



unicri
United Nations
Interregional Crime and Justice
Research Institute

Biological Security Priorities in Southeast Asia

An Analysis of National Needs and Regional Trends

United Nations Interregional Crime and Justice Research Institute (UNICRI)

Canada 

Disclaimer

The opinions, findings, conclusions and recommendations expressed in this report do not necessarily reflect the views of or endorsement by UNICRI or the United Nations, or any other national, regional or international entity. The designation employed and presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area of its authorities, or concerning the delimitation of its frontiers or boundaries.

Contents of this publication may be quoted or reproduced, provided that the source of information is acknowledged. UNICRI would like to receive a copy of the document in which this publication is used or quoted.

Copyright © UNICRI, 2020

Acknowledgements

This report has been produced thanks to the support of the Government of Canada. It has been prepared by UNICRI Senior Fellow, R. Alexander Hamilton, in coordination with the Public Health Agency of Canada (PHAC). UNICRI would also like to express its gratitude to the national experts who contributed to the report's findings by completing a custom survey and participating in interviews.

Table of contents

Forward	5
Summary of key findings	6
1. Introduction	7
2. Risk factors shaping the threat environment	8
3. Relevant needs assessment instruments	10
3.1 WHO Joint External Evaluations (JEEs).....	10
3.2 OIE Performance of Veterinary Service (PVS) Evaluations	12
3.3 1540 Reporting (National Reports, Action Plans, and Matrices)	13
3.4 EU Chemical, Biological, Radiological and Nuclear (CBRN) National Action Plans	14
4. Biological security priorities: National needs and regional trends based on an analysis of five JEE technical areas	16
4.1 Capacity needs at a glance: Summary of JEE scores by country and indicator	17
4.2 Capacity needs in focus: Regional priorities by JEE technical area.....	19
4.2.1 Biosafety and biosecurity	19
4.2.2 National laboratory system	22
4.2.3 Real-time surveillance	24
4.2.4 Emergency response operations.....	25
4.2.5 Linking public health and security authorities	27
5. Conclusions and recommendations	28
Definitions	30
References	32
Annex A: Figures corresponding with indicators for each technical area.	33
Biosafety and biosecurity (P.6.1-P.6.2).....	33
National laboratory system (D.1.1-D.1.4)	34
Real-time surveillance (D.2.1-D.2.4)	36
Emergency response operations (R.2.1-R.2.4)	38
Annex B: Summary of biological security capacity needs by technical area	40

List of tables, figures and boxes

Table 1: Overview of risk factors in the ASEAN region	9
Box 1: Why this report places emphasis on JEE data	11
Table 2: Status of needs assessment instruments in the ASEAN region	15
Table 3: “Heat map” of JEE scores by country and indicator	17
Box 2: Colour scoring system used in this report	17
Table 4: Summary of key capacity gaps by indicator	18
Box 3: Target for JEE technical area “Biosafety and biosecurity”	19
Figure 1: Average JEE score by country for the technical area “Biosafety and biosecurity”	20
Box 5: Target for JEE technical area “National laboratory system”	22
Figure 2: Average JEE score by country for the technical area “National laboratory system”	23
Box 7: Target for JEE technical area “Real-time surveillance”	24
Figure 3: Average JEE score by country for the technical area “Real-time surveillance”	24
Box 9: Target for JEE technical area “Emergency response operations”	25
Figure 4: Average JEE score by country for the technical area “Emergency response operations”	26
Box 11: JEE target for the technical area “Linking public health and security authorities”	27
Figure 5: Average JEE score by country for the technical area “Linking public health and security authorities”	27

Forward

The present report identifies national needs and regional priorities for biological security – capabilities needed to prevent, detect and respond to accidental or deliberate disease events (biological threats) – in Southeast Asia.

Focusing on the 10 Member States of the Association of Southeast Asian Nations (ASEAN) – Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam – the report aims to help inform the allocation of biological security resources through the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership), the Global Health Security Agenda (GHS), and related global programs.

The report is based on an analysis of relevant needs assessments and action plans – with an emphasis on the seven Joint External Evaluations (JEEs)¹ currently available for countries in the ASEAN region – published articles, and data generated through a custom survey and interviews with experts from the region.

The following methodological considerations informed the choice of data collection methods, the approach to data analysis, and the presentation of results:

- Several methods of data collection, drawing on multiple sources of information, were employed. This approach aimed to strengthen the validity of results by minimizing methodological bias, limiting inaccuracies in reporting, and enabling the identification of common themes.
- Emphasis was placed on understanding biological threats and biological security on a regional basis. This was achieved by comparing country data to identify regional trends, while acknowledging differences between countries based on distinct national perspectives and conditions.
- As biological security encompasses a number of related capabilities – including biosafety and biosecurity, national laboratory systems, surveillance, emergency response operations, and linking public health and security authorities – each of these JEE technical areas were evaluated.

¹ See: <https://www.who.int/ihr/procedures/joint-external-evaluations/en/>.

Summary of key findings

Biological threats in the ASEAN region:

- Emerging and re-emerging pathogens continue to pose the most significant high-impact threat in the region, but high-consequence biological accidents and deliberate disease events are increasingly possible.

National needs and regional trends by technical area:²

Biosafety and biosecurity

- Establish comprehensive biosafety and biosecurity regulatory frameworks
- Establish national inventories and control lists
- Establish sustainable mechanisms for the procurement and maintenance of biosafety and biosecurity infrastructure and equipment
- Develop sustainable biosafety and biosecurity training and education programs

National laboratory system

- Strengthen laboratory quality management systems
- Establish sustainable mechanisms for the procurement of equipment, supplies and maintenance for laboratory testing
- Strengthen coordination and collaboration between human and animal health laboratories

Real-time surveillance

- Strengthen electronic mechanisms for reporting, integrating and sharing surveillance data
- Strengthen coordination, communication and information sharing

Emergency response operations

- Conduct emergency preparedness and response training exercises
- Reinforce emergency operations centers (EOCs)
- Develop EOC plans and standard operating procedures (SOPs)

Linking public health and security authorities

- Strengthen information sharing between public health and security authorities
- Develop joint exercise programs between public health and security authorities
- Develop SOPs for joint public health and security risk assessment

² See “Annex B” for a complete breakdown of needs by country.

1. Introduction

The ASEAN region faces a growing number of threats to public health security. While addressing threats posed by endemic diseases, poverty and unsafe food and drinking water remain a priority across much of the region, risks associated with emerging and re-emerging infectious diseases, environmental degradation, natural disasters, conflict, trans-national crime and terrorism are growing concerns.³

Highlighted by stakeholders at a recent strategic multilateral dialogue on biosecurity in Southeast Asia, a number of risk factors – ranging from highly mobile populations and increased air travel to porous borders and the increased presence of terrorist groups – have contributed to increasing the vulnerability of the region to natural, accidental and deliberate biological events.⁴

Moreover, citing recent regional and global outbreaks of avian influenza, Ebola virus disease, Middle East respiratory syndrome (MERS), dengue, Zika virus disease and yellow fever, the World Health Organization (WHO) underscores that emerging and re-emerging infectious diseases have already had significant health, political and economic impacts within the ASEAN and wider Asia Pacific region.⁵

Encouragingly, ASEAN countries have taken significant steps to enhance national and regional capacity to prevent, detect and respond to public health emergencies. Notably, since 2005, progress has been made to enhance surveillance, develop human resources through field epidemiology training, and strengthen laboratory diagnostics to detect priority and unknown pathogens.⁶ In doing so, countries have helped fulfill their obligations under the International Health Regulations (IHR) (2005), and helped the international community as a whole prevent and respond to acute public health risks that have the potential to threaten populations worldwide.⁷

However, persistent challenges and capacity gaps remain. Notably, the region remains vulnerable to emerging diseases, national and regional readiness to respond to public health emergencies in an effective and coordinated way is

³ ASEAN Secretariat (2006). *ASEAN Regional Security: The Threats Facing it and the Way Forward*. Available at: https://asean.org/?static_post=asean-regional-security-the-threats-facing-it-and-the-way-forward-by-asean-secretariat.

⁴ Cicero et al. (2019). Southeast Asia Strategic Multilateral Dialogue on Biosecurity. *Emerging Infectious Diseases* 25(5). Available at: https://wwwnc.cdc.gov/eid/article/25/5/18-1659_article.

⁵ World Health Organization Regional Office for the Western Pacific (2017). *Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III): Advancing implementation of the International Health Regulations (2005)*. Manila, Philippines.

⁶ Ibid.

⁷ See: https://www.who.int/topics/international_health_regulations/en/.

lacking,⁸ and biosafety and biosecurity capabilities (legislation, training, etc.) are underdeveloped in most countries. Moreover, due to rapidly changing social, environmental and economic conditions in Southeast Asia, including developments related to burgeoning biological sciences and biotechnology sectors, the risk landscape is becoming more complex, and the threats more acute.

In this environment, the need for targeted and sustainable financial investment and technical support from national governments and regional and international partners has never been more important⁹ to ensure that all ASEAN countries have the necessary capabilities to prevent, detect and respond to biological threats.

The following analysis seeks to support this goal by identifying national needs and regional trends in relation to biological threats and biological security in the ASEAN region. The analysis includes an overview of risk factors shaping the threat environment; a summary of existing capacity assessment instruments, including details on their status, and an analysis of capacity-building priorities focusing on data obtained from available JEEs for ASEAN countries.

2. Risk factors shaping the threat environment

Although the most likely high-impact biological threats in Southeast Asia continue to be emerging or re-emerging pathogens, deliberate biological events and high-consequence accidents are increasingly possible.¹⁰ This section of the report presents an overview of relevant biological security risk factors shaping the threat environment in the ASEAN region. Summarized in Table 1, these risk factors include the presence of naturally occurring and endemic pathogens, criminal and terrorist activity, and growing capabilities in the biological sciences and biotechnology.¹¹ Inputs for the table are based on data obtained from the open-source literature and presentations made by experts from the ASEAN region at a workshop dedicated to assessing regional biosecurity risks.¹²

⁸ World Health Organization Regional Office for the Western Pacific (2017). *Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III): Advancing implementation of the International Health Regulations (2005)*. Manila, Philippines.

⁹ Cicero et al. (2019). Southeast Asia Strategic Multilateral Dialogue on Biosecurity. *Emerging Infectious Diseases* 25(5). Available at: https://wwwnc.cdc.gov/eid/article/25/5/18-1659_article.

¹⁰ Ibid.

¹¹ Risk factor categories adapted from Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

¹² "South East Asia Regional Biosecurity Risk Assessment Workshop" (22-24 May 2019, Cebu City, Philippines).

