

JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES

of

MALAYSIA

Mission report:

21–25 October 2019



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ABBREVIATIONS

AEFI	Adverse event following immunization
AMR	Antimicrobial resistance
APSED	Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies
ASEAN	Association of Southeast Asian Nations
CBRNe	Chemical, biological, radiological, nuclear and explosives
CIP	Cataloguing-in-Publication
COMBI	Communication for behavioural impact
CPRC	Crisis Preparedness and Response Centre
DVS	Department of Veterinary Services
EMT	Emergency medical team
EQA	External quality assessment
ESBL	Extended-spectrum beta-lactamases
FAO	Food and Agriculture Organization of the United States
FETP	Field Epidemiology Training Programme
HAZMAT	Hazardous material team
HIV	Human immunodeficiency virus
IHR	International Health Regulations (2005)
INFOSAN	International Food Safety Authorities Network
IPC	Infection prevention and control
ISO	International Organization for Standardization
JEE	Joint External Evaluation
MERS-CoV	Middle East respiratory syndrome coronavirus
MOH	Ministry of Health
MRSA	Methicillin-resistant Staphylococcus aureus
MyAP-AMR	Malaysian action plan on Antimicrobial Resistance
MySED	Malaysia Strategy for Emerging Diseases and Public Health Emergencies
NADMA	National Disaster Management Agency
NFP	National IHR Focal Point
NIP	National Immunization Programme
OIE	World Organisation for Animal Health
PCR	Polymerase chain reaction
PPE	Personal protective equipment
PVS	Performance veterinary services
SOP	Standard operating procedures
WHO	World Health Organization

EXECUTIVE SUMMARY

INTRODUCTION

The International Health Regulations (IHR (2005)) is a legally binding instrument that requires signatory countries to have the minimum capacity to detect, assess, report and respond to any potential international public health emergency and event. In the Western Pacific Region, the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies (APSED III) and its earlier iterations have been used as a common strategic framework for action to guide Member States in advancing implementation of the IHR (2005).

In 2016, the monitoring and evaluation framework of the IHR was revised to include the compulsory State Party Annual Reporting as well as voluntary after-action reviews, simulation exercises and the execution of a JEE. The aim of a JEE is to measure the country-specific status and progress in preventing, detecting and rapidly responding to public health events and to identify and prioritize urgent priority actions to further enhance the capacity and capability of the health security system. The JEE tool consists of 19 technical areas and 49 indicators, with attributes that reflect various levels of capacity and capability. Each country conducts a self-assessment and provides relevant documentation to support each indicator. During the JEE, the evidence is reviewed by a team of external experts and are discussed with host country experts using a peer-to-peer, consensus-based approach.

Malaysia has made tremendous progress in strengthening capacity in health security and implementation of the IHR in the last decade. Guided by the two iterations of the "Malaysia strategy for emerging diseases and public health emergencies" (MySED), Malaysia has implemented a step-by-step strategy for health security strengthening. MySED I and MySED II were developed through a multisectoral collaborative approach and are based on APSED. Malaysia has also used their response to cases of Middle East respiratory syndrome coronavirus (MERS-CoV) as an entry point to enhance their preparedness in health security.

Using the same multisectoral collaborative approach and coordinated by the Ministry of Health (MOH), Malaysia initiated the JEE process in October 2018. In May 2019, the Malaysian JEE Committee conducted a formal internal evaluation based on the JEE tool. The internal evaluation was followed by external evaluation from 21 to 25 October 2019; a multisectoral team of international and national experts jointly reviewed Malaysia's capacities across the 19 technical areas of the JEE tool, using the evidence provided during the mission. This report summarizes the findings of this JEE and provides recommended priority actions for each of the 19 technical areas.

Findings from the JEE

The JEE team recognizes the hard work and time invested by Malaysia in their preparation for the JEE, their ongoing willingness to provide information and the robust discussions in the technical sessions. The breadth and depth of multisectoral representation across all technical areas was commendable, and the field visits were well coordinated and invaluable in providing evidence for functionality of the health security system.

The JEE team found many strengths in Malaysia, particularly:

- The step-by-step strengthening of health security systems with a long-term vision, through the development and implementation of MySED I and MySED II and their associated workplans.
- Well established mechanisms for command, control and coordination of multisectoral health emergency preparedness and response, as guided by the National Security Council Directive 20 and facilitated by the National Disaster Management Agency (NADMA), while the MOH Crisis Preparedness and Response Centre (CPRC) provides the functional centre for preparedness planning, synthesizing information and coordinating health sector responses.
- The multisectoral collaborative approach to health security, with all the sectors involved in implementing MySED II workplans and MOH providing overall coordination.
- A national surveillance system that synthesizes data across various reporting systems and has real-time entry at the district, state and national level; this is monitored daily and informs risk assessment, response decision-making and risk communication.
- A culture of continuous improvement through the conduct of simulation exercises, after-action reviews and other assessments, with exercises assuming possible introduction of MERS-CoV strengthening preparedness for health security.

The overarching recommendations of the JEE team were to:

- Continue to invest in strengthening health security systems, guided by MySED II, further reviewing system readiness through high-level functional exercises and after-action reviews, and addressing identified gaps, particularly for a large-scale event, such as an influenza pandemic.
- Further enhanced coordination, stewardship and accountability of all relevant sectors across Malaysia for full implementation of IHR (2005). This includes strengthening coordination and collaboration between the human and animal sectors across relevant technical areas.
- Consider developing nationwide strategies to further optimize workforce in all relevant sectors to advance implementation of IHR.
- Strengthen effective engagement of the private sector in health security systems, including surveillance, case management, risk communication, and other preparedness and response activities.
- Continue to share the considerable experience in health security within the region and globally, including the expertise in emergency operations, surveillance, laboratory, field epidemiology training, risk communication and capabilities in dealing with chemical and radiation events.

Conclusions

Malaysia has demonstrated a high level of achievement in fulfilling IHR requirements and has a well-developed health security system. However, the context in which health security threats are managed are increasingly complex, and these threats can challenge any health system, including those of Member States with demonstrated capacity for IHR (2005). The JEE team therefore encourages Malaysia to continue to implement MySED II to further advance implementation of IHR (2005) for health security taking into consideration the recommended priority actions from the JEE.

In closing, the JEE team has appreciated the peer-to-peer discussions and the valuable insights gained throughout the JEE process, and thanks Malaysia for their active participation throughout this evaluation.

SCORES AND PRIORITY ACTIONS

Technical areas	Indicator no.	Indicator	Score	Priority Actions
PREVENT				
National legislation, policy and financing	P.1.1	The state has assessed, adjusted and aligned its domestic legislation, policies and administrative arrangements in all relevant sectors to enable compliance with the IHR	4	<ul style="list-style-type: none"> Conduct a holistic assessment of the implementation of national and state legislation, regulations and other legal documents in a systematic and coordinated manner to ensure they support government-wide implementation of IHR (2005). Strategically prioritize and monitor financial investment into priority preparedness actions to address the key remaining gaps in the system readiness, building upon the framework of MySED II.
	P.1.2	Financing is available for the implementation of IHR capacities	4	
	P.1.3	A financing mechanism and funds are available for timely response to public health emergencies	4	
IHR coordination, communication and advocacy	P.2.1	A functional mechanism established for the coordination and integration of relevant sectors in the implementation of IHR	5	<ul style="list-style-type: none"> Maintain and further empower the National IHR Focal Point (NFP) and existing IHR mechanisms for communication and information sharing for all acute public health events across relevant sectors. Continue to routinely review and test the functionality of the existing multisectoral coordination mechanisms for public health emergency preparedness and response, including management of large-scale disease outbreaks and public health emergencies. Advocate for sustainable investment in health security, including enhancing core capacities under IHR, guided by APSED.
Antimicrobial resistance (AMR)	P.3.1	Effective multisectoral coordination on AMR	4	<ul style="list-style-type: none"> Strengthen the involvement of private health sectors in AMR, especially for AMR surveillance and the appropriate use of antimicrobials in inpatient and outpatient settings. Strengthen AMR in the animal health sector, especially for antimicrobial consumption surveillance and continue phasing out of antimicrobials used as growth promoters through appropriate monitoring. Enhance multisectoral coordination, especially with the environmental sector for AMR under the One Health approach.
	P.3.2	Surveillance of AMR	4	
	P.3.3	Infection prevention and control (IPC)	5	
	P.3.4	Optimize use of antimicrobial medicines in human and animal health and agriculture	3	

