicrobial-resistant organisms in humans, animals and fish/molluscs/crustaceans, and in their environments, resulting in improved patient management and a baseline for assessing future interventions, and better advocacy for the control of antimicrobial resistance.
3. More rational antimicrobial prescribing and dispensing in the human, animal and aquaculture sectors.
4. Stronger risk assessment and forecasting of outbreaks of vector-borne infections, and baselines for measuring the impact of vector control interventions.

[11] http://www.malariaconsortium.org/interactive-malaria-guide/malaria-information/vector-and-insecticide-resistance

5. Adoption of best practice in cross-border surveillance and response for human and animal disease throughout the region.

Opportunities for DFAT regional support for surveillance, alert and response

Activity	Outcomes (numbers above)	Potential financial partners	Potential partners	Priority
Technical support for surveillance and alert of infectious diseases in animal and human populations	1, 2	ADB Ending Pandemics Organization CDC	WHO OIE FAO PODD Cambodian Hotline CDC	High
Technical support to assess the current status and potential of the Mekong Basin Disease Surveillance Network and ASEAN Coordinating Centre for Animal Health and Zoonoses	5	Rockefeller Foundation Ending Pandemics Organization	CDC WHO FAO	Medium
Financial and technical support for regular regional conferences on health security for exchange of best practice innovations	1, 2, 3, 4, 5,	Ending Pandemics Organization ADB BMGF	WHO OIE FAO IANPHI TEPHINET Red Cross	Medium
Technical support for vector biology and vector control	4	BMGF	WHO Pasteur Institutes CDC	Medium
Technical support to Emergency Operations Centres for regular joint human/animal risk assessment	1, 2, 4	USAID CDC BMGF	WHO FAO OIE CDC	Medium
Technical support for surveillance of antimicrobial-resistant organisms in animals, fish and humans, and of antibiotic residues in their environments	2,3	Fleming Fund USAID CDC	WHO FAO OIE	Medium

Activity	Outcomes (numbers above)	Potential financial partners	Potential partners	Priority
Technical support for behavioural studies to better understand prescribing and dispensing behaviour of antimicrobials in human and animal sectors	2, 3	Fleming Fund		Low
Technical support for upgrading diagnostic algorithms for infections with outbreak potential and antibiotic resistant infections	1, 2	Fleming Fund USAID	WHO US CDC Pasteur Institutes	Low

Note: see the Acronyms list for full names of potential partners.

2. Health workforce

Situation analysis

A skilled public health workforce is critical to a country's capacity to detect and respond to outbreaks of infectious diseases within a country and regions. Field Epidemiology Training Programs (FETP) provide health workers at various levels with the skills to conduct surveillance of emerging diseases, assess risks and investigate and respond to outbreaks.

Epidemiological training of medical professionals is ongoing in most countries in Southeast Asia with support from United States CDC. Epidemiological training in some countries is also underway through FETP for veterinarians, also supported by United States CDC and, to some extent, FAO. However, many countries do not have regular extended programs with the exception of Indonesia, the Philippines and Thailand which have two-year programs (in the case of Indonesia, a two-year University degree).

In most countries, there is a concern among professional staff who have undertaken Field Epidemiology Training Programs, including for veterinarians, that they do not have a formal academic degree, and they feel this impedes their career development.

Currently, this training is provided primarily to medical doctors and veterinarians, but not enough training is available to those workers whose day to day work includes surveillance and alert, and laboratory diagnosis.

Medical, veterinary and paramedical school curricula in some countries do not fully address the needs for outbreak detection and response, and in-service training to provide regular simulation exercises in outbreak response and surveillance is very rare.

Trained epidemiologists in both veterinary and human public health are unequally distributed in countries and in rural or remote areas, where the need is greatest, there are often gaps in epidemiology skills. In some countries there has been task shifting, extending epidemiology training from medical doctors and veterinarians to other health workers (such as nurses), and this has resulted in better distribution of epidemiology skills. There is generally better distribution of workers with epidemiology skills in the human public health sector than in veterinary public health.

Routine preventive services, such as childhood immunisations, mean isolated areas in some countries have low vaccination coverage. As a result, periodic outbreaks of childhood diseases such as measles and rubella can lead to complications - infections requiring use of antimicrobial drugs that could otherwise have been avoided.[12]

[12] Vaccination coverage of animal populations against preventable key zoonotic diseases remains very low in the majority of countries in Southeast Asia.

Desired outcomes from investment related to health workforce investment

The following goals for DFAT regional support are based on the informed opinions of the scoping team members following the scoping mission country visits:

1. Stronger cadre of health and veterinary professionals with skills in epidemiological surveillance, risk assessment, alert and outbreak response.
2. Understanding of feasibility/value of degree training in epidemiology or other fields of public health in national/regional universities simultaneously or before Field Epidemiology Training Programs and Field Epidemiology Training Programs for veterinarians, through post-implementation assessment.
3. More equal distribution of epidemiological skills in regions and districts and in both men and women providing earlier detection and response, and greater health system resilience.
4. Up-to-date medical and paramedical and para-veterinary training and in-service training materials for earlier outbreak detection and stronger response.
5. Stronger childhood immunisation services with increased vaccination coverage for vaccine-preventable diseases, where these are emerging as major epidemic threats, and decreased use of antimicrobials, and stronger surveillance.

Opportunities for DFAT regional support for health workforce

Activity	**Outcomes (number above)**	**Potential financial partners**	**Potential partners**	**Priority**
Support for study of FETP/FETPV degree feasibility, as appropriate to country needs	2	Australian university scholarship programs	ASEAN World Federation of Schools of Public Health and Vet schools WHO FAO	High
Technical and financial support to FETP/FETPV programs	1	CDC	WHO FAO SAFETYNET CDC	FETPV: High FETP: Medium

Activity	Outcomes (number above)	Potential financial partners	Potential partners	Priority
Technical and financial support for field epidemiology training for lower cadre of health and veterinary workers	1, 3	CDC BMGF	WHO FAO SAFETYNET CDC	Medium
Technical support for mapping of distribution of health/veterinary workers with epidemiological skills	3	CDC BMGF	WHO FAO	Medium
Technical support for curriculum assessment and updating in medical, veterinary and paramedical schools	1, 3, 4	CDC	ASEAN World Federation of Schools of Public Health and Vet Schools WHO FAO OIE Australian Universities	Low
Technical support for development of in-service training materials with practical simulation exercises for outbreak detection, investigation, response and control	1, 3, 4	CDC	WHO FAO GOARN CDC	High
Technical support for strengthening routine immunisation systems in areas of dangerously low coverage	5	CDC	WHO UNICEF CDC	Low

Note: see the Acronyms list for full names of potential partners.

3. Health facilities including laboratories

Situation analysis

Timely identification of infectious agents and other hazards likely to cause public health emergencies depends on reliable and up-to-date facilities and laboratories.

Health facilities in the region, including laboratory services, vary in quality of infection prevention and control, ability to diagnose infections, and ability to facilitate the best possible use of antimicrobial drugs that is required to slow the development of antimicrobial resistance.

Inadequate infection control at times amplifies transmission of infection into outbreaks, as occurred in Vietnam and other countries in the region during the SARS outbreak. This can result in increased incidence of lethal nosocomial infections[13], many of which are caused by antimicrobial-resistant organisms.