Table 1: Overview of risk factors in the ASEAN region

Naturally occurring & endemic pathogens	Criminal & terrorist activity	Biological sciences & biotech capabilities
<ul style="list-style-type: none"> • Hyperendemic infectious diseases: <ul style="list-style-type: none"> ○ Water-borne diseases: Salmonella, Shigella, E. coli ○ Blood-borne diseases: Hepatitis B, Hepatitis C, HIV ○ Vector-borne diseases: Japanese encephalitis, Malaria, Chikungunya, Zika virus, Dengue fever, Lymphatic filariasis ○ Airborne diseases: influenza, tuberculosis/TB, including multi-drug resistant TB • Emerging infectious diseases of zoonotic or animal origin, including viruses with pandemic potential, such as avian influenza (H5N1) • Animal & human populations living in closer proximity (increases likelihood of animal-human transmissions) • Influence of climate change (hotter & wetter weather in the region) on vector-borne & zoonotic diseases • Cities with growing urban population densities (increases incidence & magnitude of disease outbreaks) • Highly mobile populations (tourists, migrant workers, displaced persons, etc.) & porous borders create dynamic human-animal-plant-environment (i.e. One Health) interface (increases susceptibility of the region to the emergence & spread of infectious diseases) 	<ul style="list-style-type: none"> • Pockets of terrorist activity in some countries in the region • Increased presence of sophisticated terrorist groups, such as so-called Islamic State & affiliated groups that have shifted operations to Southeast Asia (among other regions) due to territorial losses in Iraq and Syria • Transnational crime, illicit drug trafficking, trafficking in persons, money laundering, & other crimes such as arms smuggling, sea piracy, international economic crime & cyber crime 	<ul style="list-style-type: none"> • Region investing heavily in biotechnology • Asia-Pacific second largest & fastest growing market in global microbiology testing • Many institutions already possess advanced laboratory capabilities & technical abilities • Growing number of high-containment laboratories that work with high-consequence human, animal, or plant pathogens & emerging biotechnologies, such as synthetic biology

3. Relevant needs assessment instruments

International and regional organizations and bodies, such as WHO, the World Organisation for Animal Health (OIE), the United Nations Security Council Committee established pursuant to resolution 1540 (1540 Committee) and the European Union (EU), have already, in accordance with their respective mandates and policies, made significant progress towards mapping national needs relevant to biological security, both in the ASEAN region and globally.

These organizations and bodies (among others) have supported national governments and stakeholders to identify key capacity gaps and opportunities to strengthen national and regional capacity to prevent, detect and respond to threats with the potential to severely impact human and animal health, the environment, the economy and political stability. Each of these organizations and bodies simultaneously approach the subject of “biological security” from somewhat different perspectives, and employ different assessment methodologies.

This section of the report provides a summary of the assessment instruments led by the organizations and bodies noted above. Complementing this discussion, Table 2 provides an overview of the status of these instruments in the ASEAN region. This information is intended to guide those interested in obtaining access to, or further information on, specific needs assessments or action plans.

3.1 WHO Joint External Evaluations (JEEs)

As described by WHO: “A joint external evaluation (JEE) is a voluntary, collaborative, multisectoral process to assess country capacities to prevent, detect and rapidly respond to public health risks whether occurring naturally or due to deliberate or accidental events. The JEE helps countries identify the most critical gaps within their human and animal health systems in order to prioritize opportunities for enhanced preparedness and response.”¹³

JEEs are prepared using the JEE Tool¹⁴ – an assessment instrument covering 19 technical areas and 49 indicators – and are the product of a two-phase assessment process: a national self-assessment followed by an independent evaluation by an external team consisting of international subject matter experts that “visit the

¹³ See: <https://www.who.int/ihr/procedures/joint-external-evaluations/en/>.

¹⁴ WHO (2018). *Joint external evaluation tool: International Health Regulations (2005)*, Second Edition. Geneva: World Health Organization. Available at: <https://apps.who.int/iris/handle/10665/204368>.

country for facilitated in-depth discussions of the self-reported data and participate in structured site visits and meetings organized by the host country.”¹⁵

For each indicator included in the JEE, scores are assigned to reflect the current level of advancement for the indicator. Employing a “1-5” scoring system, scores range from “1” (indicating that implementation has not occurred) to “5” (indicating that implementation has occurred, is tested, reviewed and exercised, and that the country has a sustainable level of capability for the indicator).¹⁶

JEE mission reports, the result of JEE evaluations, are publicly available on the WHO website.¹⁷ As of 5 July 2019, 100 countries have completed a JEE. The African Region has the most JEEs completed (43) and the Region of the Americas has the least (5). All 10 ASEAN Member States have completed a JEE. However, the JEEs of Brunei Darussalam, Malaysia and the Republic of the Philippines were not published in time to be analyzed for this report.¹⁸

Following the publication of a country’s JEE, WHO works with the country and partners to support the development of a National Action Plan for Health Security (NAPHS). A NAPHS “captures national priorities for health security, brings sectors together, identifies partners and allocates resources for health security capacity development.” As of March 2019, 52 NAPHSs have been completed.¹⁹ In the ASEAN region, one country (Myanmar) has a NAPHS that is both completed and published. These documents can be accessed on the WHO website.²⁰

Box 1: Why this report places emphasis on JEE data

The present report places emphasis on JEE data for several reasons. First, the report focuses on biological security from a public health perspective, which is the primary focus of the JEE. Second, the scope of the JEE covers prevention detection and response capabilities needed to mitigate natural outbreaks, as well as accidental and deliberate disease events (biological threats), providing a relatively comprehensive assessment of national health security systems. Third, the “1-5” scoring system employed in the JEE enables national needs to be visualized and compared in concise and systematic manner, while additional information (notably, within the “Areas that need strengthening and challenges” and “Recommendations for priority

¹⁵ Ibid, p. 9.

¹⁶ Ibid, p. 10.

¹⁷ For access to JEE mission reports by WHO region, see: <https://www.who.int/ihr/procedures/mission-reports/en/>.

¹⁸ WHO (2019). Strategic Partnership for International Health Regulations (2005) and Health Security (SPH). Available at: <https://extranet.who.int/sph/jee-dashboard>.

¹⁹ WHO (2019). *Public health emergencies: Preparedness and response*. Seventy Second World Health Assembly. WHA72/6, available at: https://apps.who.int/gb/ebwha/pdf_files/WHA72/A72_6-en.pdf.

²⁰ See: <https://extranet.who.int/sph/country-planning>.

actions” sections of JEE mission reports) helps shed light on national priorities. Finally, most countries in the region (7 out of 10) have both completed and published a JEE, helping enable the identification of regional trends.

3.2 OIE Performance of Veterinary Service (PVS) Evaluations

PVS Evaluation and PVS Evaluation Follow-Up missions assess the current level of performance of OIE’s Member Countries relative to the OIE international standards on the quality of Veterinary Services (VS). These missions are undertaken on a voluntary basis at the request of Member Countries. They enable the identification of capacity gaps and weaknesses, promote a shared vision, establish priorities and support strategic initiatives of the VS of participating countries.²¹ These missions are undertaken as part of the OIE PVS Pathway.

PVS Evaluation and PVS Evaluation Follow-Up mission reports are prepared using the OIE *Tool for the Evaluation of Performance of Veterinary Services* (OIE PVS Tool).²² The OIE PVS Tool covers four fundamental components – human, physical and financial resources; technical authority and capability; interaction with stakeholders; and access to markets – using 45 Critical Competencies. The most recent Edition of the OIE PVS Tool (2019) introduced elements related to “biological threat reduction”, including explicit references to laboratory biosafety and biosecurity in the context of national laboratory systems.

For each Critical Competency, five qualitative levels of advancement are described, ranging from “Level 1” (no compliance with OIE international standards) to “Level 5” (full compliance with OIE international standards). A higher level of advancement assumes that the VS are complying with the preceding levels.

Once a mission report is completed, the respective country decides if the report is going to be publicly available on the OIE website, available for restricted distribution to partners and donors, or confidential. As of 26 June 2019, 137 countries have completed a PVS Evaluation mission (31 of these mission reports are publicly available)²³ and 60 countries have completed a Follow-Up mission (17 of

²¹ See: <http://www.oie.int/solidarity/pvs-evaluations/oie-pvs-tool/>.

²² OIE (2019). *OIE Tool for the Evaluation of Performance of Veterinary Services*, Seventh Edition. Paris: World Organisation for Animal Health. Available at: http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/pdf/AF-PVSTool.pdf.

²³ For access to OIE PVS Evaluation Reports that countries have authorized to make fully public, see: <http://www.oie.int/solidarity/pvs-evaluations/pvs-evaluation-reports/>.

these mission reports are publicly available).²⁴ In the ASEAN region, 9 out of 10 countries have completed a PVS Evaluation and 5 of these countries have also completed a PVS Evaluation Follow-Up. Vietnam's PVS Evaluation mission report and Follow-Up mission report, and Laos' PVS Evaluation Follow-Up mission report are publicly available on the OIE website.

3.3 1540 Reporting (National Reports, Action Plans, and Matrices)

Pursuant to United Nations Security Council Resolution 1540 (2004), which “obliges States, *inter alia*, to refrain from supporting by any means non-State actors from developing, acquiring, manufacturing, possessing, transporting, transferring or using nuclear, chemical or biological weapons and their means of delivery”,²⁵ countries have agreed to national reporting (including obligatory and voluntary reporting) to demonstrate national implementation of the resolution.

To fulfill obligatory reporting under the resolution, States are required by the Security Council to prepare a “first report” outlining steps they have taken to implement the resolution and to submit this report to the 1540 Committee. To date, most countries have done so, including all 10 ASEAN countries.^{26 27}

In addition, States are encouraged to voluntarily provide information on laws, regulations and effective practices that are relevant to the resolution. To date, 115 countries have submitted additional information.²⁸

A key component of voluntary reporting under the resolution, States are encouraged to submit (with the assistance of the 1540 Committee as appropriate) National Implementation Action Plans that map out national priorities and plans for implementing the key provisions of the resolution. To date, 36 countries have done so, and these are publicly available on the 1540 website.²⁹ Among ASEAN Member States, no countries have yet to complete a plan of this kind.

²⁴ For access to OIE PVS Evaluation Follow-up Reports that countries have authorized to make fully public, see: <http://www.oie.int/solidarity/pvs-evaluations/pvs-follow-up-reports/>.

²⁵ See: <https://www.un.org/en/sc/1540/about-1540-committee/general-information.shtml>.

²⁶ See: <https://www.un.org/en/sc/1540/national-implementation/general-information.shtml>.

²⁷ For access to National Reports (including “first reports”), see:

<https://www.un.org/en/sc/1540/national-implementation/general-information.shtml>.

²⁸ See: <https://www.un.org/en/sc/1540/national-implementation/general-information.shtml>.

²⁹ For access to National Implementation Action Plans, see:

<https://www.un.org/en/sc/1540/national-implementation/national-implementation-plans.shtml>.

A further component of voluntary reporting under the resolution, and one that has been undertaken by significantly more countries to date, 1540 Matrices detail national legislation and regulations relevant to the resolution, and are intended to facilitate its implementation and technical assistance.³⁰ To date, 193 countries have completed a 1540 Committee Approved Matrix (including all ASEAN Member States) and these are publicly available on the 1540 website.³¹

3.4 EU Chemical, Biological, Radiological and Nuclear (CBRN) National Action Plans

CBRN National Action Plans (NAPs) establish national needs and priorities “with the ultimate goal of developing an integrated and effective CBRN policy that is in line with internationally agreed standards.”³² Produced by countries participating in the EU CBRN Centres of Excellence Initiative (EU CBRN CoE), funded through the EU Instrument Contributing to Security and Peace,³³ NAPs enable the identification of gaps that can be addressed by means of tailored regional projects.

NAPs are prepared on a voluntary basis “[b]ased on the EU CBRN CoE prescribed methodology”, which places participating countries (each represented by a National Focal Point and a National Team) at the center of the needs assessment process.³⁴ This process is supported by a custom needs assessment questionnaire, which covers prevention detection and response elements relevant to natural, accidental and deliberate CBRN events, in combination with technical meetings and drafting workshops led by the European Commission's Joint Research Center.

To date, 9 countries have both finalized a NAP and had the document officially adopted by their respective national Government; 13 countries have finalized a NAP and the document is awaiting adoption, and 18 countries have a NAP in progress. Among ASEAN Member States, 3 countries (Cambodia, Vietnam, Philippines) have NAPs that are finalized and adopted; 3 countries (Brunei, Laos, Myanmar) have NAPs at various stages of completion (i.e. they exist as draft documents), and 3 countries (Malaysia, Singapore, Thailand) have NAP-equivalents already in place. NAPs that have been completed and adopted, or that exist as draft documents, are available to donors and partners based on country authorization.