Technical areas	Indicator no.	Indicator	Score	Priority Actions
Zoonotic disease	P.4.1	Coordinated surveillance systems in place in the animal health and public health sectors for zoonotic diseases/pathogens identified as joint priorities	4	<ul style="list-style-type: none"> • Increase capacity of veterinary services for surveillance as recommended in the OIE performance veterinary services (PVS) Gap Analysis Mission Malaysia report 2017, focusing on human resources at the district level; reporting from abattoirs; encouraging farmer awareness and motivation to notify disease suspicion. • Develop linkages between disease reporting systems for priority zoonotic diseases among relevant agencies for timely data sharing and response and increase the frequency of sharing formal reports. • Increase capacities and capabilities of public health and veterinary laboratories in diagnosing zoonotic diseases by exchanging expertise and conducting joint training; develop standard operating procedures (SOPs) for sharing isolates and reference material for diagnosis and surveillance between public health and veterinary laboratories. • Further strengthen regular public awareness campaigns and health education activities on zoonotic disease prevention, reporting and outbreak control.
	P.4.2	Mechanisms for responding to infectious and potential zoonotic diseases established and functional	4	
Food safety	P.5.1	Surveillance systems in place for the detection and monitoring of foodborne diseases and food contamination	4	<ul style="list-style-type: none"> • Strengthen strategies to manage emerging issues that impact food safety, such as online food sales and food fraud. • Continue to strengthen laboratory capacity to test for priority microbiological, chemical and physical foodborne hazards. • Implement the updated National Food Safety Emergency Response plan, in consultation with relevant stakeholders and government agencies, including appropriate training and simulation exercises.
	P.5.2	Mechanisms are established and functioning for the response and management of food safety emergencies	5	
Biosafety and biosecurity	P.6.1	Whole-of-government biosafety and biosecurity system in place for all sectors (including human, animal and agriculture facilities)	3	<ul style="list-style-type: none"> • Finalize and endorse the draft Biological and Toxin Weapons Convention Bill and the laboratory licensing regulation for private health laboratories within the Pathology Act 2007. • Strengthen training based on a needs assessment and evaluation of the effectiveness of biosafety and biosecurity. • Increase capacity-building at the state and district level to strengthen the implementation of biosafety and biosecurity.
	P.6.2	Biosafety and biosecurity training and practices in all relevant sectors (including human, animal and agriculture)	3	

Technical areas	Indicator no.	Indicator	Score	Priority Actions
Immunization	P.7.1	Vaccine coverage (measles) as part of national programme	4	<ul style="list-style-type: none"> Continue to implement specific vaccination strategies to improve vaccination coverage among semi nomadic indigenous population; and access for non-citizens in collaboration with nongovernmental organizations. Work to achieve and document measles elimination in alignment with the regional goal. Strengthen reporting of vaccination coverage data by developing a national immunization registry and improving vaccination card retention. Strengthen public-private collaboration on vaccination service delivery, risk communication and vaccine hesitancy.
	P.7.2	National vaccine access and delivery	5*	
DETECT				
National laboratory system	D.1.1	Laboratory testing for detection of priority diseases	5	<ul style="list-style-type: none"> Strengthen collaboration between the human and animal laboratories and public and private laboratories through multisectoral laboratory networks. Expand laboratory capacity for advanced analytical and diagnostic technologies, e.g. point of care tests and molecular methods through a systematic training approach. Establish regulation for laboratory licensing and compliance in quality standards for the national and international laboratory system. Strengthen national policy and guidelines to transfer specimens in a safe and secure manner.
	D.1.2	Specimen referral and transport system	4	
	D.1.3	Effective national diagnostic network	4	
	D.1.4	Laboratory quality system	3	
Surveillance	D.2.1	Surveillance systems	4	<ul style="list-style-type: none"> Conduct national level evaluations of surveillance systems for identified priority human and animal notifiable diseases using international guidelines. Automate data sharing between the indicator-based (eNotifikasi) and event-based (eWabak) systems and consider automated notification of laboratory results. Develop capacity within the electronic notification systems of MOH to enable data analysis and automated reporting. Provide regular and frequent reporting for priority diseases and make them publicly available.
	D.2.2	Use of electronic tools	3	
	D.2.3	Analysis of surveillance data	5*	
Reporting	D.3.1	System for efficient reporting to Food and Agriculture Organization of the United States (FAO), OIE and WHO	4	<ul style="list-style-type: none"> Strengthen the mechanisms for reporting potential public health events to the event-based surveillance system in human and animal health. Ensure risk assessment tools are available at the national level in all sectors and strengthen the capacity for multisectoral risk assessment at national and state levels.
	D.3.2	Reporting network and protocols in country	4	

Technical areas	Indicator no.	Indicator	Score	Priority Actions
Human resources (animal and human health sectors)	D.4.1	An up-to-date multi-sectoral workforce strategy is in place	5	<ul style="list-style-type: none"> • Increase staffing and competencies in the animal health sector and explore potential mechanisms for recruiting temporary and contract professionals in all areas. • Continue to provide in-service training to enhance the skills and competencies of health professionals to function and respond at all levels of the health system. • Expand and diversify the FETP by increasing the number of trainees and graduates at all levels and including veterinarians and laboratorians. • Continue to contribute to the global health emergency workforce, with the objective of gaining global public health experience and establishing global networking.
	D.4.2	Human resources are available to effectively implement IHR	4	
	D.4.3	In-service trainings are available	5	
	D.4.4	Field Epidemiology Training Programme (FETP) or other applied epidemiology training programme in place	4	
RESPOND				
Emergency Preparedness	R.1.1	Strategic emergency risk assessments conducted and emergency resources identified and mapped	5	<ul style="list-style-type: none"> • Further strengthen coordination to ensure multi-sectoral implementation of preparedness and response plans. • Use the lessons identified through simulation exercises and after-action reviews to update health emergency plans in a timely manner and share with stakeholders as appropriate. • Develop a human resources resilience plan that includes senior leaders within MOH. • Further enhance MyCPRC by incorporating machine learning to forecast, predict and provide insights on disease occurrence.
	R.1.2	National multi-sectoral multi-hazard emergency preparedness measures, including emergency response plans, are developed, implemented and tested	4	
Emergency response operations	R.2.1	Emergency response coordination	5	<ul style="list-style-type: none"> • Consider setting up mechanisms to deal with computer system outages and dependence on smart phones. • Further develop and strengthen electronic documentation filing systems. • Ensure updating of SOPs and guidelines every five years when revisions are published and as a consequence of after-action reviews.
	R.2.2	Emergency operations centre capacities, procedures and plans	5	
	R.2.3	Emergency Exercise Management Programme	5	
Linking public health and security authorities	R.3.1	Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspect or confirmed biological, chemical or radiological event	4	<ul style="list-style-type: none"> • Formalize information sharing mechanisms between public health and security authorities, both for routine operations and during emergencies. • Conduct a full-scale live exercise at the national level to test these information sharing modalities. • Consider a mutual secondment of staff between the MOH and security authorities.