The lack of up-to-date public health laboratory support at peripheral levels requires specimens be sent to more central public health laboratories. This results in complicated and costly logistics support for the despatch of specimens and delays in diagnosis. In addition, public health laboratories often do not use most up-to-date diagnostic protocols, have frequent ruptures in reagents and other supplies, and/or are not quality controlled.

Where national public health laboratories are functioning well, their value as potential reference laboratories in the region is not recognised. This means specimens are generally sent to reference laboratories in more distant locations, at times delaying an effective response to outbreaks that then spread geographically.

Communication between and among laboratories, and between the laboratories and those using the findings for outbreak alert and response and surveillance, is often delayed or does not occur. This is because of insufficient networking and a lack of common data sharing platforms in use. Newer communication technologies are underused in surveillance and alert, despite the fact that pilot studies in the region have shown their effectiveness.[14]

Desired outcomes from investment related to health facilities including laboratories

The following goals for DFAT regional support are based on the informed opinions of the scoping team members following the scoping mission country visits:

1. Decreased nosocomial transmission and amplification of transmission of emerging and re-emerging infectious agents.
2. Decreased rate of evolution of antimicrobial resistance.
3. Decreased transmission of antimicrobial-resistant bacteria.
4. More timely and accurate identification of emerging and re-emerging infectious agents in animals and humans.
5. More rapid and effective outbreak response and decreased risk of international spread through reliable laboratory results and better link with epidemiological information.

[13] Infections transmitted in a medical setting, caused by improper sterilisation of equipment and/or supplies, and by improper patient isolation and failure of health workers to wash hands between patients.
[14] http://www.skollglobalthreats.org/tag/podd/

Opportunities for DFAT regional support for health facilities including laboratories

Activity	Outcomes (number above)	Potential financial partners	Potential partners	Priority
Technical support for Infection prevention and control in health facilities and laboratories	1, 2, 3,	USAID CDC	WHO FAO OIE	High
Support for development and implementation of external quality assurance (EQA) programs	4	Merieux Foundation CDC	WHO FAO OIE CDC AAHL APHLN	High
Technical support for development and implementation of IT platforms that link laboratories, and permit linkage with epidemiological services	4, 5	Ending Pandemics Organization InSTEDD	WHO FAO OIE Private partnerships for LIMS	Medium
Technical support to national public health and veterinary laboratories for standardisation of procedures and data management	4, 5	USAID CDC	WHO FAO Public Health Laboratory Federations AAHL APHLN	Medium
Technical support for capacity development of national public health institutes	5	CDC	CDC IANPHI WHO	Medium

Note: see the Acronyms list for full names of potential partners.

4. Community resilience

Situation analysis

Outbreaks such as Ebola, Avian Influenza and SARS have previously demonstrated how important it is to inform and involve communities in activities to prevent or control outbreaks. Communities can provide trusted mediators to explain complex health issues and government policies, and to encourage community participation in reducing risk. A 2011 AusAID review of community-based interventions for emerging zoonotic infectious diseases in ASEAN countries highlighted the positive impact of community engagement, particularly in reducing Dengue incidence through vector control following environmental clean-up and education campaigns, and in improving reporting of Dengue haemorrhagic fever.[15] Many previous Australian aid programs, especially in HIV, have also demonstrated good results from involving communities.

Governments across Southeast Asia have established village and community 'volunteers', usually under the supervision of staff at primary health care centres or district health offices. However, these community workers are often unsalaried, and paid and trained on an 'as needed' basis, or through external funding, such as the Global Fund or the Red Cross. They are often active in more than one capacity. In Laos and Vietnam community health or animal health workers are often also members of government funded 'mass organisations' such as the Women's Union or the Youth Union. International and local non-government organisations (NGOs) are also involved to varying degrees in health and animal health, and are numerous and extremely active, particularly in Cambodia and Myanmar. However, individual NGOs and INGOs do not generally have the coverage and access of the Red Cross or mass organisations.

In all countries, the Red Cross has trained community volunteers for first response to natural disasters and, in some instances, for first response to infectious disease outbreaks. While the Global Fund has tended to train health volunteers vertically—so they are 'malaria volunteers' or 'HIV outreach workers'—these volunteers have the potential to work across a number of health areas. In Myanmar, for instance, 17,000 malaria health volunteers are now being trained by the National Malaria Control Program is as 'integrated' community malaria volunteers to be able to provide tuberculosis, HIV, Leprosy and Dengue related services.[16] In animal health, the pandemic risk of H5N1 was the initial driving force for many community-based activities across the region, and FAO has been especially involved in community-level training for safe poultry and other farming.

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[15] Kate Halton at al. *A systematic review of community-based interventions for emerging zoonotic infectious diseases in Southeast Asia*. DFAT/AusAID—Community-based interventions in SE Asia: Grant no. 59615, https://dfat.gov.au/about-us/publications/Documents/interventions-for-emerging-zoonotic-diseases.pdf.
[16] *Republic of the Union of Myanmar Global Fund OIG Audit Report*, August 2018, https://www.theglobalfund.org/en/oig/updates/2018-08-07-myanmar-audit-report/.

Communities regularly experience outbreaks of mosquito-borne infection such as Dengue. Standing water in containers around households perpetuates the risk by providing vector breeding sites. Backyard farming occurs in most communities, leading to close contact between animals and humans, and increased risk of infections that cross the human/animal species barrier.

Farmers have reported disease in animals at the community level using handheld mobile phone technology through the Participatory One Health Disease Detection Project in Thailand, although detailed evaluation of these reports is required to obtain optimal sensitivity (ability to correctly identify disease). More work is needed to improve the ability to accurately detect diseases through identifying potential system weaknesses, such as access to the devices, software, strength and coverage of mobile networks, user acceptance, data aggregation and analysis which may vary by country. In general, however, mobile and handheld technologies appear to be underexploited in disease surveillance and alert throughout the region.

Community level resilience is not uniform throughout the region, and there is a need for increased attention to community-led vector control, risk management of smallholder farming, and health promotion for better health seeking behaviour in immunisation, decreased antibiotic purchase and use, infection prevention and control and other preventive services. Active involvement of the community, particularly in rural areas, must be considered to address these issues.

However, communities are not homogenous. Vulnerability to and the impact of infectious disease outbreaks will vary according to gender, disability status, age, income level, occupational group, so that community-based responses require engagement with – and empowerment of – diverse groups in the community. Gender training is important to help stakeholders understand how gender issues influence vulnerability and impact and need to be addressed in responses to outbreaks, at individual, community and institutional levels. There is also a need for systematic collection and analysis of sex-disaggregated data, which is important for tracking trends and results.

Desired outcomes from investment related community resilience investment

The following goals for DFAT regional support are based on the informed opinions of the scoping team members following the scoping mission country visits:

1. Better utilisation of existing technologies, already familiar and in use in the community, for outbreak detection in animal and human populations.
2. Prevention of outbreaks of mosquito-borne infections.
3. Earlier and stronger community involvement in outbreak response, addressing the different needs of men and women, and decreased risk of spread.
4. Increased health seeking behaviour and demand for prevention services including vaccination.