³⁰ See: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices.shtml>.

³¹ For access to 1540 Committee Approved Matrices, see: <https://www.un.org/en/sc/1540/national-implementation/1540-matrices/committee-approved-matrices.shtml>.

³² See: <http://www.cbrn-coe.eu/Countries.aspx>.

³³ See: https://ec.europa.eu/fpi/what-we-do/instrument-contributing-stability-and-peace-preventing-conflict-around-world_en.

³⁴ See: <http://www.cbrn-coe.eu/Countries.aspx>.

Table 2: Status of needs assessment instruments in the ASEAN region

Country	WHO JEEs	OIE PVS Evaluations	1540 Committee Approved Matrices	EU CBRN National Action Plans
Brunei	Completed (2019), available on WHO website	PVS Evaluation completed (2008), confidential	Completed (2015), available on 1540 website	Draft document, available to donors & partners based on country authorization
Cambodia	Completed (2016), available on WHO website	PVS Evaluation (2008) & Follow-Up (2018) completed, both available to partners & donors	Completed (2015), available on 1540 website	Completed & adopted, available to donors & partners based on country authorization
Indonesia	Completed (2017), available on WHO website	PVS Evaluation completed (2008), available to partners & donors	Completed (2015), available on 1540 website	Introductory workshop held March 2019
Laos	Completed (2017), available on WHO website	PVS Evaluation completed (2007), available to partners & donors; Follow-Up completed (2012), publicly available	Completed (2015), available on 1540 website	Draft document, available to donors & partners based on country authorization
Malaysia	Completed (2019), not yet published on WHO website	PVS Evaluation completed (2016), available to partners & donors	Completed (2015), available on 1540 website	NAP-equivalent already in place
Myanmar	Completed (2017), available on WHO website	PVS Evaluation completed (2008), available to partners & donors; Follow-Up completed (2016), confidential; 2nd Follow-Up completed (2019), available to partners & donors	Completed (2015), available on 1540 website	Draft document, available to donors & partners based on country authorization
Philippines	Completed (2018), available on WHO website	PVS Evaluation completed (2009), available to partners & donors; Follow-Up completed (2017), confidential	Completed (2015), available on 1540 website	Completed & adopted, available to donors & partners based on country authorization
Singapore	Completed (2018), available on WHO website	No missions	Completed (2015), available on 1540 website	NAP-equivalent already in place
Thailand	Completed (2017),	PVS Evaluation completed (2014),	Completed (2015), available	NAP-equivalent already in place

	available on WHO website	confidential	on 1540 website	
Vietnam	Completed (2016), available on WHO website	PVS Evaluation (2007) & Follow-Up (2010) completed, both publicly available	Completed (2015), available on 1540 website	Completed & adopted, available to donors & partners based on country authorization

4. Biological security priorities: National needs and regional trends based on an analysis of five JEE technical areas

Although considerable progress has been made to strengthen national and regional capacity to prevent, detect and respond to public health emergencies in the ASEAN region, significant capacity gaps remain.³⁵ This section of the report presents the most urgent national needs and regional priorities for biological security capacity building based on an analysis of JEE data for countries in the region.

The analysis focuses more precisely on 15 JEE indicators³⁶ relevant to biological security within five JEE technical areas, including “Biosafety and biosecurity”, “National laboratory system”, “Real-time surveillance”, “Emergency response operations”, and “Linking public health and security authorities”.

Complementing this analysis, additional information sources (including other needs assessment instruments, published articles, a survey and interviews with experts from the region) are drawn on to strengthen the analysis and to fill in information gaps as needed. Notably, additional sources are drawn on in the case of countries that have not yet published a JEE (Brunei, Malaysia, Philippines) and for relevant topics that are currently not covered in sufficient depth in the JEE (e.g. national oversight of dual-use research and emerging technologies).

³⁵ World Health Organization Regional Office for the Western Pacific (2017). *Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III): Advancing implementation of the International Health Regulations (2005)*. Manila, Philippines.

³⁶ “P.6.1 Whole-of-government biosafety and biosecurity system”; “P.6.2 Biosafety and biosecurity training and practices”; “D.1.1 Laboratory testing for detection of priority diseases”; “D.1.2 Specimen referral and transport system”; “D.1.3 Effective modern point-of-care and laboratory based diagnostics”; “D.1.4 Laboratory quality system”; “D.2.1 Indicator and event based surveillance”; “D.2.2 Interoperable, interconnected, electronic real-time reporting system”; “D.2.3 Analysis of surveillance data”; “D.2.4 Syndromic surveillance systems”; “R.2.1 Capacity to activate emergency operations”; “R.2.2 Emergency operations centre operating procedures and plans”; “R.2.3 Emergency operations programme”; “R.2.4 Case management procedures are implemented for IHR-relevant hazards”; “R.3.1 Public health and security authorities are linked during biological event”.

4.1 Capacity needs at a glance: Summary of JEE scores by country and indicator

Table 3 presents a summary of JEE scores by country for the 15 evaluated indicators, covering prevention (“P”), detection (“D”) and response (“R”) capabilities relevant to biological security. As defined in the JEE Tool,³⁷ each score – from “1” (“No capacity”) to “5” (“Sustainable capacity”) – corresponds with a country’s current level of advancement for a specific indicator. For this report, scores have also been assigned a unique colour code that is employed in Table 3 and throughout the remainder of the report. Both coding elements are elaborated in Box 2.

Table 3: “Heat map” of JEE scores by country and indicator

Indicator	JEE Scores							
	Cambodia	Indonesia	Laos	Myanmar	Singapore	Thailand	Vietnam	Average
P.6.1 Whole-of-government biosafety and biosecurity system	2	3	2	2	5	4	3	3
P.6.2 Biosafety and biosecurity training and practices	2	3	2	1	5	4	3	2.9
D.1.1 Laboratory testing for detection of priority diseases	4	4	4	3	5	4	3	3.9
D.1.2 Specimen referral and transport system	2	4	3	3	5	4	3	3.4
D.1.3 Effective modern point-of-care and laboratory based diagnostics	2	3	3	2	5	4	3	3.1
D.1.4 Laboratory quality system	2	3	2	3	5	3	3	3
D.2.1 Indicator and event based surveillance systems	4	3	4	4	5	4	4	4
D.2.2 Interoperable, interconnected, electronic real-time reporting system	3	3	3	2	5	4	3	3.3
D.2.3 Analysis of surveillance data	3	2	4	3	5	4	3	3.4
D.2.4 Syndromic surveillance systems	4	4	4	3	5	4	4	4
R.2.1 Capacity to activate emergency operations	2	3	2	2	4	3	2	2.6
R.2.2 Emergency operations centre operating procedures and plans	1	2	1	1	4	3	3	2.1
R.2.3 Emergency operations programme	1	3	3	2	5	3	3	2.9
R.2.4 Case management procedures are implemented for IHR-relevant hazards	1	3	2	2	4	3	3	2.6
R.3.1 Public health and security authorities are linked during biological event	2	4	4	2	5	4	2	3.3

Box 2: Colour scoring system used in this report

(Adapted from the JEE Tool, Second Edition, WHO 2018, p. 10)

- 1 = No Capacity:** Attributes of a capacity are not in place
- 2 = Limited capacity:** Attributes of a capacity are in development stage
- 3 = Developed capacity:** Attributes of a capacity are in place; however, sustainability has not been ensured
- 4 = Demonstrated capacity:** Attributes are in place and sustainable for a few years, and can be measured by the inclusion of attributes or IHR core capacities in the national health sector plan and a secure funding source
- 5 = Sustainable capacity:** All attributes are functional and sustainable, and the country is supporting one or more other countries in their implementation

The colour-coded “heat map” in Table 2 captures a number of general trends in relation to biological security capacity levels in the region:

- Three countries (Cambodia, Laos, Myanmar) demonstrate **No capacity** (red blocks) for at least one of the 15 selected indicators.

³⁷ See: <https://www.who.int/ihr/procedures/joint-external-evaluations/en/> (p. 10).

- Two countries (Cambodia, Myanmar) demonstrate **Limited capacity** (orange blocks) for most of the 15 selected indicators.
- Two countries (Indonesia, Vietnam) demonstrate **Developed capacity** (yellow blocks) for most of the 15 selected indicators.
- One country (Thailand) demonstrates **Demonstrated capacity** (light green blocks) for most of the 15 indicators.
- Only one country (Singapore) has achieved **Sustainable capacity** (dark green blocks) for any of the selected indicators.

The above trends underline considerable variation between countries in the region, with some countries demonstrating relatively low capacity levels across the 15 selected indicators, and others demonstrating relatively high capacity levels across these indicators. While multiple factors can be attributed to this observed variation, it is important to note that ASEAN countries are at different and wide-ranging stages of economic development, including Lower-Middle Income Economies (Cambodia, Laos, Myanmar, Indonesia, Philippines, Vietnam), Upper-Middle Income Economies (Thailand) and High Income Economies (Brunei, Singapore).³⁸ These economic disparities necessarily influence the resources available for biological security, and help (at least in part) explain the observed variation between countries.

Table 4 offers a more focused look at key capacity gaps by indicator. Countries demonstrating **“Limited capacity”** or **“No capacity”** are listed in parenthesis (see “Annex A” for figures corresponding with all 15 indicators).

Table 4: Summary of key capacity gaps by indicator

Biosafety and biosecurity (indicators P.6.1-P.6.2)
<p>Whole-of-government biosafety and biosecurity system (P.6.1)</p> <ul style="list-style-type: none"> • <u>3 countries</u> (Cambodia, Laos, Myanmar) demonstrate Limited capacity <p>Biosafety and biosecurity training and practices (P.6.2)</p> <ul style="list-style-type: none"> • <u>2 countries</u> (Cambodia, Laos) demonstrate Limited capacity • <u>1 country</u> (Myanmar) demonstrates No capacity
National laboratory system (indicators D.1.1-D.1.4)
<p>Specimen referral and transport system (D.1.2)</p> <ul style="list-style-type: none"> • <u>1 country</u> (Cambodia) demonstrates Limited capacity <p>Effective modern point-of-care laboratory based diagnostics (D.1.3)</p> <ul style="list-style-type: none"> • <u>2 countries</u> (Cambodia, Myanmar) demonstrate Limited capacity <p>Laboratory quality system (D.1.4)</p> <ul style="list-style-type: none"> • <u>2 countries</u> (Cambodia, Laos) demonstrate Limited capacity

³⁸ For map of countries by World Bank Income Group, see: <http://datatopics.worldbank.org/world-development-indicators/the-world-by-income-and-region.html>.