Technical areas	Indicator no.	Indicator	Score	Priority Actions
Medical counter-measures and personnel deployment	R.4.1	System in place for activating and co-ordinating medical countermeasures during a public health emergency	5	<ul style="list-style-type: none"> Continue to support international deployment of trained public health and/or medical personnel to support regional and global responses to outbreaks and emergencies, as appropriate. Continue to review and update case management guidelines on IHR relevant hazards based on the latest evidence, especially for high threat pathogens and chemical and radiation hazards, and continue to strengthen resources for case management at designated health care facilities.
	R.4.2	System in place for activating and coordinating health personnel during a public health emergency	4	
	R.4.3	Case management procedures implemented for IHR relevant hazards	4	
Risk communication	R.5.1	Risk communication systems for unusual/unexpected events and emergencies	5	<ul style="list-style-type: none"> Continue to enhance the risk communication system through regular staff development and training of risk communication specialists at all levels (national, state and district) and across multiple sectors, including the strategic use of new and emerging communication technologies. Scale-up the innovative approach of using communication for behavioural impact (COMBI) teams for community engagement to include all hazards, with appropriate capacity development activities. Continue to routinely conduct after-action reviews and evaluations of risk communication strategies jointly with relevant sectors, and use the lessons learned for future communications planning. Formalize the mechanism to systematically conduct risk perception assessment.
	R.5.2	Internal and partner coordination for emergency risk communication	5	
	R.5.3	Public communication for emergencies	4	
	R.5.4	Communication engagement with affected communities	4	
	R.5.5	Addressing perceptions, risky behaviours and misinformation	4	
IHR-RELATED HAZARDS AND POINTS OF ENTRY				
Points of entry	PoE.1	Routine capacities established at points of entry	4	<ul style="list-style-type: none"> Continue to review and clarify the list of IHR authorized ports to issue ship sanitation certificates. Continue to routinely conduct continuous education, training and exercises involving all agencies at points of entry. Conduct training to manage cruise ships for potential events with a large number of cases.
	PoE.2	Effective public health response at points of entry	4	

Technical areas	Indicator no.	Indicator	Score	Priority Actions
Chemical events	CE.1	Mechanisms established and functioning for detecting and responding to chemical events or emergencies	4	<ul style="list-style-type: none"> • Improve national response and investigation capabilities during chemical events by investing in state of the art equipment for on-site detection and laboratory reach-back analyses. • Provide further multisectoral training on responding to chemical events for first responders, including the MOH Rapid Assessment Team and Rapid Response Team. • Improve interoperability among response agencies in the interpretation of testing results and model projections through joint training sessions and simulation exercises.
	CE.2	Enabling environment in place for management of chemical events	5	
Radiation emergencies	RE.1	Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies	4	<ul style="list-style-type: none"> • Improve capacity and capabilities of hospitals designated for managing radiation casualties, including decontamination, radiation monitoring and specialized expertise by investing in facilities, equipment, training and international collaborations. • Improve timely and effective information exchange between public health authorities and other agencies involved in radiation emergency response through exercises including a full-scale exercise.
	RE.2	Enabling environment in place for management of radiological and nuclear emergencies	4	

Scores: 1=No capacity; 2=Limited capacity; 3=Developed capacity; 4=Demonstrated capacity; 5=Sustainable capacity.

PREVENT

NATIONAL LEGISLATION, POLICY AND FINANCING

INTRODUCTION

The IHR (2005) provide obligations and rights for States Parties. In some States Parties, implementation of the IHR (2005) may require new or modified legislation. Even if new or revised legislation may not be specifically required, States may still choose to revise some regulations or other instruments in order to facilitate IHR implementation and maintenance. Implementing legislation could serve to institutionalize and strengthen the role of IHR and operations within the State Party. It can also facilitate coordination among the different entities involved in their implementation. In addition, policies that identify national structures and responsibilities as well as the allocation of adequate financial resources are also important.

Target

An adequate legal framework for States Parties to support and enable the implementation of all their obligations and rights made by the IHR. Development of new or modified legislation in some States Parties for the implementation of the Regulations. Where new or revised legislation may not be specifically required under a State Party's legal system, the State may revise some legislation, regulations or other instruments in order to facilitate their implementation in a more efficient, effective or beneficial manner. States Parties ensure provision of adequate funding for IHR implementation through the national budget or other mechanisms. Country has access to financial resources for the implementation of IHR capacities. Financing that can be accessed on time and distributed in response to public health emergencies, is available.

LEVEL OF CAPABILITIES

Legislation

Malaysia has a series of legislation and government instruments to implement IHR (2005) for health security, including statutes (Acts of Parliament and State Enactments) and subsidiary legislation (by-laws, orders, proclamations, rules and notifications). In the animal sector, the states of Sabah and Sarawak have their own legislation separate to national legislation. Examples of key legislation relevant to IHR implementation include:

- National Security Council Directive No. 20;
- Prevention and Control of Infectious Diseases Act 1988 (Act 342);
- Prevention and Control of Infectious Diseases (Importation and Exportation of Human Remains, Human Tissues and Pathogenic Organisms and Substances) Regulations 2006;
- Food Act 1983 (Act 281); and
- Poisons Act 1952 (Act 366).

Several national guidelines and SOPs have been developed from the legislation and to guide implementation of IHR (2005), such as for NFP communication, operations of the MOH CPRC, surveillance, specimen collection and transportation, human resource mobilization during public health emergencies, IPC, and antimicrobial use in humans and animals.

The MySED provides a five-year multisectoral strategic framework for action to advance implementation of IHR (2005) in Malaysia. The second iteration of MySED for 2017-2021 is based on the Asia Pacific Strategy for Emerging Diseases and Public Health Emergencies. Individual legislation documents, regulations, guidelines and SOPs are regularly assessed and amended as needed. However, a comprehensive assessment of domestic legislation against the IHR obligations has not been undertaken.

Financing

The strengthening of IHR capacities in Malaysia are guided by MySED I and MySED II workplans and are funded by sustainable domestic financial resources. Funding is provided through the annual budget allocation process of the Ministry of Finance to the MOH and other relevant ministries. Activities to strengthen IHR core capacities in each sector are integrated into existing budget lines; there is no specific funding for the MySED II workplan or specific data on expenditure related to MySED II implementation or health security related activities.

In the health sector, the Secretary-General of MOH is designated as the Financial Control Officer as per Section 15A of the Financial Procedure Act 1957 (Act 61). Funds are disbursed twice a year for recurrent activities and during the mid-term review the funding can be adjusted as necessary. Subnational level activities are financed centrally for the health sector with allocation for each programme determined, and funds allocated, at the national level for distribution to the states and districts. For the animal sector, state authorities fund state level activities.

Health care is increasingly provided by the private sector in Malaysia. Private health insurance is voluntary, with variable premiums charged based on the type of health insurance and the level of coverage. Out of pocket expenses incurred at the point of utilization by patients, at both public and private health facilities, increasingly constitute a substantial proportion of health care financing.

Various financing mechanisms are available to support timely response to public health events, as demonstrated in recent emergencies. The MOH, in their annual operational budget, retains 15% in a contingency fund. These funds are available for the health sector to respond to unexpected events. . During a public health emergency, this contingency fund is the first resource utilized. When additional funding is required, the National Disaster Relief Trust Fund, coordinated by the NADMA, can be accessed. In addition, at the state level, funding for disaster management is supported by a state trust fund which can be utilized if the disaster is being controlled by the state government. The state government can also request additional funding from NADMA.

Two treasury orders allow for rapid and flexible disbursement of funds during emergency responses: AP55: Emergency Expenditure and AP173.2: Emergency Allocation. During a public health emergency response, the Ministry of Finance coordinates funding while the affected ministry and NADMA provide oversight in spending the allocated funds.

Indicators and scores

P.1.1 The State has assessed, adjusted and aligned its domestic legislation, policies and administrative arrangements in all relevant sectors to enable compliance with the IHR. Score – 4.

Strengths and best practices

- There are adequate legislation, regulations and other government instruments to support the implementation of IHR and these are reviewed and amended on regular basis.
- The MySED II Workplan (2017-2021) provides a five-year, multisectoral strategic framework to strengthen IHR capacities in Malaysia.

Areas that need strengthening and challenges

- Comprehensive assessment of domestic legislation against IHR obligations, as suggested by the WHO legislative reference and assessment tool (See https://www.who.int/ihr/Toolkit_Legislative_Implementation.pdf)
- Effective national coordination with the states of Sabah and Sarawak in the animal sector to ensure that their state-based legislation allows for adequate implementation of IHR (2005).

P.1.2 Financing is available for the implementation of IHR capacities. Score – 4.**Strengths and best practices**

- Sustainable domestic funds are available to strengthen and implement IHR capacities, as guided by MySED II Workplan (2017-2021).
- Funds are disbursed twice a year to MOH divisions and subnational authorities.
- The level of funding is sufficient, especially in the health sector.

Areas that need strengthening and challenges

- Specific costing or expenditure data related to MySED II implementation or health security activities to monitor financial investment.
- Further strategic prioritization of financial investment to ensure a robust health security systems. Prioritization can be guided by response planning for future major public health emergencies, including pandemics.
- Adequate funding across all JEE technical areas and sectors to support implementation of IHR capacities.