5. Decreased demand and unregulated purchase of antibiotics at community level.

Opportunities for DFAT regional support for community resilience

Activity	Outcomes (number above)	Potential financial partners	Potential partners	Priority
Technical support for development of training materials for community first response and risk communication	1, 3	IFRC USAID CDC	IFRC WHO FAO OIE CDC	High
Support to national civil society to train community volunteers in first response and risk communication	1, 3	IFRC USAID CDC	IFRC WHO FAO OIE CDC	High
Technical support for development of training materials for community vector control, safe farming, and health promotion	2, 3, 4, 5	IFRC USAID	IFRC WHO FAO OIE UNICEF	Medium
Support to national civil society to train community volunteers in vector control, safe farming and health promotion advocacy	2, 3, 4, 5	IFRC USAID	IFRC WHO FAO OIE UNICEF	Medium
Technical support for assessment of effectiveness of handheld communication technologies in outbreak detection and response	1	CDC USAID Ending Pandemics Organization IFRC	IFRC WHO FAO CDC Ausvet (Private sector)	Low

Note: see the Acronyms list for full names of potential partners.

5. Health policy and regulation of drugs, vaccines and diagnostics

Situation analysis

Health security requires cross-sectoral collaboration, especially between the animal and human health sectors, and collaboration with sectors that deal with trade, commerce and regulation of vaccines and pharmaceuticals. Stronger government policies on One Health are lacking, as evidenced in the JEE and PVS Pathway assessments and from the teams' discussions with ministries of health and ministries of agriculture—ministries that can meet infrequently to discuss issues such as outbreak preparedness, alert and response.

Several governments raised the issue of the control of rabies, for example, that underlines the need for a One Health approach to assign responsibility and budgets to both ministries of health and agriculture. Presently, there is no obvious sector in charge of rabies control. The response in the human health sector is costly post-exposure prophylaxis, and may be less cost-effective than rabies control programs in animals, for which ministries of agriculture have not been fully engaged. A One Health approach to rabies control, as well as to other infectious diseases and antimicrobial resistance could enable regular dialogue to properly address health security issues at the human/animal interface. This could potentially be enhanced by developing an informal or formal legal framework for collaboration between sectors.

Another common theme in many country-level discussions was lack of harmonisation of regulatory procedures for newly developed medicines, vaccines and diagnostic tests. This results in delayed availability of new products in prevention and control programs in both the animal and human health sectors, and difficulty in harmonising surveillance, response and control measures in the region. It also makes it difficult to develop and use standardised algorithms for infectious disease diagnosis.

Recently, under the Health Security Initiative, Australia's Therapeutic Goods Administration has begun activities to strengthen the market authorisation systems in the region, but the team notes that no comparable mechanism is planned for veterinary or pesticide regulation.

FAO and OIE have been active in the region, promoting, along with WHO, a One Health approach for the governance of control measures for infections at the animal/human interface.

Desired outcomes from health policy and regulation of drugs, vaccines and diagnostics investment

The following goals for DFAT regional support are based on the informed opinions of the scoping team members following the scoping mission country visits:

1. Standardisation of national procedures in surveillance, alert, and laboratory diagnosis.
2. More effective regional collaboration and regional standards in surveillance, alert and laboratory diagnosis.

3. Decreased time for market entry of new drugs, vaccines and diagnostics.
4. Increased demand by countries in the region for regulatory harmonisation, including through Australia's Therapeutic Goods Administration.
5. Common planning and budget contribution to rabies control, as a means of demonstrating the importance of the One Health concept.

Opportunities for DFAT regional support for health policy and regulation of drugs, vaccines and diagnostics

Activity	Outcomes (number above)	Potential financial partners	Potential partners	Priority
Technical support for joint planning for rabies control through a one health platform associated with the Emergency Operations Centre	5	USAID CDC	WHO FAO OIE Global Alliance for Rabies Control[17]	High
Technical support for increased regional harmonisation efforts in drug, vaccine and diagnostics regulation	2, 3, 4	TGA APVMA		Medium
Technical support for regional alignment of surveillance and alert procedures in humans and animals	1, 2	USAID CDC	WHO FAO OIE	Medium
Technical support for regional alignment of national diagnostic procedures in animal and veterinary laboratories	1, 2	USAID CDC	WHO FAO OIE CDC Pasteur institutes AAHL	Medium
Technical support for development of informal agreements and/or model legislation for stronger cross sector work under a one health platform	5	USAID	WHO FAO OIE	Medium

Note: see the Acronyms list for full names of potential partners.

[17] Involvement of the ASEAN Zoonotic Disease Working Group will also facilitate regional cooperation.

Annex 1: Scoping team

The Scoping Team for South East Asia was jointly led by Professor David Heymann, Head of the Global Health Security Centre at Chatham House in the United Kingdom and Dr Guénaël Rodier, until recently the Director of Country Health Emergencies Preparedness & International Health Regulations at the World Health Organization (WHO).

Technical specialists were: Dr Claudia Surjadjaja (public health), a Public Health Physician with qualifications in medical ethics and epidemiology and wide experience in Southeast Asia health systems and infectious disease research; and Professor Robyn Alders AO, (animal health) an Associate Professor and Principal Research Fellow at the University of Sydney, who has been active in highly pathogenic avian influenza control and preparedness in Africa and Asia, since 2004.

Annex 2: Visit programs

Indo Pacific Health Security Initiative High Level Scoping Mission

Indonesia

Mission team:

- Prof David Heymann, Head and Senior Fellow, Centre on Global Health Security (Mission Lead)
- Dr Claudia Surjadjaja, epidemiology/public health specialist
- Prof Robyn Alders, animal health specialist
- Mr Blair Exell, Acting Deputy Secretary, Department of Foreign Affairs and Trade, and Australia's Ambassador for Regional Health Security
- Ms Kristen Stokes, Assistant Director, Indonesia Economic and Trade Section

Jakarta, 18–20 April 2018	
Time	**Activity**
18 April 2018	
07:45 – 08:30	Meet with Ms Fleur Davis and Human Development team, Australian Embassy
08:30 – 09:30	Meet with Charge, MrAllaster Cox and Minister Counsellors
10:30 – 11:30	Meet with Deputy for Coordination of Health Improvement, Dr Sigit Priohutomo and Deputy Assistant of Disease Prevention and Control, Dr Naalih Kelsum
15:00 – 18:00	Embassy briefing and Post discussion with Mission
18:00 – 20:00	Official dinner: Dr. Samhari Baswedan, MPA Executive Secretary of Country Coordinating Mechanism Indonesia Dr Navaratnasamy Paranietharan, WHO Indonesia Representative Dr James, McGrane FAO Mr George Hughes, DAWR Mr Adrian Coghill, DAWR
19 April 2018	
08:00 – 08.30	Meeting with Mr Adrian Coghill and Australia Indonesia Partnership for Emerging Infectious Diseases (AIPEID) team
08:30 – 09:30	Meet with Minister, Dr Ir. H. Andi Amran Sulaiman, MP
14:00 – 15:00	Meet with Head of Eijkman Insitute, Prof Amin Soebandrio, Ph.D., Sp.MK
15:30 – 16:30	Meet with Ginandjar Kartasasmita, Vice Chairman (Executive Chairman) Indonesian Red Cross (PMI)
17:00 – end	Development meeting
20 April	
08:00 – 10:00	Meet with Secretary General, Dr. Untung Suseno Sutarjo, M.Kes