Real-time surveillance (indicators D.2.1-D.2.4)
<p>Interoperable, interconnected, electronic real-time reporting system (D.2.2)</p> <ul style="list-style-type: none"> • <u>1 country</u> (Myanmar) demonstrates Limited capacity <p>Analysis of surveillance data (D.2.3)</p> <ul style="list-style-type: none"> • <u>1 country</u> (Indonesia) demonstrates Limited capacity
Emergency response operations (indicators R.2.1-R.2.4)
<p>Capacity to activate emergency response operations (R.2.1)</p> <ul style="list-style-type: none"> • <u>4 countries</u> (Cambodia, Laos, Myanmar, Vietnam) demonstrate Limited capacity <p>Emergency operations centre operating procedures and plans (R.2.2)</p> <ul style="list-style-type: none"> • <u>3 countries</u> (Cambodia, Laos, Myanmar) demonstrate No capacity • <u>1 country</u> (Indonesia) demonstrates Limited capacity <p>Emergency operations programme (R.2.3)</p> <ul style="list-style-type: none"> • <u>1 country</u> (Cambodia) demonstrates No capacity • <u>1 country</u> (Myanmar) demonstrates Limited capacity <p>Case management procedures are implemented for IHR-relevant hazards (R.2.4)</p> <ul style="list-style-type: none"> • <u>2 countries</u> (Laos, Myanmar) demonstrate Limited capacity • <u>1 country</u> (Cambodia) demonstrates No capacity
Linking public health and security authorities (indicator R.3.1)
<p>Public health and security authorities ... linked during a suspect or confirmed biological, chemical or radiological event (R.3.1)</p> <ul style="list-style-type: none"> • <u>3 countries</u> (Cambodia, Myanmar, Vietnam) demonstrate Limited capacity

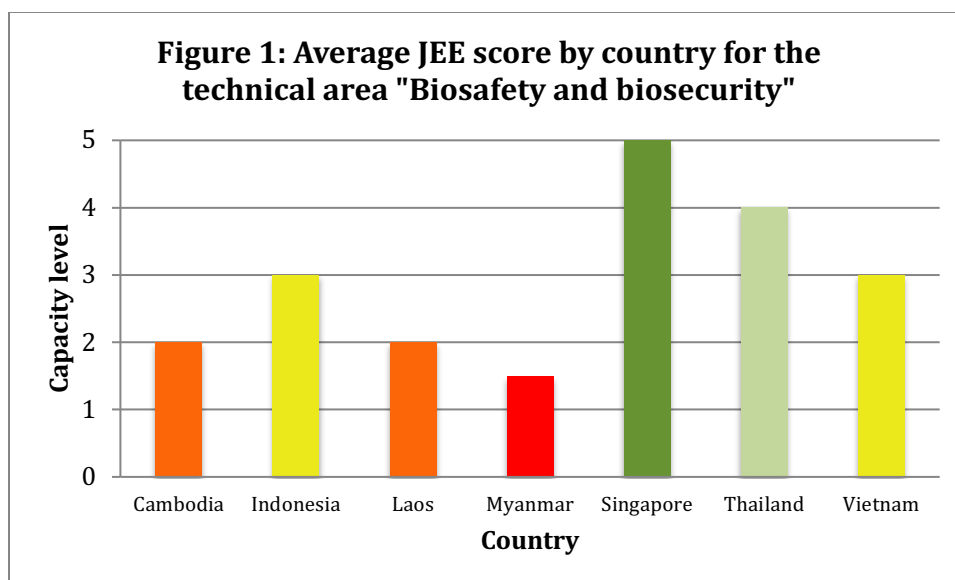
4.2 Capacity needs in focus: Regional priorities by JEE technical area

The remaining analysis looks more closely at the five evaluated JEE technical areas, identifying national needs and regional trends for biological security capacity building (see “Annex B” for a summary table).

4.2.1 Biosafety and biosecurity

Box 3: Target for JEE technical area “Biosafety and biosecurity”
<p>“A whole-of-government multisectoral national biosafety and biosecurity system with dangerous pathogens identified, held, secured and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach conducted to promote a shared culture of responsibility, reduce dual-use risks, mitigate biological proliferation and deliberate use threats, and ensure safe transfer of biological agents; and country specific biosafety and biosecurity legislation, laboratory licensing and pathogen control measures in place as appropriate.” (WHO 2018, p. 38)</p>

Figure 1 illustrates the average JEE score by country for the technical area “Biosafety and biosecurity” (indicators P.6.1-P.6.2). Among the five evaluated technical areas, the average capacity level (average score) for this technical area is relatively low (second only to “Emergency response operations”). The region as a whole demonstrates **Limited capacity** for the technical area.



Based on a more detailed analysis of available JEEs (and other sources, where specified) the following *capacity-building priorities* were identified:

Establish comprehensive biosafety and biosecurity regulatory frameworks

Reflecting global trends,^{39 40} most countries in the ASEAN region have not yet established a comprehensive national regulatory framework (legislation, regulations, guidelines, in combination with effective oversight and enforcement) for laboratory biosafety and biosecurity. Notably, several countries (Cambodia, Laos, Myanmar) have no national biosafety and biosecurity legislation and regulations in place.⁴¹ For countries that have established a regulatory basis for biosafety (and biosecurity), regulatory elements dedicated to biosecurity are relatively underdeveloped.⁴² In general, “biosecurity” (as a concept and as a

³⁹ Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

⁴⁰ Gozzer, E. and Nikkari, S. (2018). *Current Trends in Global Biosecurity and Biosafety: An Analysis and Recommendations for the NTI Global Biosecurity Dialogue*. 18-20 June 2018. London, United Kingdom.

⁴¹ In the case of Laos, the country is in the process of finalizing a “National Biosafety and Biosecurity regulation” (source: regional survey and interviews).

⁴² In the case of Malaysia, the country has prepared a “Biological and Toxin Weapons Convention (BTWC) draft bill” (source: regional survey and interviews). In the case of the Philippines, the country has a “BWC Bill” pending (source: regional survey and interviews).

technical domain) is a relatively new point of emphasis in the region, and biosecurity awareness and associated capabilities (legislation, training, etc.) currently significantly lag behind those of biosafety.⁴³

National inventories and control lists

Multiple countries (Cambodia, Laos, Myanmar, Indonesia, Vietnam) have not yet established an up-to-date national inventory of dangerous pathogens and toxins that is continually monitored across all human and animal health laboratories. These countries also generally do not have a national list of controlled biological agents specific to the country, and thus do not have an adequate basis for their oversight.⁴⁴ For those countries that have established “agent-focused” lists of this kind, there is a general need⁴⁵ to consider establishing comparable lists and oversight mechanisms for dual-use research and emerging technologies.⁴⁶

Establish sustainable mechanisms for the procurement and maintenance of biosafety and biosecurity infrastructure and equipment

The JEEs of a number of countries in the region identify the need for improved laboratory biosafety and biosecurity infrastructure and equipment (Cambodia, Laos, Myanmar), and/or additional capacity and resources (human and budget) for associated maintenance, certification and calibration functions (Cambodia, Indonesia, Laos, Myanmar, Vietnam).⁴⁷ Countries share similar sustainability challenges, such as: insufficient national budget and human resources to ensure maintenance of safe and secure laboratory facilities (Laos); the need to invest in maintenance and servicing of biosafety cabinets, including through training of staff locally (Cambodia); the need to educate and deploy a nationwide function for maintenance and control of laboratory safety facilities and equipment (Indonesia), and the need to commit resources to maintain key biosafety infrastructure, such as biosafety cabinets, in a sustainable manner (Vietnam). In each instance, the need for “sustainable laboratories”, adapted to the unique financial and technical realities of countries, stands out as a capacity-building priority.

⁴³ Source: regional survey and interviews.

⁴⁴ In the case of Malaysia, a national list of high-risk biological materials is included in the BTWC draft bill (source: regional survey and interviews). In the case of the Philippines, a “National Biological Materials of Concern” list is in progress (source: regional survey and interviews).

⁴⁵ Source: regional survey and interviews.

⁴⁶ Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

⁴⁷ World Health Organization Regional Office for the Western Pacific (2017). *Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III): Advancing implementation of the International Health Regulations (2005)*. Manila, Philippines.

Develop sustainable (e.g. train-the-trainer approach) biosafety and biosecurity training and education programs

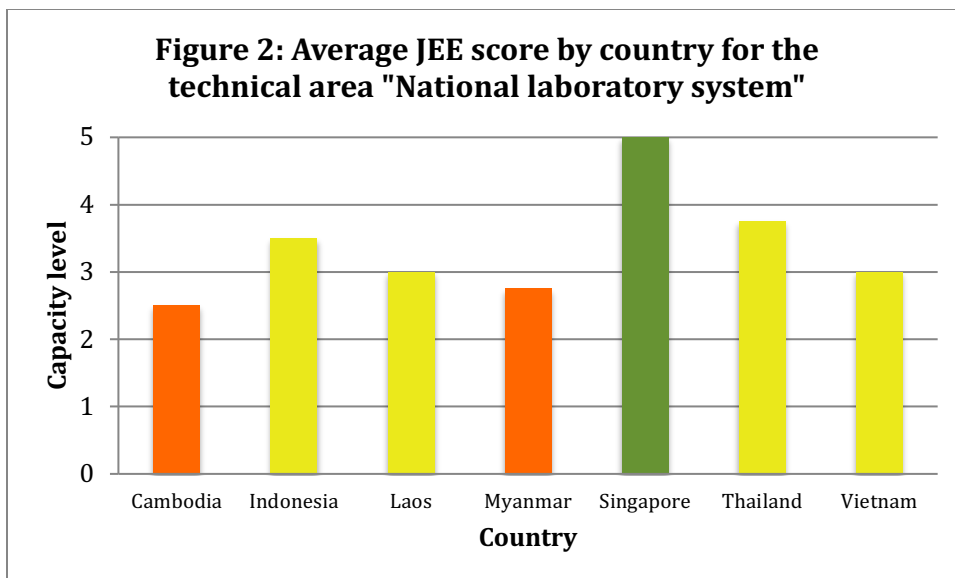
Biosafety and biosecurity training and education is a universal priority in the region, whether a country is seeking to train and certify a cadre of biosafety and biosecurity officers based on a national curriculum or national certification scheme (Cambodia, Indonesia, Laos, Myanmar); scale-up existing training and education programs to establish a large network of trained laboratory workers and trainers (Thailand, Vietnam); and/or provide continuing education and professional development in biorisk management (Vietnam). Some countries (Laos, Myanmar) lack sufficient national budget and human resources to ensure sustainability of biosafety and biosecurity training programs, and biosafety and biosecurity training and education at the district and community levels is relatively limited. These challenges underline a common need for sustained investment in biosafety and biosecurity education and training, including through the establishment of train-the-trainer and programs, and similar initiatives that help build sustainable, local capacity.

4.2.2 National laboratory system

Box 4: Target for JEE technical area “National laboratory system”

“Surveillance with a national laboratory system, including all relevant sectors, particularly human and animal health, and effective modern point-of-care and laboratory-based diagnostics.” (WHO 2018, p. 49)

Figure 2 illustrates the average JEE score by country for the technical area “National laboratory system” (indicators D.1.1-D.1.4). Among the five evaluated technical areas, the average capacity level (average score) for this technical area is relatively high (second only to “Real-time surveillance”). The region as a whole demonstrates **Developed capacity** for the technical area.



Based on a more detailed analysis of available JEEs (and other sources, where specified) the following *capacity-building priorities* were identified:

Develop laboratory quality management systems meeting international standards

Laboratory quality and laboratory quality control mechanisms are lacking in a number of countries in the region. Specific needs include: accrediting national public health laboratories based on international standards (Cambodia, Laos); finalizing and implementing laboratory quality standards (Laos), and establishing a national body responsible for laboratory licensing, inspection, certification and accreditation (Laos, Myanmar). For other countries (Indonesia, Thailand, Vietnam), although laboratory quality control mechanisms are in place, there is a need to increase the number of accredited/licensed laboratories to reach 100% coverage.

Establish sustainable mechanisms for the procurement of equipment, supplies and maintenance for laboratory testing

Several countries (Cambodia, Laos, Myanmar) have not yet established a standardized and sustainable mechanism for the procurement of supplies, equipment, maintenance and calibration essential to ensuring the sustainability of laboratory testing. Some countries (Vietnam), although reasonably well resourced and outfitted, need improved equipment maintenance. Some countries lack core tests for priority diseases (Cambodia, Myanmar), and others require further capacity to detect new or emerging diseases (Indonesia, Laos).