P.1.3 A financing mechanism and funds are available for the timely response to public health emergencies. Score – 4.**Strengths and best practices**

- There are various financing mechanisms available to support timely response to public health emergencies, including the MOH contingency fund, the National Disaster Relief Trust Fund and state trust funds.
- Two treasury orders allow for rapid and flexible disbursement of funds during emergency responses.
- There are special mechanisms for funding the private sector or nongovernmental organizations during an emergency.

Areas that need strengthening and challenges

- Coordination and the redistribution of funding during health emergencies.

Recommendations for priority actions

- Conduct a holistic assessment of the implementation of national and state legislation, regulations and other legal documents in a systematic and coordinated manner to ensure they support government-wide implementation of IHR (2005).
- Strategically prioritize and monitor financial investment into priority preparedness action to address the key remaining gaps in the system readiness, building upon the framework of MySED II.

IHR COORDINATION, COMMUNICATION AND ADVOCACY

INTRODUCTION

The effective implementation of the IHR requires multisectoral/multidisciplinary approaches through national partnerships for efficient alert and response systems. Coordination of nationwide resources, including the designation of an NFP, and adequate resources for IHR implementation and communication, is a key requisite for a functioning IHR mechanism at the country level.

Target

To implement multisectoral/multidisciplinary approaches through national partnerships that allow efficient, alert and response systems for effective implementation of the IHR. Coordinate nationwide resources, including sustainable functioning of an NFP – a national centre for IHR communications which is a key obligation of the IHR – that is accessible at all times. States Parties should provide WHO with contact details of the NFP, continuously update and annually confirm them.

LEVEL OF CAPABILITIES

The Office of the Deputy Director-General (public health) is designated as the Malaysian NFP. The two iterations of the Malaysian Strategy for Emerging Diseases and Public Health Emergencies (MySED I and MySED II) have provided a common framework for action for health security. There are established mechanisms for command, control and coordination of health emergency preparedness and response, as guided by the National Security Council Directive 20. These multisectoral mechanisms are facilitated by the NADMA, Inter-Ministerial Committee for Control of Zoonotic Disease, National Disaster Management Committee and the National Environmental Health Action Plan Technical Committee. Malaysia collaborates with other countries through WHO and other platforms, such as the Association of Southeast Asian Nations (ASEAN).

There are SOPs for the NFP operations with a 24/7 roster of IHR duty officers. The functionality of the NFP has been tested in real-life events as Malaysia has notified six public health events to WHO – a rabies outbreak, MERS-CoV cases (n=2), human infection with avian influenza (n=2) and a Zika outbreak. The NFP has also been tested through simulation exercises at the national level (avian influenza and MERS-CoV outbreak response), regional level (the WHO annual Crystal Simulation Exercise) and the global level (Global Emergency Organisation Exercise). After-action reviews have been conducted following major outbreaks and disasters where response was across multiple disciplines.

Indicators and scores

P.2.1 A functional mechanism established for the coordination and integration of relevant sectors in the implementation of IHR. Score – 5.

Strengths and best practices

- There is a high level of commitment to the IHR with the Office of the Deputy Director-General of Health (public health) the NFP for Malaysia.
- MOH has established information sharing and coordination mechanisms across several divisions, as outlined in the Malaysian National IHR Communications Guideline and MySED II (2017-2021) Work Plan.
- Malaysia has a fully functional NFP, accessible 24/7, with updated SOPs for IHR communications.
- IHR coordination and communication capacities are regularly tested through real events and simulation exercises.

Areas that need strengthening and challenges

- There are further opportunities for the NFP to apply the IHR monitoring and evaluation framework, especially by engaging multisectoral stakeholders to participate in after-action reviews and simulation exercises.
- Malaysia can further enhance information sharing and coordination with other ministries through documenting and articulating their existing processes in SOPs.

Recommendations for priority actions

- Maintain and further empower the IHR NFP and existing IHR mechanisms for communication and information sharing for all acute public health events across relevant sectors.
- Continue to routinely review and test the functionality of the existing multisectoral coordination mechanisms for public health emergency preparedness and response, including management of large-scale disease outbreaks and public health emergencies.
- Advocate for sustainable investment in health security, including enhancing core capacities under IHR, guided by APSED.

ANTIMICROBIAL RESISTANCE

INTRODUCTION

Bacteria and other microbes evolve in response to their environment and inevitably develop mechanisms to resist being killed by antimicrobial agents. For many decades, the problem was manageable as the growth of resistance was slow and the pharmaceutical industry continued to create new antibiotics.

Over the past decade, however, this problem has become a crisis. AMR is evolving at an alarming rate and is outpacing the development of new countermeasures capable of thwarting infections in humans. This situation threatens patient care, economic growth, public health, agriculture, economic security and national security.

Target

A functional system in place for the national response to combat AMR with a One Health approach, including:

- a) Multisectoral work spanning human, animal, crops, food safety and environmental aspects. This comprises developing and implementing a national action plan to combat AMR, consistent with the Global Action Plan on AMR.*
- b) Surveillance capacity for AMR and antimicrobial use at the national level, following and using internationally agreed systems, such as the WHO Global AMR Surveillance System and the OIE global database on use of antimicrobial agents in animals.*
- c) Prevention of AMR in health care facilities, food production and the community, through IPC measures.*
- d) Ensuring appropriate use of antimicrobials, including assuring quality of available medicines, conservation of existing treatments and access to appropriate antimicrobials when needed, while reducing inappropriate use.*

LEVEL OF CAPABILITIES

In Malaysia, the National AMR Committee, co-chaired by the Director-General of Health and the Director-General of Veterinary Services, is the coordinating body that governs multisectoral AMR activities in line with the WHO Global Action Plan on AMR. The committee includes representation from MOH, the veterinary and aquaculture sector of the Ministry of Agriculture, the Ministry of Education, the Ministry of Defence and professional organizations. Under the guidance of the National AMR Committee, the Malaysian Action Plan on AMR 2017-2021 (MyAP-AMR) was developed. The MyAP-AMR has four priority areas: public awareness and education; surveillance and research; IPC; and appropriate use of antimicrobials.

In Malaysia, there are specific surveillance systems to monitor trends in antimicrobial use in the human and animal health sectors. In the human health sector, the voluntary National Surveillance on Antimicrobial Utilization received data from 85 of the 144 public hospitals in 2018 and the National Surveillance on Antimicrobial Consumption received data from all public and private hospitals. The National Surveillance on AMR received data from 42 of the 144 public hospitals and 15 of the 187 private hospitals in 2018. There is also the Multidrug Resistance Organism and Methicillin-resistant *Staphylococcus aureus* (MRSA) Bacteraemia Surveillance. Malaysia also participates in the Global AMR Surveillance System and the WHO pilot project: Global Integrated Surveillance on Extended-Spectrum Beta-Lactamase (ESBL) *E. coli* using a One Health approach. All 144 public hospitals and 74 of the

187 private hospitals participated in AMR surveillance with the target pathogens of public hospitals are MRSA, ESBL-*E. coli*, ESBL-*Klebsiella pneumoniae*, *Acinetobacter baumannii*, Carbapenem-resistant *Enterobacteriaceae* and vancomycin-resistant *Enterococci*. The target pathogens for private hospitals are MRSA, ESBL-*E. coli* and ESBL-*Klebsiella pneumoniae*.

The National IPC Programme in the human health sectors was established in 2001 with IPC policies and guidelines developed and revised regularly. All 144 public hospitals adopted the National IPC Policies and Procedures and all 1060 primary health clinics adopted the Infection Control Guidelines for Primary Healthcare Facilities. The 187 private hospitals and 7335 private medical clinics have local policies which are based on the MOH IPC policies. The larger hospitals report IPC data to MOH, and the smaller hospitals report to MOH at the state level, with any issues reported to the national MOH. Since 2013, hand hygiene has been used as an indicator of IPC and has been evaluated through the WHO Hand Hygiene Self-Assessment Framework Survey every two years with the results reported to WHO and MOH. In 2017, 150 hospitals (140 public and 10 private), including small hospitals, participated and earned a higher score than achieved in the 2015 survey.