Jakarta, 18–20 April 2018	
Time	**Activity**
10:30 – 12:30	Multilateral Partners Roundtable: Dr Navaratnasamy Paraniethara, WHO Indonesia Representative, Rim Kwang, WHO Indonesia Outbreaks and Emergency Team Leader Rodrigo A. Chaves, World Bank Indonesia Country Director Pandu Harimurti, World Bank Indonesia Senior Health Specialist (MDTF) Sinta Satriana, World Bank Indonesia Health Financing Consultant Dr James McGrane, FAO Emergency Centre for Transboundary Animal Diseases (ECTAD) Team Leader Paul Pronk, UNICEF Country Manager Sowmya Kadandale, UNICEF Indonesia Manager of Health
11:00 – 11:30	Meeting with Dato Lim Jock Hoi, ASEAN Secretary General
12:30 – 14:00	Lunch meeting with US partners: Ryan Washburn, USAID Indonesia Deputy Mission Director Jonathan Ross, USAID Indonesia Director for Health William Hawley, USCDC Acting Country Director
14:30 – 15:00	Meet with Jane Duke, Australian Ambassador to ASEAN
15:00 – 16:00	Comprehensive debrief with Post
16:00 – 16:30	High-level debrief with Charge, health security mission

Philippines

Mission team:

- Prof David Heymann, Head and Senior Fellow, Centre on Global Health Security (Mission Lead)
- Dr Claudia Surjadjaja, epidemiology/public health specialist
- Prof Robyn Alders, animal health specialist
- Mr Robin Davies, Head of the Indo-Pacific Centre for Health Security
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Manilla, 23 April 2018	
Time	**Activity**
23 April	
08:30	Meet with: Dr Li Ailan, Regional Emergency Director, WHO Health Emergencies Programme Dr Angela Pratt Executive Officer, Regional Director's Office and Coordinator, Communications and External Relations, WPRO Dr Gerrie Medina, Emergency Focal Point, WHO Philippines
10:30 – 12:15	Meet with Government of Philippines Ministry of Health, Technical Services Cluster: Dr Myrna Cabotaje, Director, Disease Prevention and Control Bureau (DPCB) Dr Gemma M. Arellano, EREID National Program Manager, DPCB

Manilla, 23 April 2018	
Time	**Activity**
12:15 – 13:15	Meet with USAID: Ms Karen Klimowski, Director USAID Philippines Office of Health Mr Lawrence Hardy, USAID Mission Director, Philippines, Pacific Islands and Mongolia
14:30 – 15:30	Team A—Meet with Department of Agriculture: Dr Emelinda L. Lopez, Animal Health and Welfare Division, Bureau of Animal Industry (BAII), Department of Agriculture Team B—Meet with Asian Development Bank (ABD): Ms Sonalini Khetrapal, Health Specialist, Sustainable Development and Climate Change Department ADB

Thailand

Mission team:

- Prof David Heymann, Head and Senior Fellow, Centre on Global Health Security (Mission Lead)
- Dr Claudia Surjadjaja, epidemiology/public health specialist
- Prof Robyn Alders, animal health specialist
- Mr Robin Davies, Head of the Indo-Pacific Centre for Health Security
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Bangkok, 24 April 2018	
Time	**Activity**
24 April 2018	
07:30 – 09:00	Meet with FAO and OIE Regional Offices for Asia and the Pacific in Bangkok: Dr Wantanee Kalpravidh FAO Regional Manager, ECTAD Dr Kachan Wongsathapornchai, Regional Epidemiology Coordinator, FAO Dr Ronello C. Abila, Sub-Regional Representative for South-East Asia Mr Richard Lee, DFAT ASEAN Regional Office

Cambodia

Mission team:

- Prof David Heymann, Head and Senior Fellow, Centre on Global Health Security (Mission Lead)
- Dr Claudia Surjadjaja, epidemiology/public health specialist
- Prof Robyn Alders, animal health specialist
- Mr Robin Davies, Head of the Indo-Pacific Centre for Health Security
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Phnom Penh, 24–27 April 2018	
Time	**Activity**
24 April 2018	
14:30 – 16:00	Visit to Institut Pasteur du Cambodge: Briefing and tour with Dr Didier Fontenille, Director
25 April	
09:30 – 11:00	Meeting with WHO (Team A) Dr Liu Yunguo, WHO Representative Ms Vicky Houssiere, Risk Communication Dr Kumanan Rasanathan, Coordinator, Health Systems Meet with Ministry of Health (Team B) Prof Chhea Chorvann, Director of National Institute of Public Health Dr Teng Srey, Deputy-Director of Communicable Disease Control Department Ms Ouch Monipheap, Vice-chief of Department of Medical Laboratory Service
11:00 – 11:30	Meeting with Regional Health Security Cadre volunteers (placed at WHO) (Team A): Yasmin Lisson
12:00 – 13:30	Lunch meeting with World Bank: Dr Somil Nagpal, Senior Health Specialist Sovanratnak (Ratnak), Health Analyst Tomo Morimoto Nareth Ly, Health Specialist Video link in global/regional World Bank officials (in Siem Reap)
14:00 – 15:00	Meet with FAO: Mr Alexandre Huynh, FAO Representative Ms Kristina Osbjer, Team Leader of FAO Emergency Centre for Transboundary Animal Diseases (ECTAD) Ms Seng Sokerya, National AMR Coordinator of FAO ECTAD Ms Ann Chansopheak, National Operations support to FAO ECTAD
15:45 – 17:00	Meet with US Government: Christina (Tina) Lau, Acting Director, Office of Public Health and Education, USAID Dr Rachel Albalak, US CDC Country Director Dr John Brooks, NAMRU2 Director
26 April 2018	

Phnom Penh, 24–27 April 2018	
Time	**Activity**
09:30 – 10:30	Team A—Meet with Australian Ambassador to Cambodia, Ms Angela Corcoran Team B—Videoconference with ADB health specialist team in Manila
10:30 – 11:30	Meet with KOICA: Mr Jeoung Yun Gil, Country Director Ms Jiyoon Kim, Health Manager
12:00 – 13:30	Attend donor lunch meeting with Dr Takeshi Kasai, Director, Programme Management, WHO Western Pacific Regional Office (Team A) Ms Laura Davison, Programme Management Officer, WHO Western Pacific Regional Office Ms Franziska Schuster, Programme Management Officer
14:00 – 16:00	Meet with General Director of Animal Health and Production: H.E. Sen Sovann, Director General, General Directorate of Animal Health and Production Dr Sorn San, Deputy Director General, General Directorate of Animal Health and Production Dr Holl Davun, Deputy Director General, General Directorate of Animal Health and Production Mr Peng Chanberna, Director, Department of Animal Health and Veterinary Public Health Mr Nou Yuteka, Director, Department of Administration, Planning, Accounting and Cooperation Dr Tum Sothyra, Director, National Animal Health and Production Research Institute
27 April 2018	
09:00 – 10:00	Meet with National Centre for Parasitology Entomology and Malaria: Dr Huy Rekol, Director of CNM Dr Lek Dysoley, Vice Director of CNM Dr Siv Sovannaroth, Chief of Technical Office Dr Po Ly, Vice Chief of Technical Office Dr Leang Rithea, Vice Chief of Technical Office
10:30 – 11:30	Team A—Meet with International Federation of the Red Cross (IFRC) and Cambodian Red Cross: Ms Lak Mony Rasmey, Program Coordinator and Office Manager, IFRC Cambodia H.E. Mom Chanthy, Deputy Director of Health Department, Cambodia Red Cross Team B—Meeting with Ministry of Economic and Finance: Dr Chhuon Samrith, Deputy Director-General