Coordination and collaboration between human and animal health laboratories

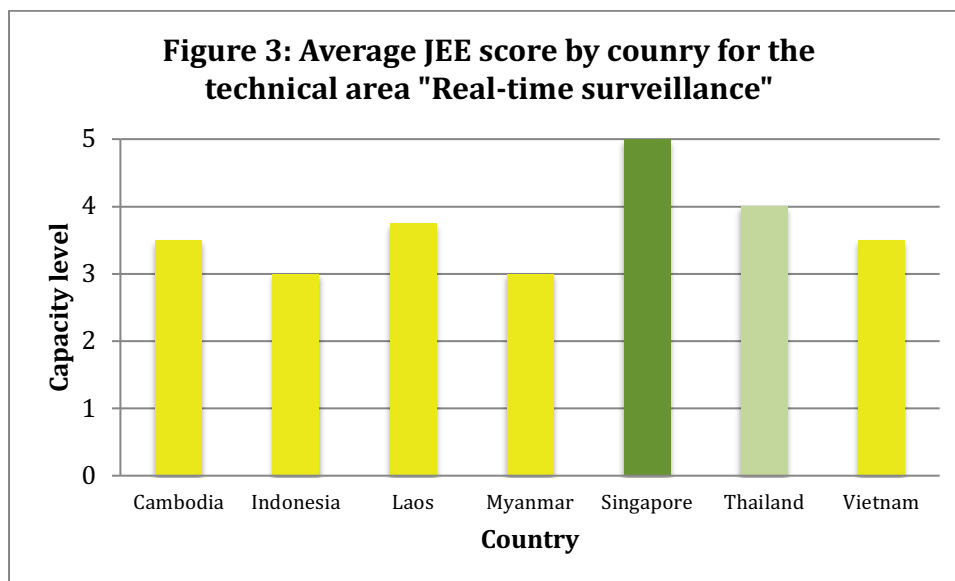
The JEEs of several countries (Laos, Myanmar, Thailand) identify the need to strengthen coordination and collaboration mechanisms between human and animal health laboratories according to the One Health approach.

4.2.3 Real-time surveillance

Box 5: Target for JEE technical area “Real-time surveillance”

“(1) Strengthened indicator-based and event-based surveillance systems that are able to detect events of significance for public health and health security; (2) improved communication and collaboration across sectors and between subnational (local and intermediate), national and international levels of authority regarding surveillance of events of public health significance; and (3) improved national and intermediate level regional capacity to analyse and link data from and between, strengthened early-warning surveillance, including interoperable, interconnected electronic tools. This would incorporate epidemiological, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; and advancement in fulfilling the core capacity requirements for surveillance in accordance with the IHR and OIE guidelines.” (WHO 2018, p. 56)

Figure 3 illustrates the average JEE score by country for the technical area “Real-time surveillance” (indicators D.2.1-D.2.4). The average capacity level (average score) for this technical area is the highest among the five evaluated technical areas. The region as a whole demonstrates **Developed capacity** for the technical area.



Based on a more detailed analysis of available JEEs (and other sources, where specified) the following **capacity-building priorities** were identified:

Strengthen electronic mechanisms for reporting, integrating and sharing surveillance data

Throughout much of the region (notably, Cambodia, Indonesia, Laos, Myanmar), the capacity for real-time surveillance is constrained by limitations related to electronic mechanisms for reporting, integrating and sharing surveillance data. Common challenges include: a lack of electronic systems and infrastructure (especially in remote areas, which tend to be hampered by poor or absent internet and telecommunication services); the existence of multiple, stand-alone surveillance programs (and surveillance databases); incomplete data collection (e.g. data from private hospitals and clinics may not be incorporated) or infrequent (i.e. not real-time) data collection, review and dissemination (often due to constraints imposed by a lack of access to real-time electronic reporting systems).

Strengthen coordination, communication and information sharing between human health, animal health and other relevant sectors

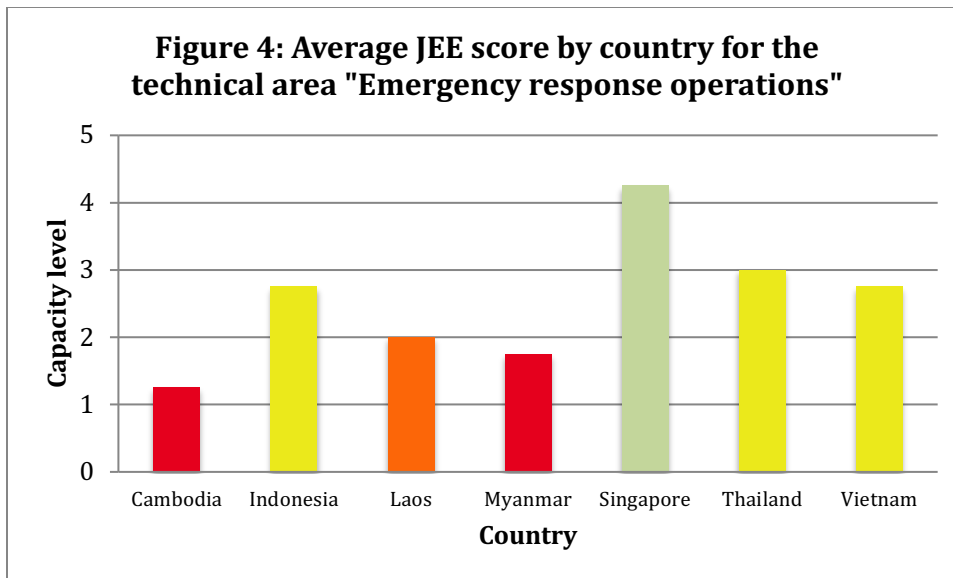
The JEEs of a number of countries (Cambodia, Indonesia, Laos, Myanmar, Vietnam) identify the need to improve coordination, communication and information sharing between relevant sectors, according to the One Health approach, to strengthen real-time surveillance. Common, and closely related, priorities include: strengthening collaboration between human health, animal health and non-health sectors (Cambodia, Myanmar); establishing or strengthening mechanisms for sharing information (e.g. surveillance data) between sectors (Indonesia, Laos), scheduling combined reviews of zoonotic disease surveillance data (Cambodia), and augmenting participation in joint exercises (Cambodia).

4.2.4 Emergency response operations

Box 6: Target for JEE technical area “Emergency response operations”

“Countries will have a coordination mechanism, incident management systems, exercise management programmes and public health emergency operation centre (EOC) functioning according to minimum common standards; maintaining trained, functioning, multisectoral rapid response teams, and trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of an emergency.” (WHO 2018, p. 75)

Figure 4 illustrates the average JEE score by country for the technical area “Emergency response operations” (indicators R.2.1-R.2.4). The average capacity level (average score) for this technical area is the lowest among the five evaluated technical areas. The region as a whole demonstrates **Limited capacity** for the technical area.



Based on a more detailed analysis of available JEEs (and other sources, where specified) the following *capacity-building priorities* were identified:

Conduct emergency preparedness and response training exercises

The need for (additional and/or improved) emergency preparedness and response training (including functional exercises and table-top exercises), with an emphasis on Incident Management System (IMS) principles and concepts, is a priority throughout the region (Cambodia, Indonesia, Laos, Myanmar, Singapore, Thailand, Vietnam). Specific needs range from establishing a comprehensive, multi-year public health emergency management training and exercise program (Cambodia, Laos, Myanmar) to improving the quality of table-top exercises (Thailand) and increasing the frequency of exercises (Singapore).

Reinforce emergency operations center (EOC), including staffing and rosters of qualified personnel

For a number of countries in the region, staffing EOCs, including permanent staff to manage the EOC on a daily basis (Laos, Myanmar) and surge staff to perform emergency management operations once the EOC is activated (Cambodia, Laos, Vietnam), remains a challenge. Priorities include establishing a master roster of qualified personnel and providing relevant training.

Develop EOC plans and standard operating procedures (SOPs)

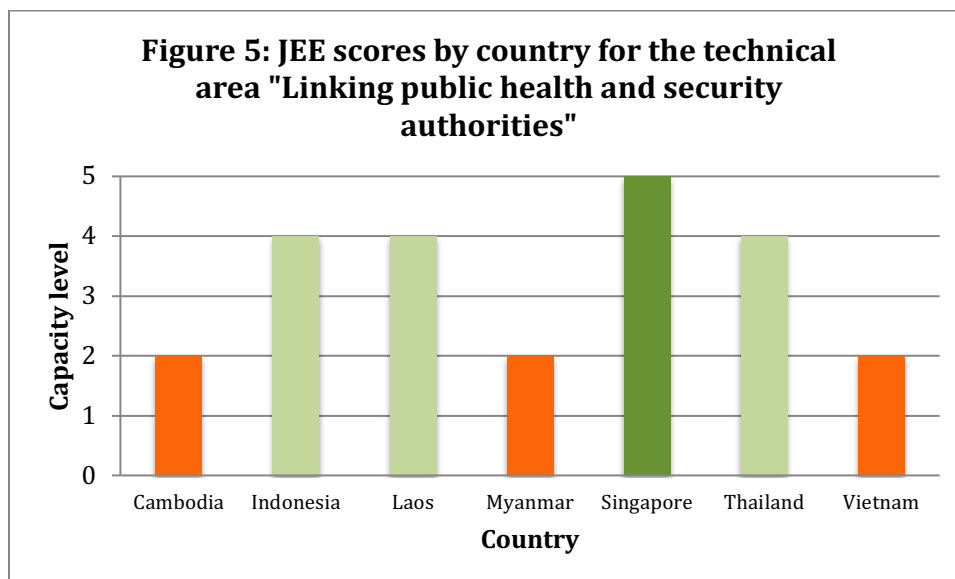
A number of countries (Cambodia, Laos, Myanmar, Vietnam) are in the process of formalizing plans and procedures for the management of public health response operations. A priority for these countries is to establish or finalize an EOC plan or handbook and associated SOPs that define roles and responsibilities and provide an overarching framework for coordinating EOC operations.

4.2.5 Linking public health and security authorities

Box 7: JEE target for the technical area “Linking public health and security authorities”

“Country conducts a rapid, multisectoral response for any event of suspected or confirmed deliberate origin, including the capacity to link public health and law enforcement, and to provide timely international assistance.” (WHO 2018, p. 80)

Figure 5 illustrates JEE scores by country for the technical area “Linking public health and security authorities” (indicator R.3.1). The region as a whole demonstrates **Developed capacity** for the technical area.



Based on a more detailed analysis of available JEEs (and other sources, where specified) the following **capacity-building priorities** were identified:

Strengthen information sharing between public health and security authorities

Improved inter-sectoral information sharing between public health and security authorities is a priority in a number of countries in the region. Notably, several countries (Cambodia, Myanmar, Vietnam) need to establish MOUs (or other documented, formal agreements) and associated SOPs that define critical information requirements and triggers for sharing of information during suspected deliberate disease events. In other instances, while formal agreements of this kind exist, there is a need to: review and update existing MOUs to ensure the efficient sharing of information between relevant ministries (Laos); increase the regularity of

information sharing (Thailand); or strengthen cooperation between health and security sectors responsible for handling CBRN terrorism threats (Indonesia).