Malaysia updated their National Antibiotic Guidelines in human health in 2019 and this was distributed to public health hospitals. The Antimicrobial Stewardship Programme in Malaysia's public health facilities has been operational since 2014 and an evaluation of appropriate antibiotic use was conducted in 23 public hospitals in an inpatient setting using a Point Prevalence Survey.

In the animal health sector, surveillance on antibiotic usage commenced in 2018 with seven regional veterinary laboratories, 10 food safety and quality laboratories and three public health laboratory food sections with the capacity to detect, isolate and identify AMR through the One Health Integrated AMR Surveillance. The Malaysian Good Agricultural Practice certification programme and Veterinary Health Mark certification requires that farms comply with good animal husbandry and biosecurity practices to obtain their operating license. Farmers are not encouraged to use antibiotics at subtherapeutic level and must comply with the National Animal Vaccination Program for foot and mouth disease, brucellosis (*B. abortus*) and haemorrhagic septicaemia. The National Veterinary Antibiotic Guideline has been drafted and initiatives to phase out growth promoters in animal sectors commenced in January 2019 with a plan to phase out five further antimicrobials (erythromycin, tilmicosin, tylosin, fosfomycin, and neomycin) by 2020.

Indicators and scores

P.3.1 Effective multi-sector coordination on AMR. Score – 4.

Strengths and best practices

- The National AMR Committee has high-level multisectoral membership and is supported by four technical working groups.
- The MyAP-AMR describes the national level strategies for AMR and is aligned with the WHO Global Action Plan on AMR.
- All involved departments and ministries provide budget for MyAP-AMR, as well as other agencies, such as WHO and Malaysian One Health University Network.

Areas that need strengthening and challenges

- Having a secretariat in each sector to contribute the coordination and implementation of MyAP-AMR.
- The current budget is inadequate for full implementation of the MyAP-AMR and may require specific funding for AMR in each sector.

P.3.2 Surveillance of AMR. Score – 4.*Strengths and best practices***Human health**

- There are several surveillance systems for AMR in Malaysia with adequate representation of hospitals participating: National Surveillance on Antimicrobial Utilization; National Surveillance on Antimicrobial Consumption; National Surveillance on AMR; and the Multidrug Resistance Organism and MRSA Bacteraemia Surveillance.
- All 144 public hospitals and 74 of the 187 private hospitals participate in surveillance of infections caused by AMR.
- Malaysia has participated in the Global AMR Surveillance System and the pilot project WHO Global Integrated Surveillance for ESBL *E. coli* using a One Health approach.

Animal health

- Antimicrobial use surveillance has commenced through the One Health Integrated AMR Surveillance.
- Several laboratories in the animal health sector have the capacity to detect, isolate and identify AMR and contribute to the surveillance system.

Areas that need strengthening and challenges

- Increasing the number of laboratories and private facilities in the animal sector that contribute to antimicrobial use surveillance.

P.3.3 IPC. Score – 5.*Strengths and best practices***Human health**

- Malaysia has a strong National IPC Programme in the human health sector with regularly revisions of policies and guidelines.
- All 144 public hospitals adopted the National IPC Policies and Procedures and all 1060 primary health clinics adopted the Infection Control Guidelines for Primary Healthcare Facilities.
- Monitoring of hand hygiene has been effectively evaluated using WHO Hand Hygiene Self-Assessment Framework Survey every two years across 150 hospitals.

Animal health

- It is required that farms comply with good animal husbandry and biosecurity practices to obtain their operating license, do not use antibiotics at subtherapeutic level and comply with the National Animal Vaccination Program.

Areas that need strengthening and challenges

- Providing education on IPC in private health care facilities and small hospitals.

P.3.4 Optimize use of antimicrobial medicines in human and animal health and agriculture. Score – 3.

Strengths and best practices

Human health

- There is an antimicrobial stewardship programme and revised National Antibiotic Guidelines.
- A Point Prevalence Survey on Antibiotic Utilisation in public Hospitals commenced in 2018.
- An antimicrobial stewardship workshop for private hospital pharmacists was conducted in 2018; some private hospitals have antimicrobial stewardship teams.

Animal health

- The National Veterinary Antibiotic Guidelines have been drafted.
- There are initiatives to discontinue use of growth promoters in the animal sectors with plans to phase out five antimicrobials by 2020.

Areas that need strengthening and challenges

- Expanding the Antimicrobial Stewardship Programme to private facilities.
- Strengthening the Antimicrobial Stewardship Programme in the animal health sector by encouraging the continued phasing out of antimicrobials used as growth promoters.

Recommendations for priority actions

- Strengthen the involvement of private health sectors in AMR, especially for AMR surveillance and the appropriate use of antimicrobials in inpatient and outpatient settings.
- Strengthen AMR in the animal health sector, especially for antimicrobial consumption surveillance and continue phasing out of antimicrobials used as growth promoters through appropriate monitoring.
- Enhance multisectoral coordination, especially with the environmental sector for AMR under the One Health approach.

ZOONOTIC DISEASES

INTRODUCTION

Zoonotic diseases are communicable diseases that can spread between animals and humans. These diseases are caused by viruses, bacteria, parasites and fungi carried by animals, insects or inanimate vectors that aid in its transmission. Approximately 75% of recently emerging infectious diseases affecting humans are of animal origin; and approximately 60% of all human pathogens are zoonotic.

Target

Functional multisectoral, multidisciplinary mechanisms, policies, systems and practices are in place to minimize the transmission of zoonotic diseases from animals to human populations.

LEVEL OF CAPABILITIES

The three main government agencies involved in zoonotic disease control are the MOH, Department of Veterinary Services (DVS), and the Department of Wildlife Protection and National Park Peninsular. The states of Sabah and Sarawak have their own state legislation and therefore define their own animal health, veterinary public health, and animal welfare policies and programmes through DVS Sabah and DVS Sarawak. Coordination between the three DVSs is through regular meetings and a reporting system established by the national DVS.

Zoonotic events are managed through the One Health approach, with the Inter-Ministerial Committee and Technical Committee on Control of Zoonotic Disease providing the mechanism of multisectoral collaboration between the three agencies. Similar committees are established at the state level to strengthen the One Health network and to facilitate the response to a zoonotic outbreak. These committees participate in annual simulation exercises for zoonotic diseases as part of influenza pandemic preparedness.

The draft National Strategic Plan for Zoonosis 2019, which is based on MySED II (2017-2021) includes the strengthening of capacities and capabilities for zoonotic diseases prevention and control, as well as partnerships and networking with other governmental agencies, such as the district authorities, the Malaysia One Health University Network and private stakeholders, e.g. the Federation Livestock Farmers' Association Malaysia.

DVS Malaysia requested an OIE PVS Pathway to identify their strengths and gaps in animal health. The OIE PVS Evaluation was conducted in July 2016 and the OIE PVS Gap Analysis was conducted July 2017. The evaluation identified several issues: human resources for veterinary services were constrained; reporting from abattoirs was insufficient; farmers' awareness and motivation to notify disease suspicions due to the absence of a compensation scheme for animals culled for disease control and eradication purposes; and coordination between DVS and the veterinary services of Sabah and Sarawak. During the OIE PVS Gap Analysis mission in 2017, activities to strengthen and human, technical and financial resources had been identified to rectify these gaps and further improve the performance of the veterinary services. Since then, some progress had been made, with an ongoing restructure of the DVS and the approval to recruit additional veterinarians and veterinary paraprofessionals.

Surveillance activities and information sharing between MOH and DVS is conducted for 14 priority diseases – Nipah, highly pathogenic avian influenza, rabies, Japanese encephalitis, brucellosis, tuberculosis, leptospirosis, bovine spongiform encephalopathy/variant Creutzfeldt-Jakob disease, anthrax, salmonellosis (*S. enteritidis*, *S. typhimurium*), Rift Valley fever, Q fever, hantavirus and other zoonotic diseases of human importance (e.g. filariasis and zoonotic malaria). A permanent veterinary officer is located within the MOH in the zoonotic sector. Data and information are shared during meetings of the Technical Committee on Control of Zoonotic Disease every six months. For zoonotic outbreaks reported from outside the country, such as the Nipah outbreaks in Bangladesh and India, risk assessments were conducted, and control measures executed accordingly to prevent the spread into Malaysia.