Myanmar

Mission team:

- Dr Guneal Rodier, former Director of the Department of Global Capacities, Alert and Response within the Outbreaks and Health Emergencies Cluster at the World Health Organization (WHO)
- Dr Claudia Surjadjaja, epidemiology/public health specialist
- Prof Robyn Alders, animal health specialist
- Mr Robin Davies, Head of the Indo-Pacific Centre for Health Security
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Yangoon, 4–7 June 2018	
Time	**Activity**
4 June 2018	
14:00 – 15:00	DFAT briefing about Indo-Pacific Health Security Initiative
15:00 – 16:00	Meet with Dr Meg McKeown, Australian Embassy Medical Counsellor
17:15 –18:15	Meet with Dr Stephan Paul Jost, WHO Representative to Myanmar
5 June 2018	
9:30 – 10 :30	Meet with FAO: Dr Wantanee Kalpravidh, Regional Manager, ECTAD Dr Ohn Kyaw, National Consultant Advocacy and Risk Communication Expert, ECTAD
10:30-11:30	Meet with Australian Ambassador, Nicholas Coppel
12:30 – 14:00	Attend official lunch with the main health sector actors: Dr Stephan Paul Jost , Country Representative, WHO Mr Oren Ginzburg, Fund Director, 3MDG Dr Attila Molnar, Fund Director, Global Fund Dr Helenlouise Taylor, Health and Nutrition Advisor, Save the Children Mr Andrea Berloffa, Acting Country Representative, FOA Ambassador Nicholas Coppel
14:45 –15:45	Meet with Myanmar Red Cross: Dr Amaya Maw Naing (Ms), Executive Member, Focal Person for International Relations and Health Prof Dr Aye Aung, Vice President Myanmar Medical Association
16:00 – 17:00	Meet with Burnett Institute: Dr Phone Myint Win, Country Director Dr Kyu Kyu Than
18:00 – 20:00	Meet with: Frank Smithius, Medical Action Myanmar, Dr Aung Pyae Phyo, Mahidol-Oxford Tropical Medicine Research Unit Dr Aung Myint Thu, Mahidol-Oxford Tropical Medicine Research Unit

Yangoon, 4–7 June 2018	
Time	**Activity**
6 June 2018	
9:00 – 10:00	Meet with: Dr Attila Molnar, Global Fund Director, UNOPS (UNOPS manages 3MDG) Dr Thet Aung, Health Systems Strengthening Team Leader, 3MDG Dr Phyu Phyu Thin, Team Leader of the Southeast and Ethnic Health Organisations, 3MDG Dr Helenlouise Taylor, Save the Children
10:00-11:00	Meet with USAID and United Kingdom Department for International Development (DFID) Dr Feliciano Monti, Senior Malaria Advisor, US President's Malaria Initiative Robin Martz, From USAID Bangkok Dr Nu Nu Khin (Ms) , Health Security Team Dr Wai Lwin, Health Adviser, DFID
12:30 – 13:45	Meet with World Bank: Dr Hnin Hnin Pyne, Senior Health Specialist Ms Tanya Constantino, health security volunteer, Medical Laboratory Technologist (Hep B & C, Measles and Flu), National Health Laboratory
7 June 2018	
08:30 –10:30	Meet with Ministry of Health and Sports officials: Dr Myint Htwe, Minister Prof Dr Thet Khine Win, Permanent Secretary Dr Than Tun Aung, Deputy Director General, Department of Public Health (Disaster and Public Health Emergency) Dr Thaung Hlaing, Deputy Director General, Department of Public Health (Public Health) Dr Thida Hla, Deputy Director General, Department of Medical Care Dr Kyaw Khaing, Assistant Permanent Secretary, International Health Division
15:30 – x16:30	Meet with Ministry of Agriculture, Livestock and Irrigation: Dr Khin Zaw, Permanent Secretary (Livestock) Dr Ye Tun Win, Director General, Livestock Breeding and Veterinary Department Dr Tun Lwin, Assistant Permanent Secretary

Vietnam

Mission team:

- Mr Peter Verseggi, Australia's Ambassador for Regional Health Security, First Assistant Secretary, Development Policy Division, DFAT
- Dr Guénaël Rodier, Lead, former Director of the Department of Global Capacities, Alert and Response within the Outbreaks and Health Emergencies Cluster at the World Health Organization (WHO)
- Dr Claudia Surjadjaja, Technical Specialist (Public Health—Epidemiology)
- Prof Robyn Alders AO, Technical Specialist (Animal Health)
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Hanoi, 8–12 June 2018	
Time	**Activity**
9 June 2018	
13:15 – 13:50	Meet with Rebecca Bryant, Deputy Head of Mission and the Strategic Coordination Unit (SCU) team on the program
14:00 – 15:00	Meet Mr Kidong Park WHO Vietnam Representative
15:05 – 16:00	Meet Mr Pawin Padungtod, Senior Technical Coordinator, Emergency Centre for Transboundary Animal Diseases (ECTAD) Programme FAO Office
16:15 – 17:15	Call Mr Guy Thwaites Director of Oxford University Clinical Research Unit, Viet Nam
17:45 – 18:45	Visit to the National Hospital for Tropical Diseases
08:30 – 10:00	Visit to the Lung Hospital (for TB related)
10 June 2018	No external meetings
08:30 – 09:30	Courtesy call on Vice Minister of Health Nguyen Thanh Long, with representatives from the International Cooperation Dept, Medical Services Administration Dept (MSA), Preventive Medicine Dept (PMD) and National Institute of Hygiene and Epidemiology (NIHE)/ Pasteur
09:30 – 10:30	In-depth technical discussion with PMD and NIHE
11:00 – 12:00	Meet Ms Vu Hai Yen, Head, Health and Social Affairs Division, Department of Public Expenditures, Ministry of Finance (MoF)
13:30 – 14:30	Meet the Health Security Financing Assessment (HSFA) project team: Dr Dang Viet Hung Department of Planning and Finance, MOH Dr Tran Mai Oanh—Director, Health Strategy and Policies Institute (HSPI) Dr Nguyen Khanh Phuong, HSFA team leader
15:00 – 16:00	Meet ADB in Vietnam: Mr Eric Sidgwick, Country Director Ms Sakiko Tanaka, Senior Social Sector Mr Ngo Quang Vinh, Associate Social Sector
16:15 – 17:00	Meet Mme Nguyễn Thị Xuân Thu, Chairwoman of Red Cross Vietnam
17:15 – 18:00	Meet Prof Dang Duc Anh, Director, National Institute of Hygiene and Epidemiology (NIHE)

Hanoi, 8–12 June 2018	
Time	**Activity**
11 June 2018	
09:00 – 10:00	Meet Ministry of Agriculture and Rural Development (MARD), Vice Minister and Director General of Animal Health Dept (Ms Pham Van Dong) and International Cooperation Dept
10:30 – 11:30	Meet with Ms Paula Morgan, Deputy Country Director, CDC and representatives from USAID and US Embassy
11:45 – 13:15	Debriefing with Australia's Ambassador to Vietnam
13:30 – 14:00	Meet Nerolie McDonald, Defence Attache
13:45 – 14:30	World Bank official, Patrick Osewe