Develop or expand joint exercise programs between public health and security authorities

Developing or expanding joint exercise programs is a priority in several countries. Specific needs include: developing a joint exercise program between public health and security authorities to test and improve plans and procedures, including procedures for information sharing (Cambodia, Myanmar); expanding coverage of existing exercise programs to all provinces (Indonesia), and conducting training exercises dedicated to specific technical areas, such as legal issues related to the public health and security sectors (Thailand). Although Malaysia's JEE has not been completed, the country is known to equally prioritize the need to strengthen coordination between public health agencies and law enforcement, and the country has implemented joint training programs to facilitate effective collaboration, specifically for deliberate biological event responses and investigations.⁴⁸

Develop SOPs for joint public health and security risk assessment

For some countries, there is a need to establish SOPs related to risk assessment for deliberate biological events. These countries share closely related priorities, including: developing SOPs that define the risk assessment process (Cambodia), and developing SOPs that define how joint risk assessments should be conducted for deliberate biological incidents (Myanmar).

5. Conclusions and recommendations

The risk landscape in Southeast Asia is characterized by both familiar and novel biological risks and threats, ranging from natural disease events linked to endemic, emerging and re-emerging pathogens to accidental and deliberate disease events linked to a growing number of high-containment laboratories, burgeoning life science research and biotechnology sectors, and the increased presence of terrorist groups. Over the last ten years, although countries in the region have significantly strengthened their health security systems, evident capacity gaps remain.

Based on a detailed analysis of five JEE technical areas relevant to biological security, two technical areas – “Biosafety and biosecurity” and “Emergency response operations” – stand out as regional priorities. Indeed, some countries in the region demonstrate no capacity for these technical areas and the region as a whole demonstrates limited capacity for both technical areas.

⁴⁸ Sources: Cicero et al. (2009) and interviews with regional experts.

In relation to “Biosafety and biosecurity”, capacity-building initiatives are most urgently needed to establish comprehensive regulatory frameworks and to develop sustainable laboratories and training programs. In particular, capacity-building projects are needed that place emphasis on laboratory biosecurity (as a complement to laboratory biosafety) and associated concepts (e.g. dual-use research) and practices (e.g. personnel reliability) as biosecurity (as a concept and as a set of technical capabilities) has been relatively neglected to date.

In relation to “Emergency response operations”, capacity-building initiatives are most urgently needed to develop sustainable emergency response training programs. In particular, multisectoral emergency response training exercises (e.g. table-top exercises), as a component of comprehensive, multi-year emergency management and exercise programs, and emergency response SOPs are needed to strengthen information exchange and to build durable partnerships between relevant sectors (e.g. public health, animal health and law enforcement).

In general, it is apparent that a number of countries in the region are struggling not only to develop, but also to maintain sustainable biosafety and biosecurity systems, including sustainable laboratories (e.g. essential equipment maintenance is often lacking due to a lack of resources and trained personnel) and sustainable training programs (e.g. train-the-trainer programs have been underutilized). Consequently, there is a need to invest in capacity-building projects that are adapted to local resource constraints and build towards cultivating local experts.

Definitions

Biological threats: Accidental or deliberate disease events.

Biological security: Capabilities needed to prevent, detect and respond to accidental or deliberate disease events.

Biosafety risks: Accidents involving unintended exposure to/release of dangerous pathogens or toxins (e.g. needle-stick injuries).

Biosecurity risks: Incidents involving the deliberate misuse of dangerous pathogens or toxins (e.g. bioterrorism).

Dual-use research: Life science research with the potential to be used both for beneficent and nefarious purposes (e.g. research that results in a new or recreated pathogen).

Emergency response operations: The performance of coordinated emergency response operations, involving capabilities such as: national emergency operations center (EOC), national emergency response plans, national multisectoral rapid response teams, national emergency response training, etc.

Laboratory accreditation: A means of determining the technical competence of laboratories to perform specific types of testing, measurement and calibration.

Laboratory biosafety: Containment principles, technologies, and practices that are implemented to prevent unintentional exposure to pathogens and toxins, or their accidental release.

Laboratory biosecurity: Institutional and personal security measures designed to prevent the loss, theft, misuse, diversion, or intentional release of pathogens, toxins, and other related assets (e.g. equipment).

Linking health and security authorities: Multisectoral coordination between health (public health, food safety, animal health, etc.) and security (law enforcement, border control, defense, etc.) authorities, involving capabilities such as: agreements outlining roles and responsibilities for sharing information, joint exercises, etc.

National laboratory system: Laboratory quality and capacity to perform effective modern point-of-care and laboratory-based diagnostics.

One Health: Coordinated global activities to address health risks at the animal-human-ecosystems interfaces to attain optimal health for people, domestic animals, wildlife, plants and the environment.

Preparedness: Capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities.

Public health emergency: An occurrence or imminent threat of significant illness or health condition, caused by acute exposure to hazards, including biological, chemical, radiological, natural and technological hazards.

Public health security: The proactive and reactive activities required to minimize vulnerability to acute public health events that endanger the collective health of national populations.

Real-time surveillance: The systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response.

References

ASEAN Secretariat (2006). *ASEAN Regional Security: The Threats Facing it and the Way Forward*. Available at: https://asean.org/?static_post=asean-regional-security-the-threats-facing-it-and-the-way-forward-by-asean-secretariat.

Cicero et al. (2019). Southeast Asia Strategic Multilateral Dialogue on Biosecurity. *Emerging Infectious Diseases* 25(5). Online Report.

Gozzer, E. and Nikkari, S. (2018). *Current Trends in Global Biosecurity and Biosafety: An Analysis and Recommendations for the NTI Global Biosecurity Dialogue*. 18-20 June 2018. London, United Kingdom.

Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

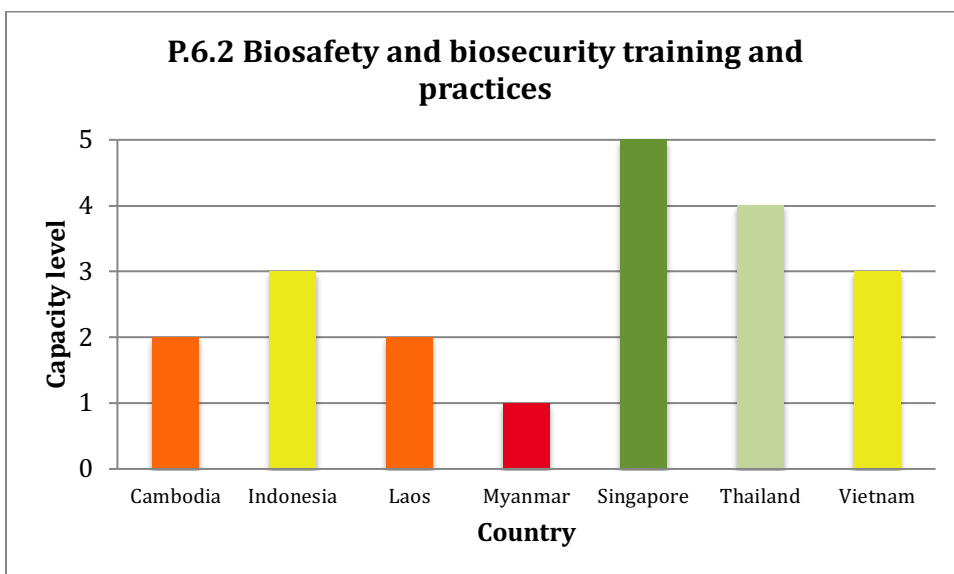
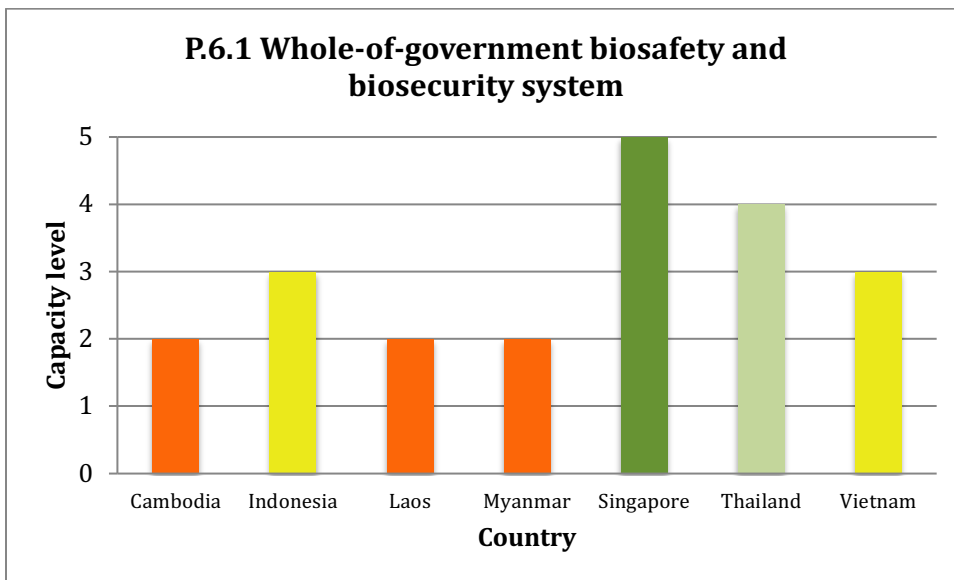
World Health Organization (WHO) (2018). *Joint external evaluation tool: International Health Regulations (2005)*, Second Edition. Geneva: World Health Organization.

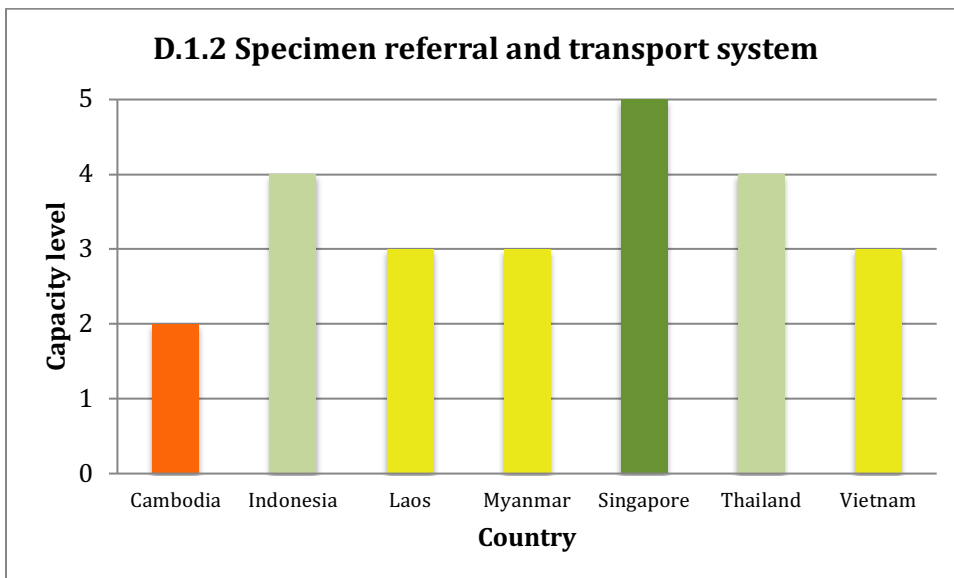
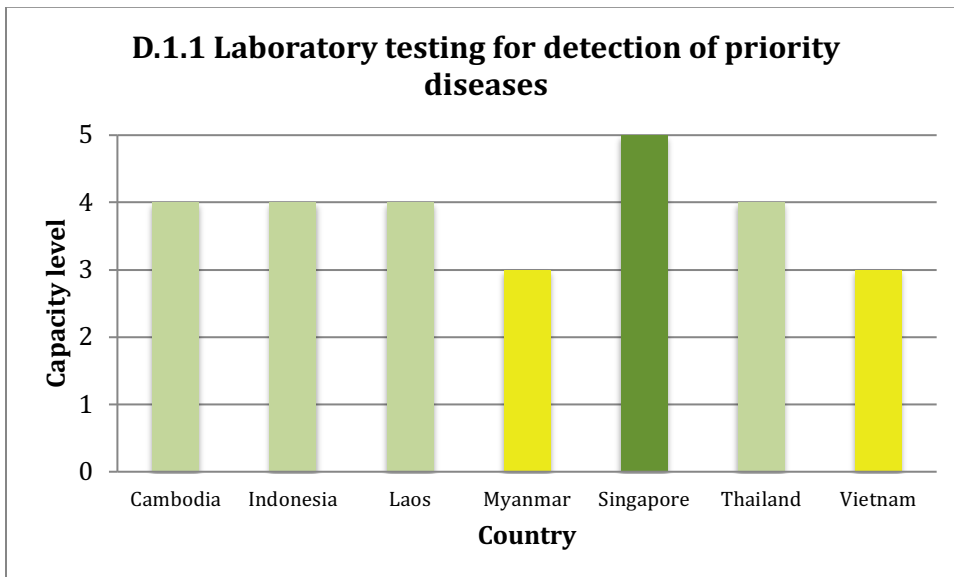
World Health Organization Regional Office for the Western Pacific (2017). *Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III): Advancing implementation of the International Health Regulations (2005)*. Manila, Philippines.