As well as MySED I and MySED II including zoonotic diseases, MOH and DVS have jointly drafted the National Strategic Plan for Zoonotic Diseases and the Manual on Joint Response to Zoonotic Diseases which provide the multisectoral and multi-stakeholder approach for managing zoonosis events using a coordinated response between the two agencies. Lessons learned from past zoonosis outbreaks (e.g. Nipah, highly pathogenic avian influenza and rabies) and from routine simulation exercises (e.g. for highly pathogenic avian influenza and rabies) have been used to develop these and other contingency plans, manuals and SOPs.

Indicators and scores

P.4.1 Coordinated surveillance systems in place in the animal health and public health sectors for zoonotic diseases/pathogens identified as joint priorities. Score – 4.

Strengths and best practices

- There are formal mechanisms for multisectoral collaboration on zoonotic diseases surveillance and response at the national and state level.
- MySED II includes zoonotic diseases and the draft National Strategic Plan for Zoonosis 2019 has been developed.
- The list of priority zoonotic diseases is regularly reviewed for relevancy with the current 14 diseases included in both human and animal health surveillance systems.
- Information sharing between relevant agencies occurs through Technical Committee meetings, with laboratory results shared in real time during when zoonotic disease is detected.
- DVS is using the OIE PVS Pathway programme to strengthen the performance of veterinary services.

Areas that need strengthening and challenges

- Increasing the frequency of information sharing for priority zoonotic diseases.
- Formalizing the mechanism for sharing isolates and biological materials between human and animal health.
- Continuing to implement the recommendations from the OIE PVS missions.
- Laboratory diagnostic capacity in the Department of Wildlife and National Parks and laboratory facilities for level 4 pathogens.

P.4.2 Mechanisms for responding to infectious and potential zoonotic diseases established and functional. Score – 4.

Strengths and best practices

- The draft Manual on Zoonosis Joint Response uses a multisectoral approach for responding to zoonotic diseases that includes the MOH, DVS and the Department of Wildlife and National Park.
- There are contingency plans for rabies and highly pathogenic avian influenza that have been tested and updated after outbreaks and simulation exercises.
- Zoonotic events are reported through animal and human health surveillance systems in timely manner at state and national levels.

Areas that need strengthening and challenges

- Human resources for veterinary services at the district level.
- Increasing awareness of farmers and the community on zoonotic disease and the requirement to report any diseases in animals to district authorities.

Recommendations for priority actions

- Increase capacity of veterinary services for surveillance as recommended in the OIE PVS Gap Analysis Mission Malaysia report 2017, focusing on human resources at the district level; reporting from abattoirs; and farmer awareness and motivation to notify disease suspicion.
- Develop linkages between disease reporting systems for priority zoonotic diseases among relevant agencies for timely data sharing and response and increase the frequency of sharing formal reports.
- Increase capacities and capabilities of public health and veterinary laboratories in diagnosing zoonotic diseases by exchanging expertise and conducting joint training; develop SOPs for sharing isolates and reference material for diagnosis and surveillance between public health and veterinary laboratories.
- Further strengthen regular public awareness campaigns and health education activities on zoonotic disease prevention, reporting and outbreak control.

BIOSAFETY AND BIOSECURITY

INTRODUCTION

It is vital to work with pathogens in the laboratory to ensure that the global community possesses a robust set of tools – such as drugs, diagnostics and vaccines – to counter the ever-evolving threat of infectious diseases.

Research with infectious agents is critical for the development and availability of public health and medical tools that are needed to detect, diagnose, recognize and respond to outbreaks of infectious diseases of both natural and deliberate origin. At the same time, the expansion of infrastructure and resources dedicated to work with infectious agents have raised concerns regarding the need to ensure proper biosafety and biosecurity to protect researchers and the community. Biosecurity is important in order to secure infectious agents against those who would deliberately misuse them to harm people, animals, plants or the environment.

Target

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.

LEVEL OF CAPABILITIES

The Biosafety Act 2009 describes the framework for the Malaysian system of regulation for living modified organisms and their products and regulates the release, importation, exportation and contained use of living modified organisms, and the release of products of such organisms.

As a signatory to the Biological Weapons Convention and to fulfil commitments under the United Nations Security Council resolution 1540 and the 1925 Geneva Protocol, the National Laboratory Biosafety and Biosecurity Subcommittee has led the drafting of the regulatory framework through the Biological and Toxin Weapons Convention Bill. This bill includes the list of dangerous pathogens and that it is compulsory that pathogen inventories are regularly maintained and updated, with records kept in two formats: hard copy and on the Biological Material Archived System.

Malaysia developed a Code of Conduct for Biosecurity as a reference document for those working in the life sciences and the 2018 National Laboratory Biosecurity Assessment and Monitoring Checklist to encourage biosecurity oversight in relevant institutions.

The 2015 Malaysia Laboratory Biosafety and Biosecurity Policy and Guidelines were developed by the National Laboratory Biosafety and Biosecurity Subcommittee, comprised of multiple stakeholders, such as government agencies, academic institutions, biosafety associations, private industries and international organizations. The document consists of basic concepts and approaches that govern all activities involving the handling, manipulation, using, storing and disposing of infectious and potentially infectious agents, materials and microbial toxins in all laboratories in Malaysia and includes having Institutional Biosafety and Biosecurity Committees at all relevant institutions. The Occupational Safety and Health Act 1994 covers physical, chemical, biological, ergonomic and psychosocial hazards and gives primary responsibility of ensuring workplace health and safety to those who create and work with the risks.

Training for biosafety and biosecurity is embedded at the national, institutional and academic level in Malaysia with 43 people certified as Registered Biosafety Professionals. There are biorisk professionals certified by the International Federation of Biosafety Associations in biorisk management, biosecurity, biological waste management and biosafety cabinet selection, installation and safe use. Training ranges from ad hoc workshops, institutional level training run by the Institutional Biosafety and Biosecurity Committee; the Malaysian Biosafety Officer Training; and Registered Biosafety Professional Training. Advanced biorisk officer training has been conducted by registered national biosafety and biosecurity associations since 2013 with approximately 60 graduates from various agencies, and biosafety and biosecurity modules are incorporated into university and college curriculum. The MOH National Public Health Laboratory also conducts intensive courses on working in biosafety level 3 laboratories.

Indicators and scores

P.6.1 Whole-of-government biosafety and biosecurity system in place for all sectors (including human, animal and agriculture facilities). Score - 3

Strengths and best practices

- The National Biosafety and Biosecurity Subcommittee comprises multiple stakeholders and coordinates through regular meetings.
- Biosafety and biosecurity practices are supported by legislation, regulations, policies and guidelines aligned to international best practices.
- There is a comprehensive biosafety and biosecurity management system at the institutional level including designated personnel for biosafety and biosecurity implementation.
- Maintenance and certification of laboratory equipment and biological containment facilities can be conducted locally.
- The inventory of dangerous pathogens and toxins stored at each facility is monitored and updated routinely.

Areas that need strengthening and challenges

- An oversight mechanism for a centralized inventory of the list of dangerous pathogens and toxins at the institutional level.
- The Biological and Toxin Weapons Convention Draft Bill requires endorsement by Malaysian Parliament.
- Finalizing the laboratory licensing regulation for private health laboratories under Pathology Act 2007.

P.6.2 Biosafety and biosecurity training and practices in all relevant sectors (including human, animal and agriculture). Score - 3

Strengths and best practices

- Training in biosafety and biosecurity is conducted continuously at the institutional and national level.
- There are international collaboration and partnerships with various recognized agencies for biosafety and biosecurity training.
- There are 60 graduates from advanced biorisk officer trainings and biosafety and biosecurity modules are incorporated into the university and college curriculum.

Areas that need strengthening and challenges

- Capacity-building at the state and district level in the implementation of biosafety and biosecurity.
- Financial support to conduct biosafety and biosecurity training.

Recommendations for priority actions

- Finalize and endorse the draft Biological and Toxin Weapons Convention Bill and the laboratory licensing regulation for private health laboratories within the Pathology Act 2007.
- Strengthen training based on a needs assessment and evaluation of the effectiveness of biosafety and biosecurity.
- Increase capacity-building at the state and district level to strengthen the implementation of biosafety and biosecurity.