Laos

Mission team:

- Mr Peter Verseggi, Australia's new Ambassador for Regional Health Security, First Assistant Secretary, Development Policy Division, DFAT
- Dr Guenael Rodier, Leader of Mission, Director of the Department of Global Capacities, Alert and Response within the Outbreaks and Health Emergencies Cluster at the World Health Organization (WHO)
- Dr Claudia Surjadjaja, Technical Specialist (Public Health –Epidemiology)
- Prof Robyn Alders AO, Technical Specialist (Animal Health)
- Ms Prudence Borthwick, Assistant Director, Indo-Pacific Centre for Health Security

Vientiane, 13–15 June 2018	
Time	**Activity**
13 June 2018	
07:30 – 08:30	Meet with Dr Juliet Fleischl, WHO Representative
09:00 – 09:45	Courtesy call on H.E Dr Bounkong Syhavong, Minister for Health Dr Soulivanh Pholsena, Chief of Cabinet, Director of Foreign Relations, MoH
10:00 – 11:00	Meet with Communicable disease control, Public Health Emergency, International Health Regulation, Ministry of Health: Dr Rattanaxay Phetsouvanh, Director General of Communicable Disease Control Department
11:30 – 12:15	Meet with Lao Red Cross: Assoc Dr Sing Menorath, Vice President, Dr Bounma Xayasouk, Director of Community Health Promotion Unit Mr Phonexay Sivilay, Director of Health Emergency Division
13:30 – 14:30	Meet with National Centre for Laboratory and Epidemiology: Dr Phonphadit Xangsayarath, Deputy Director of NCLE Dr Bouaphanh Khamphaphongphane, Head of Epidemiology Division, NCLE
15:00 – 15:45	Meet Centre for Malaria, Parasitology and Entomology Department, Ministry of Health Dr Viengxay Vanisaveth, Deputy Director,CMPE

Vientiane, 13–15 June 2018	
Time	**Activity**
16:15 – 17:15	Meet with Lao Pasteur Institute: Dr Darouny Phonekeo, Deputy Director Dr Antoine Des Graviers, CFO Dr Marc Grandadam, Head of Arbovius and Emerging Viral Disease Laboratory
14 June 2018	
09:00 – 10:00	Meet with Dr Somphanh Chanphengxay, Director General of Department of Livestock and Fishery, Ministry of Agriculture and Forestry
10:30 – 12:00	Meet with: WHO—Dr Reiko Tsuyuoka, WHE country team leader, Matt Shortus, Malaria programme and Jacques Serbert, TB programme ECTAD—Dr Chintana Chanthavisouk, ECTAD team leader FAO-Lao—Ms Dhingra Madhur, Regional Project Coordinator, Food and Agriculture Organisation Regional Office for Asia and Pacific (FAORAP in Thailand) and Ms Nguyenphuong Oanh, International Operation Specialist
13:30 – 14:30	Meet with USAID: Patrick Bowers, Deputy Country Office Director Ms Kongchay Vongsaiya, Health Specialist
15:00 – 15:45	Meet with Mr Angkansada Mouangkham, Deputy Director General of External Finance and Debt Management Department, Ministry of Finance
16:00 – 17:00	Meet with Mr Michael O'Rourke, Chief Technical Adviser, ADB GMS Health Security Project

Annex 3: Terms of reference

TERMS OF REFERENCE

HIGH LEVEL SCOPING STUDY for DESIGN of MULTI COUNTRY PARTNERSHIPS PROGRAM to STRENGTHEN HEALTH SYSTEMS FOR HEALTH SECURITY

ASIA

This Terms of Reference (TOR) specifically addresses Australia's investments through partnerships to strengthen health systems and improve health security in the Asian region. One of the challenges facing Australia is how to maximise the effectiveness of investments in terms of their being fit for purpose, effective at both a national and regional level (making an individual country safer as well as contributing to the region's safety) and coherent (so that each activity contributes to a whole greater than the sum of its parts). A rigorous evidence-based investigation of options and clear-sighted analysis will reduce the potential for investments to be scattered, fragmented and low-impact.

This investigation will be a DFAT-led process, managed by the Indo-Pacific Centre for Health Security (CHS) (Prue Borthwick/Emeline Cammack). The first phase will comprise a preliminary desk study (described briefly below but to be managed under a separate TOR), and a scoping study. The first phase will be followed by a more technical design process, and the development of an M&E framework (both of which are described briefly below but to be managed under separate TOR).

- **Preliminary desk study:** Collation of existing information on health security capacity in target countries; information from posts; existing health program information, provision of key documents, briefing and background papers to consultants (eg JEE reports or IHR self assessments, relevant DFAT evaluations or quality reporting, other studies identified through literature review).

- **Scoping Study:** High-level visits led by a senior consultant with high-level networks of contacts and access to senior members of Government in partner countries. This study is anticipated to include visits to up to seven countries in Asia. It will culminate in a report and a presentation in Canberra with a broad group of staff from different areas to be invited, presenting recommendations for investments.

- **Design Process:** This will be a more detailed exercise designed to generate activities and annual plans, based on the Scoping Study Report. The design team will consist of technical experts from relevant thematic areas, and preferably include one person from the scoping study team to enhance continuity.

- **M&E and Performance Framework:** This should be addressed by the design team and linked to the overall Health Security Initiative (HSI) Performance Framework.

A) Background

Australia's health security is only as strong as our region's weakest link. The Indo-Pacific region includes many recognised hotspots for rapidly spreading and dangerous emerging infectious diseases, 75 per cent of which originate in animals. Many countries in the region have weak human and animal health systems rendering the whole region vulnerable to such emerging infectious diseases. A major disease outbreak will have severe health and economic implications for Australia, our neighbours and trading partners – costing lives, disrupting regional trade, tourism, and development. In addition, the region is experiencing growing antimicrobial resistance including in tuberculosis and malaria, which threatens to undo decades of medical advancements in treatment of these high burden diseases.

In June 2016, the Australian Government made a pre-election policy commitment to invest in regional health security to safeguard the health and development of Australia and our region. DFAT's Indo-Pacific Centre for Regional Health Security in Australia is delivering on this commitment under the Indo-Pacific Health Security Initiative (the Initiative) announced by the Foreign Minister on 8 October 2017. This Initiative contributes to the avoidance and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale.

With funding of A$300 million over five years its investments will:

- Promote global and regional cooperation
- Catalyse international responses to countries' identified needs
- Apply Australia's unique strengths in health security
- Accelerate access to new and effective tools.

The Initiative builds on Australia's Health for Development Strategy, 2015-2020, which emphasises the role of strong health systems in improving health security[18]. It aligns with the

[18] Questions used in the H4D Strategy to identify Health System Strengthening Activities were:
- Do the interventions have cross-cutting benefits beyond a single disease?
- Do the interventions address policy and organizational constraints or strengthen relationships between the different system areas?
- Will the interventions produce permanent systemic impact beyond the term of the project?

direction of the Government's new White Paper in positioning Australia to take an active and ambitious role in responding to regional and global challenges. The Initiative specifically addresses Sustainable Development Goal Target 3.d: to "strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks". The indicator for this target is countries' status in relation to the International Health Regulations (IHR) capacity and health emergency preparedness index - measured by self-assessment or through a WHO-led voluntary Joint External Evaluation (JEE). A similar index has been established by the World Organization for Animal Health (OIE) to evaluate the Performance of Veterinary Services (PVS).