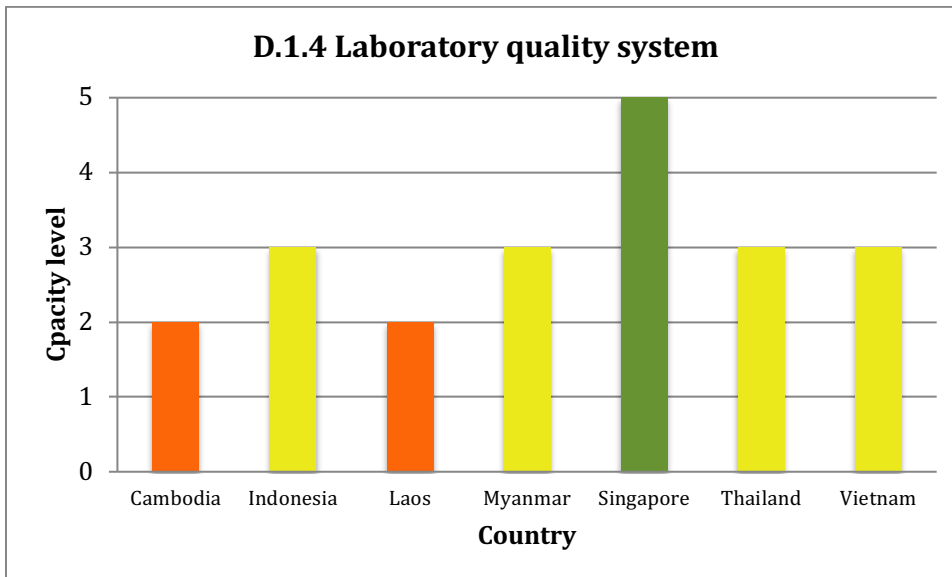
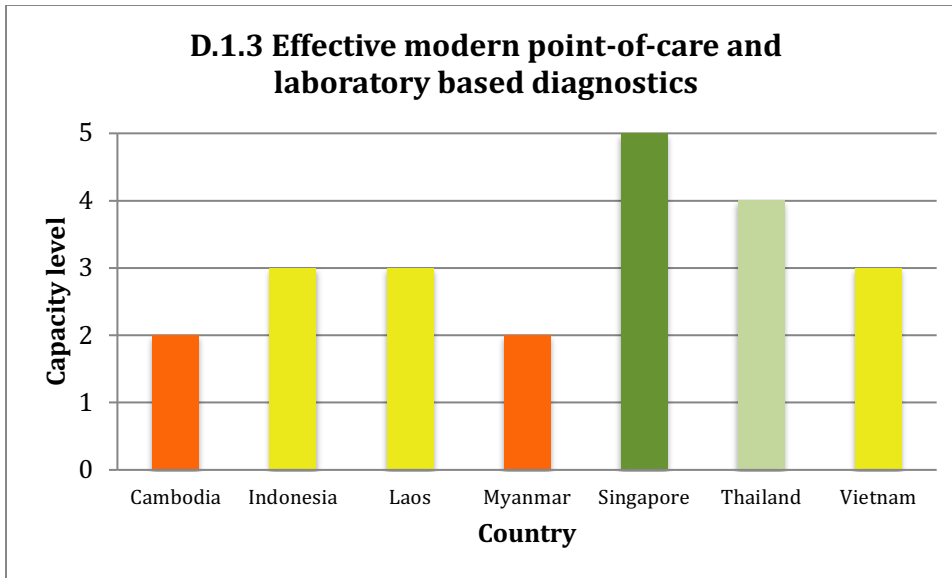
World Organisation for Animal Health (OIE) (2019). *OIE Tool for the Evaluation of Performance of Veterinary Services*, Seventh Edition. Paris: World Organisation for Animal Health.

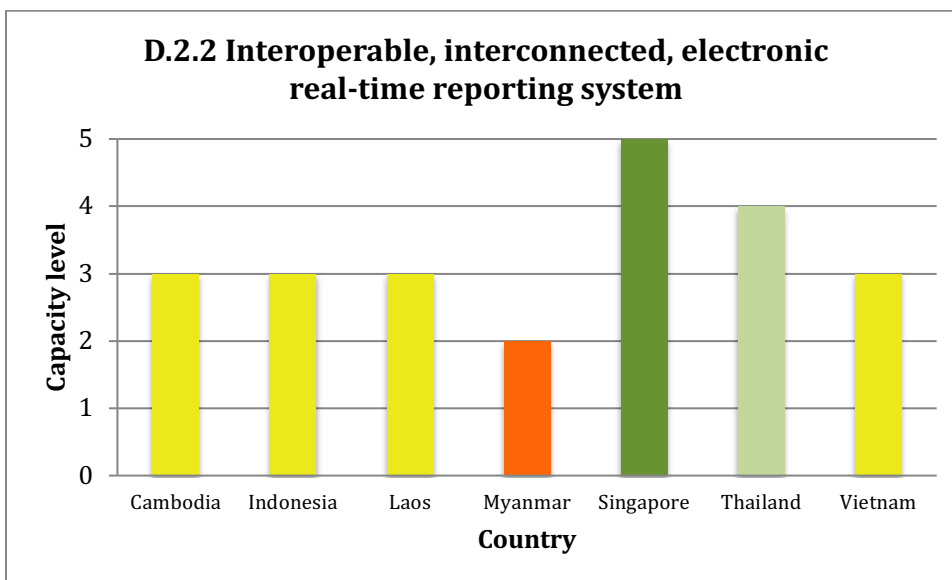
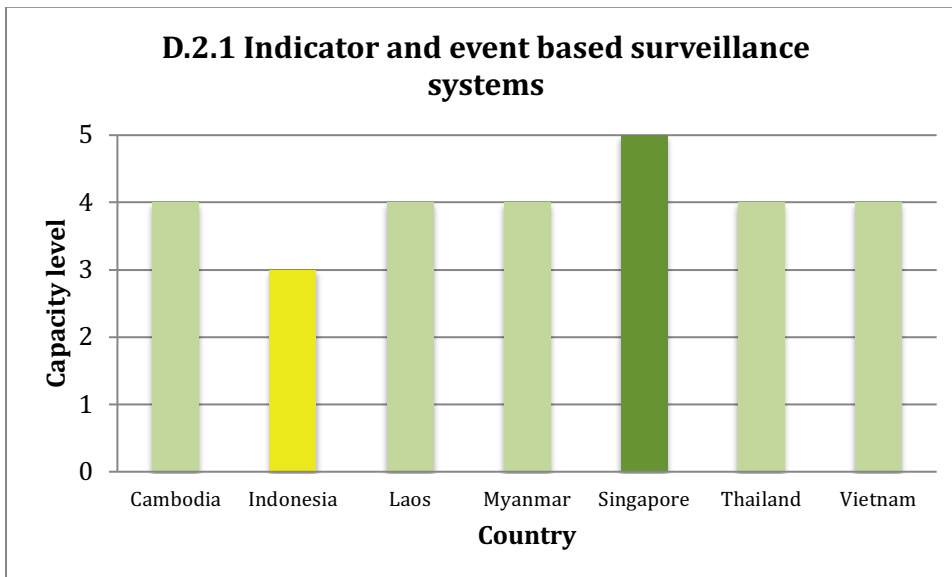
Annex A: Figures corresponding with indicators for each technical area

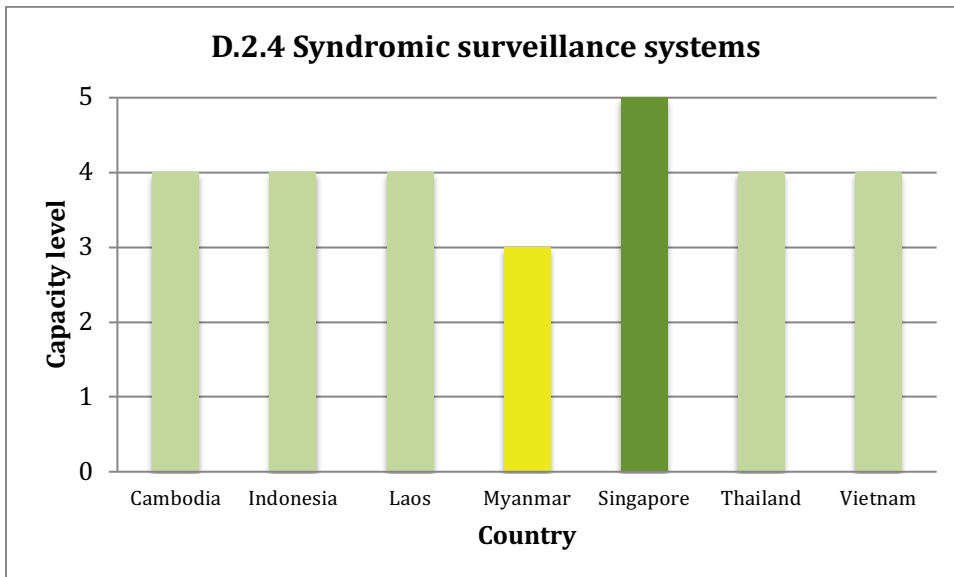
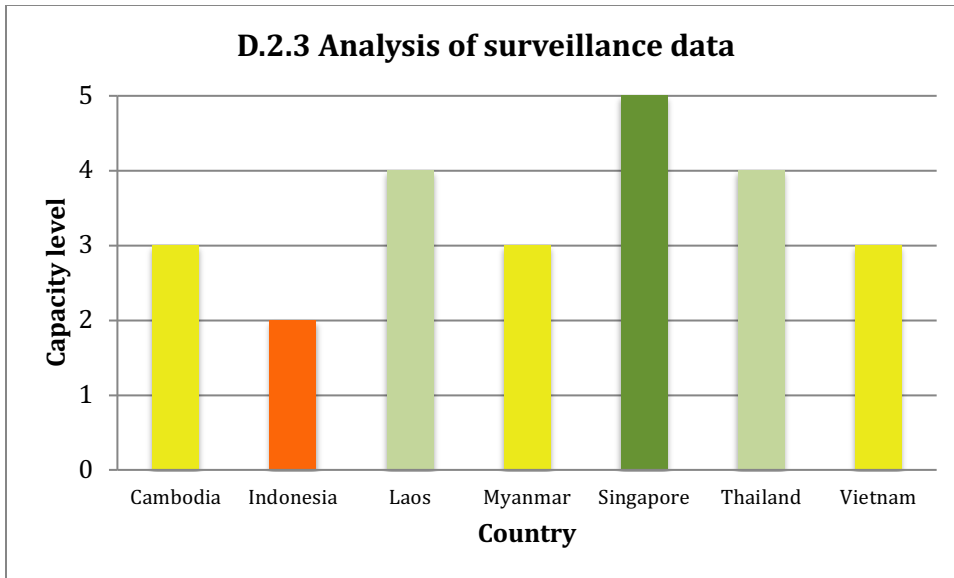
Biosafety and biosecurity (P.6.1-P.6.2)