FOOD SAFETY

INTRODUCTION

Food- and waterborne diarrhoeal diseases are leading causes of illness and death, particularly in less developed countries. The rapid globalization of food production and trade has increased the potential likelihood of international incidents involving contaminated food. The identification of the source of an outbreak and its containment is critical for control. Risk management capacity with regard to control throughout the food chain continuum must be developed. If epidemiological analysis identifies food as the source of an event, based on a risk assessment, suitable risk management options that ensure the prevention of human cases (or further cases) need to be put in place.

Target

A functional system is in place for surveillance and response capacity of States Parties for foodborne disease and food contamination risks or events with effective communication and collaboration among the sectors responsible for food safety.

LEVEL OF CAPABILITIES

The MOH Food Safety and Quality Division is the competent authority for food safety in Malaysia. The Division implements food safety and quality policies, programmes and measures as per the National Food Safety Policy and National Plan of Action 2010-2020 to ensure the food supply is safe and of quality, as mandated by the Food Act 1983 and its regulations, in line with Codex Alimentarius. Several regulations, such as the Food Hygiene Regulation 2009, Food Analyst Act 2011 and Food Analyst Regulations 2013 also contribute to food safety. The government is establishing the Food Safety Authority of Malaysia to be a statutory government agency responsible for food safety.

Food poisoning is one of the 31 notifiable diseases in Malaysia in both the indicator- and event-based surveillance systems. The guidelines for the management of food and waterborne diseases outline the roles of communicable disease and food safety authorities in these investigations and the guidelines on the Investigation on Food Poisoning based on Hazard Analysis Critical Control Point concept provides standard procedures for conducting food sampling.

There is a nationwide food monitoring system managed nationally by the Food Safety and Quality Division but implemented at the district level. Sampling plans and targeted analytes are determined annually based on previous incidents and identified microbiological and chemical risks with testing conducted at 10 food safety and quality laboratories and five public health laboratories. Subsequent follow-up and enforcement activity is undertaken at the district level. There is also a risk-based inspection process for imported food products where 1% of all imported food are analysed and/or undergo compliance testing. Malaysia utilizes private-public partnerships to implement food safety activities, such as training of food handlers by private training institutions recognized by the MOH.

The Food Safety Emergency Response plan has been tested through two simulation exercises and to manage the investigation into maleic acid contamination of tapioca balls. Based on the after-action review and lessons learned, recommendations from these exercises and real events resulted in two updated versions of the plan.

Indicators and scores

P.5.1 Surveillance systems in place for the detection and monitoring of foodborne diseases and food contamination. Score – 4.

Strengths and best practices

- Indicator and event-based surveillance and food monitoring systems are established for the investigation, monitoring and surveillance of foodborne illness outbreaks and food contamination.
- Malaysia uses a risk-based approach to manage and implement food safety measures, supported by appropriate legislation and regulations.
- There are food monitoring programmes at the district level and at points of entry for imported food.
- There is a network of 15 laboratories that conduct testing on clinical and food samples collected during outbreaks and through routine monitoring.

Areas that need strengthening and challenges

- Multisectoral coordination and collaboration, particularly between the MOH and DVS.
- Accreditation of private laboratories to provide more efficient laboratory services.

P.5.2 Mechanisms are established and functioning for the response and management of food safety emergencies. Score – 5.

Strengths and best practices

- The Food Safety Emergency Response plan is frequently tested, evaluated and revised to ensure it is fit for purpose to manage food safety emergencies.
- Risk management activities, including food recalls, is legislated through the Food Act 1983.
- The MOH Food Safety and Quality Division is the contact point for the International Food Safety Authorities Network (INFOSAN) and has relevant SOPs.

Areas that need strengthening and challenges

- Communication and information exchange between relevant stakeholders including government agencies and food businesses.
- Clarification on the criteria to trigger activation of the Food Safety Emergency Response plan.

Recommendations for priority actions

- Strengthen strategies to manage emerging issues that impact food safety, such as online food sales and food fraud.
- Continue to strengthen laboratory capacity to test for priority microbiological, chemical and physical foodborne hazards.
- Implement the updated National Food Safety Emergency Response plan, in consultation with relevant stakeholders and government agencies, including appropriate training and simulation exercises.

IMMUNIZATION

INTRODUCTION

Immunizations are estimated to prevent more than two million deaths a year globally. Immunization is one of the most successful global health interventions and cost-effective ways to save lives and prevent disease. Measles immunization is emphasized because it is widely recognized as a proxy indicator for overall immunization against vaccine preventable diseases. Countries will also identify and target immunization to populations at risk of other epidemic-prone vaccine preventable diseases of national importance (e.g. cholera, Japanese encephalitis, meningococcal disease, typhoid and yellow fever). Diseases that are transferable from cattle to humans, such as anthrax and rabies, are also included.

Target

A national vaccine delivery system – with nationwide reach, effective distributions, access for marginalized populations, adequate cold chain and ongoing quality control – that is able to respond to new disease threats.

LEVEL OF CAPABILITIES

The Malaysian National Immunization Programme (NIP) targets children from birth to 15 years old and covers vaccines to prevent tuberculosis, Hepatitis B, diphtheria, pertussis, poliomyelitis, Haemophilus influenzae type b, tetanus, measles, mumps, rubella, Japanese encephalitis and human papillomavirus. Vaccination services are offered free to all Malaysians at government health facilities and for school-based vaccination, while non-citizens must pay a minimal fee. Private health facilities also offer immunization of NIP vaccines and additional vaccines.

Vaccination for children is voluntary, and upon school entry, vaccination information is supplied electronically to schools to facilitate identification of "missed opportunities" as any children with missed immunizations are referred to health facilities.

Malaysia's NIP goals include maintaining polio-free status, eliminating maternal and neonatal tetanus, measles and rubella, accelerated control of hepatitis B and Japanese encephalitis, meeting regional vaccination coverage targets and introducing new vaccines into the routine immunization schedule.

Vaccine hesitancy and refusal is increasing in Malaysia and data for vaccine refusal is routinely collected from government health facilities. Targeted supplementary immunization activities have been conducted in areas with measles outbreaks to increase vaccination coverage.

Measles vaccination

Under the NIP, two doses of measles vaccine using the measles, mumps and rubella combination vaccine, are administered at 9 and 12 months of age. In Sabah, where the proportion of non-citizens are high (estimated at about one third of the population), an additional dose of measles monovalent vaccine is given at 6 months old. The national coverage rate for measles vaccine at 12 months of age, using administrative data, has increased since 2014 and in 2018 was 96.1% nationally, ranging from 72.0% to 119.8% by state (Figure 1). Coverage data more than 100% is due to internal migration that is not captured in the administrative data used for the population denominator.

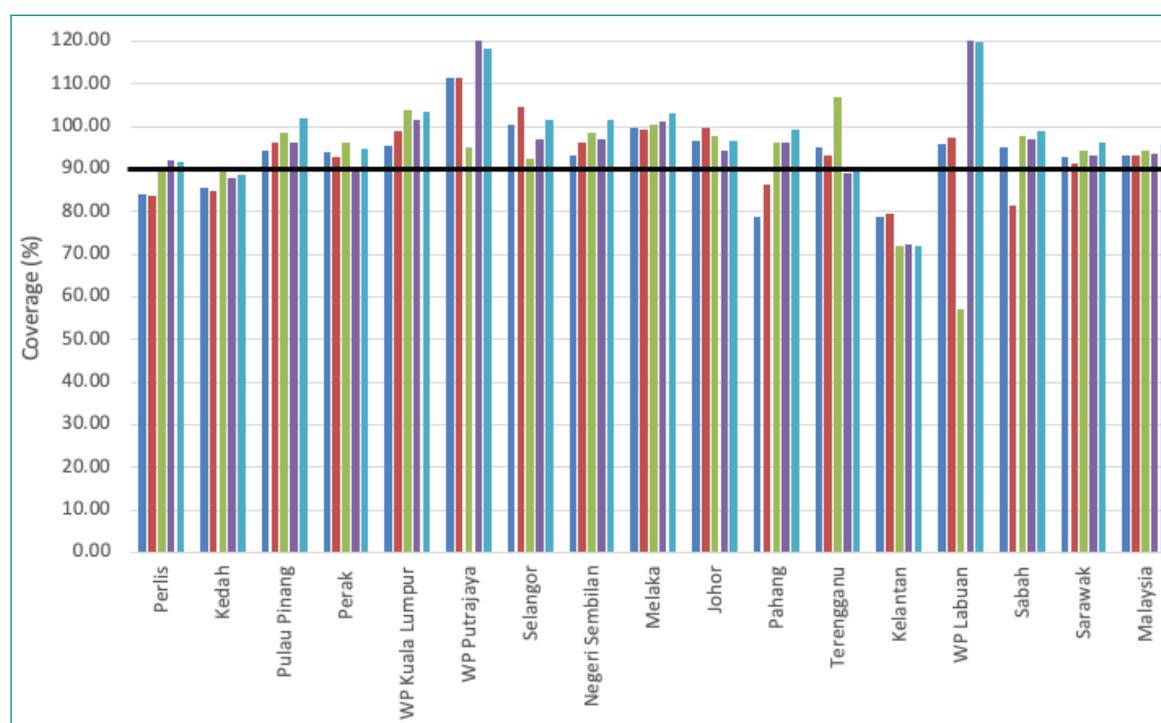
Despite efforts at measles elimination, national measles incidence in Malaysia has increased since 2013 with a rate of 31.4 cases per million year-to-date for 2019, well above the measles elimination annual target of one case per million population (Table 1).