The Initiative aims to inform evidence-based planning, help prevent avoidable epidemics, strengthen early detection capacity, and support rapid, effective national and international outbreak responses. It does this by accelerating research on new drugs and diagnostics, expanding partnerships at the national, regional and global level to strengthen human and animal health systems, and deepening people-to-people linkages that build national and regional health security capacity. Funding for the initiative is drawn from Australia's international development assistance program and will be applied to activities eligible to be classified as Official Development Assistance.

In 2017 DFAT's Office of Development Effectiveness commissioned an evaluation of Australia's investments in combatting pandemics and emerging infectious diseases, over the previous decade, with a focus on health systems impact – in both human and animal health. Previous programs have worked bilaterally and regionally. The evaluation found the best outcomes for animal health were: the establishment of a regional disease control model for foot and mouth disease (FMD) in South East Asia; and, the establishment of a digital surveillance program (i-sikhnas) for the use of farmers in Indonesia. Attempts to use a One Health approach (linking human and animal health) presented challenges in working across jurisdictions. Areas with the best results were public health issues with common ground such as rabies, avian influenza and antimicrobial resistance.

Governments in the Indo-Pacific have shown a strong interest in health security with all ten ASEAN member countries having undertaken, committed to or formally expressed interest in undergoing a JEE of their capacities to meet the legally binding International Health Regulations 2005 (IHR) requirements. Pacific leaders have also agreed to develop a new Pacific Health Security Coordination Plan (PAHSEC) to assess and develop their IHR capacities.

- Are the interventions tailored to country-specific constraints and opportunities, with clearly defined roles for country institutions?

B) Objectives of the Assignment

To investigate the articulated needs of countries and make recommendations for targeted responses that would:

- provide a clear value add in a crowded global context
- add up to a whole greater than the sum of parts
- have a regional impact as well as a national one
- build on existing, effective DFAT programs where relevant
- demonstrate Australia's comparative advantage
- enable attribution
- are evidence-based and can demonstrate development outcomes (ie health security institutions and systems improvements)
- leverage resources from other governments and donors

C) Scope of the assignment

i) The Geographic Focus

South East Asia has large populations in high-density areas supported by intensive livestock production industries. Countries share land borders and there is frequent unregulated livestock traffic across these borders, increasing opportunities for the spread of zoonotic diseases. There is a range of capacities in health systems ranging from extremely competent to barely so, this is more pronounced in the case of animal health. Government spending on health is generally low and out of pocket expenses high.

ii) The Scoping Teams

The scoping team will have senior representation and are expected to operate at a strategic level, consulting and communicating with senior government officials in selected countries to promote Australia's new Health Security Initiative, identify the partner country's view of national priorities in this area, and secure the partner country's commitment to participating in potential regional multi-country and whole of region activities.

The scoping team will also meet with country representatives of multilateral organisations, senior DFAT staff at post and where relevant, non-Government and private sector organisations.

iii) The Scoping Missions

The missions will comprise a period of approximately 44 days for South East Asia (29 travel days and 15 other working days) (to be confirmed once travel arrangements are finalised). This will be followed by a report and presentations to DFAT in Canberra at mission's end.

The mission will comprise the following:

- Pre-departure work: document review and finalisation of methodology and planning (estimated 2 days), and pre-departure meetings in Canberra (estimated 3 days).
- Visits to seven countries in the South East Asia mission team (estimated 29 days, indicatively three separate trips between 16 April and beginning of July).
- Post-visits report drafting, workshops and presentation of findings to DFAT in Canberra (estimated 10 days = 3 days for country level reports and 7 days for the final report/workshop)

iv) Consultations for each mission team

Expected Canberra consultations (individual meetings and roundtables)

- Health Policy Branch
- Indo-Pacific Centre for Health Security
- Humanitarian
- Gender, Climate Change, Disability Branches
- Relevant DFAT country desks
- Multilaterals, Banks and Funds
- NGOs & Volunteers Branch
- Scholarships
- Select whole of government partners

In-country consultations

- Meet and brief HOM on arrival
- Consult with High Commission/Embassy staff
- Meet with partner government Ministries – Health, Finance/Treasury, Agriculture, Planning
- Meet with in-country multilaterals (WHO, OIE, FAO, ADB, WB)
- Meet with key bilateral donors
- Meet with relevant NGOs and/or contractors

v) Reporting

During ***each in-country mission***, the CHS officer will be responsible for preparing brief daily summaries capturing key points of meetings, in consultation with team members. The Strategic lead will oversee the preparation of a brief report for each country, based on the insights and information they gather. One or more of the technical leads and the CHS officer will prepare the country report under the direction of the Strategic lead.

Under the direction of the Strategic Lead, the team will be responsible for preparing and delivering a consolidated regional report drawing on findings from in-country missions and the country reports, the team's technical experience, DFAT's strategic direction, Australia's comparative advantage, and a review of the literature.

The report is likely to take the form of a rapid situation analysis (or SWOT analysis) supported by recommendations identifying a limited number of options for Australian multi-country, country-led, and regional investment.

The team will also participate in workshops and presentation of the report and findings in Canberra. This may be with or linked to a similar process for Asia. The final report will be around 15-20 pages long and will be delivered before the presentation. If necessary, the final report will be adjusted following the presentation taking into account any feedback or inconsistencies/inaccuracies identified.

The scoping study report should identify partner government and other stakeholder priorities, as well as establish their willingness (or otherwise) to commit resources to the investment; significant political economy issues, country needs and capacities, review possible investment areas, and identify areas that require additional inputs or information.

The report should include consideration of key issues/decisions, including:

- Priority areas
- Potential partners for implementation
- Options for resourcing/leverage
- Indicative funding