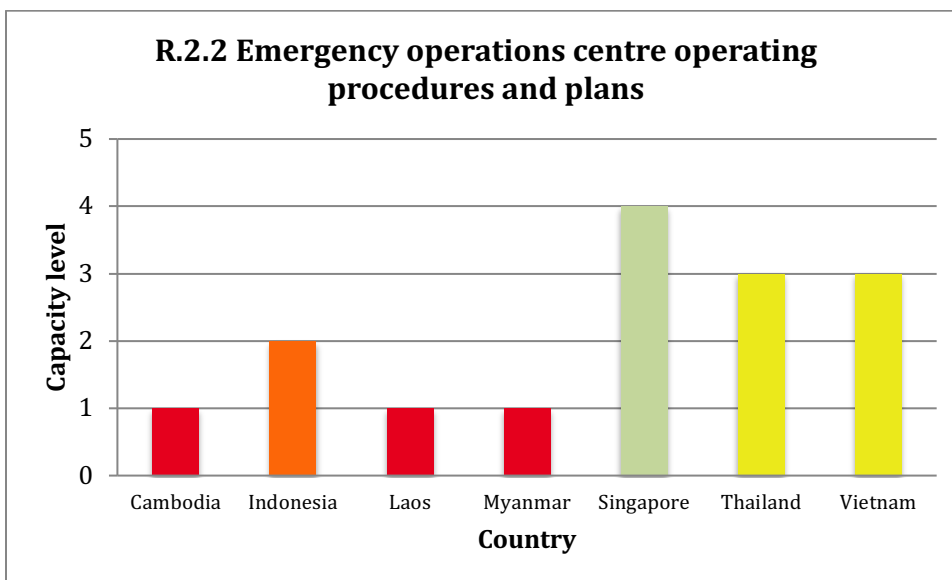
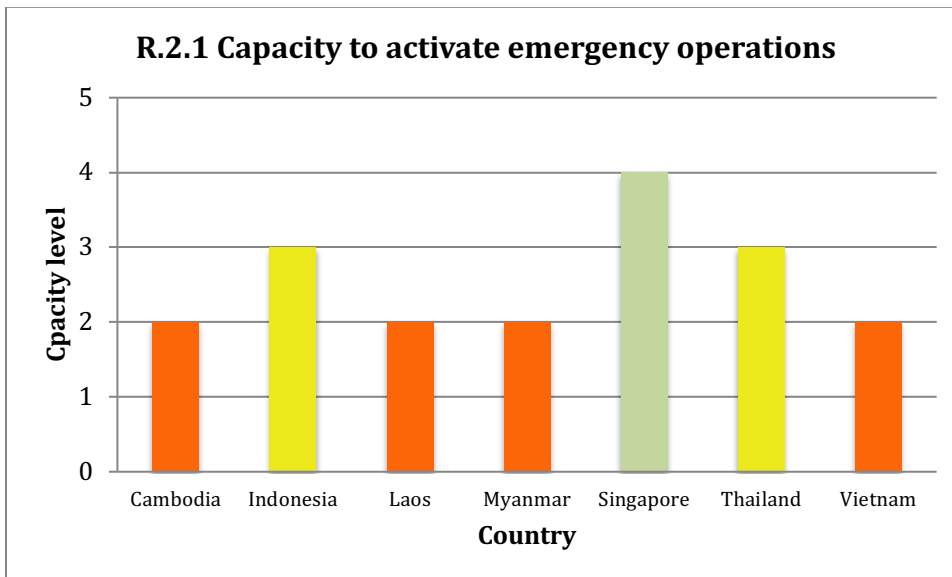


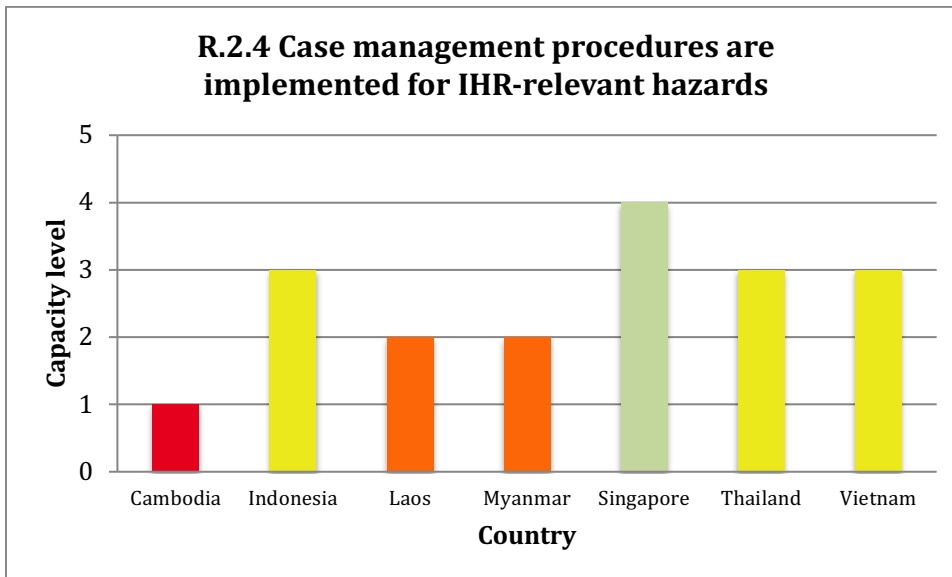
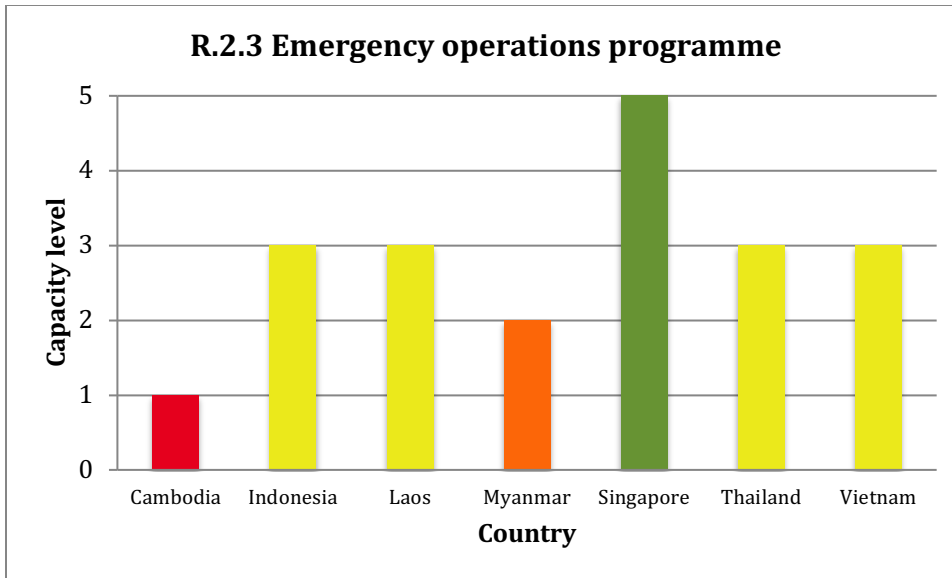
National laboratory system (D.1.1-D.1.4)



Real-time surveillance (D.2.1-D.2.4)



Emergency response operations (R.2.1-R.2.4)



Annex B: Summary of biological security capacity needs by technical area

Summary of biological security capacity needs by technical area			
Technical area	Needs	Country and source	
PREVENTION	Biosafety and biosecurity*	Establish a comprehensive national regulatory framework for biosafety and biosecurity	Cambodia (JEE, NAP), Laos (JEE, NAP), Myanmar (JEE, NAP), Philippines (NAP), Vietnam (NAP)
		Establish a national inventory and control list of dangerous pathogens and toxins	Cambodia (JEE, NAP), Indonesia (JEE), Laos (JEE, NAP), Myanmar (JEE), Vietnam (JEE, NAP)
		Establish sustainable mechanisms for the procurement and maintenance of biosafety and biosecurity infrastructure and equipment	Cambodia (JEE, NAP), Indonesia (JEE), Laos (JEE, NAP), Myanmar (JEE), Vietnam (JEE, NAP)
		Develop sustainable (e.g. train-the-trainer) biosafety and biosecurity training and education programs	Cambodia (JEE, NAP), Indonesia (JEE), Laos (JEE, NAP), Myanmar (JEE), Thailand (JEE), Vietnam (JEE, NAP)
DETECTION	National laboratory system	Develop laboratory quality management systems meeting international standards	Cambodia (JEE), Indonesia (JEE), Laos (JEE, NAP), Myanmar (JEE), Thailand (JEE), Vietnam (JEE)
		Establish sustainable mechanisms for the procurement of equipment, supplies and maintenance for laboratory testing	Cambodia (JEE), Indonesia (JEE), Laos (JEE, NAP), Myanmar (JEE), Vietnam (JEE)
		Strengthen coordination and collaboration between human and animal health laboratories	Laos (JEE), Myanmar (JEE), Thailand (JEE)
	Real-time surveillance	Strengthen electronic mechanisms for reporting, integrating and sharing surveillance data	Cambodia (JEE), Indonesia (JEE), Laos (JEE), Myanmar (JEE)

		Strengthen coordination, communication and information sharing between human health, animal health and other relevant sectors	Cambodia (JEE), Indonesia (JEE), Laos (JEE), Myanmar (JEE), Vietnam (JEE)
RESPONSE	Emergency response operations*	Conduct emergency preparedness and response training, including functional exercises and table-top exercises	Cambodia (JEE, NAP), Indonesia (JEE), Laos (JEE), Myanmar (JEE), Singapore (JEE), Thailand (JEE), Vietnam (JEE)
		Reinforce emergency operations center (EOC), including staffing and rosters of qualified personnel	Cambodia (JEE, NAP), Laos (JEE), Myanmar (JEE), Vietnam (JEE)
		Develop EOC plans and standard operating procedures (SOPs)	Cambodia (JEE, NAP), Laos (JEE), Myanmar (JEE), Vietnam (JEE)
	Linking public health and security authorities	Strengthen information sharing between public health and security authorities	Cambodia (JEE), Indonesia (JEE), Laos (JEE), Myanmar (JEE), Thailand (JEE), Vietnam (JEE)
		Develop joint exercise programs between public health and security authorities	Cambodia (JEE), Indonesia (JEE), Myanmar (JEE), Philippines (NAP), Thailand (JEE)
		Develop SOPs for joint public health and security risk assessment	Cambodia (JEE), Myanmar (JEE)

Key

- Technical areas marked with asterisk (*) = Limited capacity (lowest average JEE scores among the five technical areas)
- World Health Organization (WHO) Joint External Evaluation = JEE
- European Union (EU) CBRN National Action Plan = NAP