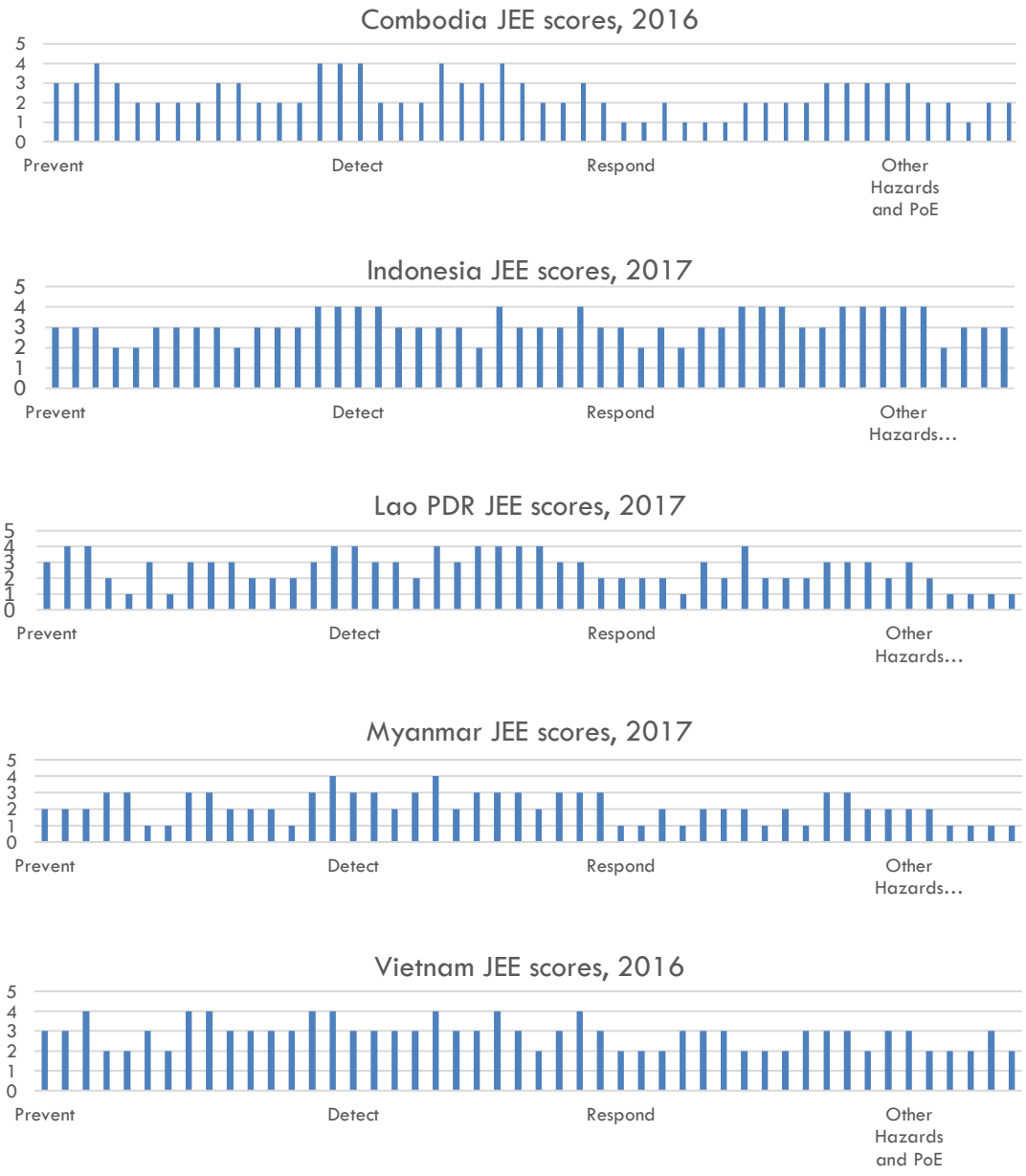
vi) Recommendations

Within the scoping study report, the recommendations should address the following:

a) **Options for country-led or regional interventions**: identifying evidence-based activities to strengthen health security systems to enable improved prevention, detection and response to communicable disease outbreaks; with a focus on IHR (2005) and OIE/PVS core capacities.
   - **Value for money:** 'best buy' interventions, based on evidence of impact and cost
   - **Achievable and sustainable outcomes:** an assessment of time and effort required to achieve results, and of likely sustainability after program ends.
   - **Potential partners:** including national government departments, multilateral organisations (see below), regional bodies, non-Government organisations, private sector organisations, other donors and academic institutions.

b) **Potential entry points for Australian co-financed health security investments** in target countries through partnerships that could include:
   - key multilateral partners including WHO, World Bank, ADB, Global Fund, Gavi, and identifying entry points in existing processes (e.g. costed JEE plan implementation, relevant regional implementation plan for health security [e.g WHO PahSEC]; financing assessment and support with World Bank); and
   - potential opportunities for collaboration and co-financing from other donors, particularly the US (USAID, USCDC), and possibly China, Korea and Japan.

Annex 4: Country-specific JEE assessment graphs



Source: World Bank, complied from the national JEE reports.

Acronyms

AAHL	Australian Animal Health Laboratory
ACCAHZ	ASEAN Coordinating Centre for Animal Health and Zoonoses
ADB	Asian Development Bank
AMR	Antimicrobial resistance
APVMA	Australian Pesticides and Veterinary Medicines Authority
APSED III	Asia Pacific Strategy for Emerging Diseases (WHO)
ASEAN	Association of South East Asian Nations
BMGF	Bill & Melinda Gates Foundation
CBHI	Community-based Health Insurance
CDC	Centers for Disease Control
CHW	Community Health Worker
CHS	Indo-Pacific Centre for Health Security (DFAT)
CHV	Community Health Volunteers
CIRAD	French Agricultural Research Organization
CILM	Center Infectiology Lao-Christophe Meriuex
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DAWR	Department of Agriculture and Water Resources
DGHT	Division of Global HIV and TB
DIFD	Department for International Development (United Kingdom)
DTP	Diptheria Tetanus Pertussis
DTRA	Defence Threat Reduction Agency
EID	Emerging Infectious Disease
EOC	Emergency Operations Centre
EQA	External quality assurance
EU	European Union
EWARS	Surveillance and Early Warning Alert and Response System
EWOR	Early Warning Outbreak Response
FETP	Field Epidemiology Training Program
FETPV	Field Epidemiology Training Program for veterinarians
FAO	Food and Agriculture Organization of the United Nations
GFATM	Global Fund on AIDS, TB and Malaria
GHSA	Global Health Security Agenda
GMS	Greater Mekong Sub-Region
GTZ	German Agency for Technical Cooperation
HPAI	Highly pathogenic avian influenza
IANPHI	International Association of National Public Health Institutes
IFRC	International Federation of Red Cross and Red Crescent Societies
IHR	International Health Regulations
IPL	Institut Pasteur du Lao
InSTEDD	Innovative Support to Emergencies Diseases and Disasters (supports iLab)
IPC	Infection Prevention and Control

ISO	International Organization for Standardization
JEE	Joint External Evaluation
JICA	Japanese International Cooperation Agency
KOICA	Korean International Cooperation Agency
LAMP	Live Animal Marketing Production
MDR TB	Multi-Drug Resistant Tuberculosis
MBDSN	Mekong Basin Disease Surveillance Network
MoH	Ministry of Health
M&E	Monitoring and Evaluation
NaVRI	National Veterinary Research Institute Cambodia
NEIDCO	National Emerging Infectious Diseases Control Organization
NGO	Non-government organisation
NHMRC CRE	National Health and Medical Research Council Centre of Research Excellence (Australia)
OCRU	Oxford University Clinical Research Group
OIE	World Organisation for Animal Health
Laos	Lao Peoples Democratic Republic
LOMWRU	Lao-Oxford-Mahosot Hospital Wellcome Trust Research Unit
PEPFAR	President's Emergency Plan for AIDS Relief
PODD	Participatory One Health Disease Detection
PVS	Performance of Veterinary Services
RAI	Regional Artemisinin-resistance Initiative
SARS	Severe Acute Respiratory Syndrome
SASS	State Authority for Social Security
SHS	Specialist Health Service
SSO	Social Security Office
TEPHINET	Training Programs in Epidemiology and Public Health Interventions Network
TGA	Therapeutic Drug Administration
TB	Tuberculosis
USAID	United States Agency for International Development
VAHWs	Village Animal Health Workers
VIDRL	Victorian Infectious Disease Reference Laboratory
VPMA	Veterinary Practice Management Association
UCSF	University of Columbia San Francisco
UNICEF	United Nations Childrens Fund
WAHIS	World Animal Health Information System
WB	World Bank
WHO	World Health Organization