Table 1: Number of measles cases and deaths and rate per million population, Malaysia, 2013-2019*

Year	Number of measles cases	Rate per 1 million population	Number of measles deaths
2013	195	6.6	0
2014	235	7.8	1
2015	1316	43.2	2
2016	1587	51.4	1
2017	1693	52.3	2
2018	1958	59.5	6
2019	687*	31.4	6

* Up to 1st August 2019

Figure 1: Measles first dose coverage using administrative data by state, Malaysia 2014 – 2016



Source of data: Health Informatics Centre, MOH. 2014 – 2016

National vaccine access and delivery

Vaccines and injection supplies are included in the MOH operational budget. Vaccines are procured through government central tender contracts and delivered to all government health facilities throughout the country. This management mechanism ensures timely vaccine delivery, good cold chain maintenance and efficient vaccine supply with minimal disruptions. MOH Malaysia rarely experiences a stock out of vaccine supply.

The supplier must ensure that the cold chain is maintained along the supply chain. The SOPs require thermal indicators and that health staff inspect the condition of vaccines received at the health centre. Supervision occurs at regular intervals in all vaccination centres to ensure that the cold chain is maintained. Private health facilities are regulated by the MOH to ensure adequate cold chain infrastructures before vaccination services can be offered.

The National Pharmaceutical Regulatory Agency manages adverse event following immunization (AEFI) surveillance and AEFI causality assessment conducted by the Malaysian Adverse Drug Reaction Advisory Committee.

Indicators and scores

P.7.1 Vaccine coverage (measles) as part of national programme. Score – 4.

Strengths and best practices

- The NIP offers free immunizations at government health facilities and schools and conducts active outreach vaccination activities.
- Private hospitals and clinics also provide immunization service delivery with approximately 7% of children vaccinated privately.
- There is strong coordination and collaboration among the multiple stakeholders (e.g. multiple ministries and divisions, private sectors and nongovernmental organizations) involved in the NIP.
- Active follow-up of parents and patients who refuse vaccination to assess the reasons for vaccine hesitancy is routinely conducted.

Areas that need strengthening and challenges

- Supplementary immunization activities to target subnational areas with lower than 95% measles vaccination coverage, high measles incidence and high-risk populations.
- Inadequate uptake of vaccination among non-citizens that rely on outreach vaccination services and supplementary immunization activities.
- Documentation on the location and size of the non-citizen population, especially the stateless population, for vaccination programme planning.
- Coverage data through comprehensive vaccination coverage reporting from private health facilities and accurate state population denominators.
- Retention of vaccination records by parents.

P.7.2 National vaccine access and delivery. Score – 5*

* Although the overall vaccine delivery system in Malaysia has sustainable capacity, systems to reach marginalized populations using culturally appropriate practices are required, particularly in areas where recent outbreaks and unimmunized children have been identified.

Strengths and best practices

- Extensive vaccination services including mobile and outreach services and school-based vaccination ensures vaccination is accessible to the target population.
- Central procurement contracts that require buffer stocks ensure that vaccines are delivered to health facilities in a timely manner with minimal disruption of vaccine supply. MOH Malaysia rarely experiences stock outs of vaccine supply.
- Efficient vaccine distribution to the service delivery point by contract company and efficient cold chain maintenance.
- There is a continuous operational budget for vaccines and service delivery, as well as a contingency fund for vaccines used during emergencies.
- AEFI surveillance and AEFI causality assessments are conducted.

Areas that need strengthening and challenges

- Private health facilities have had shortages of pentavalent vaccine supply.
- Collaboration with nongovernmental organizations and other relevant stakeholders to improve vaccine access through new mechanisms aimed at hard to reach populations, including the semi nomadic indigenous population and non-citizens.
- Uninterrupted vaccine supply in the private sector in the event of global vaccine shortage.
- Vaccine potency testing capacity within the NIP.

Recommendations for priority actions

- Continue to implement specific vaccination strategies to improve vaccination coverage among semi nomadic indigenous population.
- Improve vaccination access for non-citizens in collaboration with nongovernmental organizations.
- Work to achieve and document measles elimination in alignment with the regional goal.
- Strengthen reporting of vaccination coverage data by developing a National Immunization Registry and improving vaccination card retention.
- Strengthen public-private collaboration on vaccination service delivery, risk communication and vaccine hesitancy.

DETECT

NATIONAL LABORATORY SYSTEM

INTRODUCTION

Public health laboratories provide essential services including disease and outbreak detection, emergency response, environmental monitoring and disease surveillance. State and local public health laboratories can serve as a focal point for a national system, through their core functions for human, veterinary and food safety including disease prevention, control and surveillance; integrated data management; reference and specialized testing; laboratory oversight; emergency response; public health research; training and education; and partnerships and communication.

Target

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.

LEVEL OF CAPABILITIES

The Malaysian laboratory network comprises both government and private laboratories, with most government laboratories under the MOH or DVS.

In MOH, there are 139 public hospital laboratories and 768 public health clinic laboratories. Public health laboratories are involved in surveillance, outbreak investigations, enforcement (food and tobacco), and quality assurance for tuberculosis and malaria. The National Public Health Laboratory, under the MOH Disease Control Division, provides support services for epidemiological investigations across five locations through a national laboratory and four regional laboratories.

The National Public Health Laboratory and all state hospital laboratories (with the exception Perlis Hospital Laboratory because of logistics reasons) conducts testing for nine of the 10 priority diseases including polymerase chain reaction (PCR) for influenza virus and MERS-CoV; serology for human immunodeficiency virus (HIV), dengue and *Leptospira* species; microscopy for tuberculosis and *Plasmodium* species; and bacterial culture for *Corynebacterium Diphtheria* and *Salmonella enteritidis* serotype Typhi. The Institute for Medical Research conducts virus culture and PCR for polio.

In DVS there are the National Veterinary Research laboratory, regional veterinary laboratories, veterinary public health laboratories and mini laboratories throughout Peninsular Malaysia. The National Veterinary Research laboratory acts as the national veterinary reference laboratory and offers diagnostic tests for the following priority zoonotic diseases: PCR with serotyping for avian influenza; complement fixation tests for brucellosis; PCR and the microscopic agglutination test for leptospirosis; serology for Q fever; PCR and serology for Nipah virus; bacterial culture for *Bacillus anthracis*; western blot for bovine spongiform encephalopathy and all diagnostic test for rabies.

The regional veterinary laboratories conduct PCR test for avian influenza, leptospirosis, tuberculosis and other serology tests for detection of animal diseases for their regions. All positive tests are referred to the National Veterinary Research Laboratory for confirmation and, if required, for serotyping. The Veterinary Public Health Laboratory tests meat, milk, animal-based food products, and animal feed for safety and quality.

Other relevant laboratories include the State Food Laboratory, Reference Food Laboratory, State Chemistry Laboratory, Reference Chemistry Laboratory, Royal Military Laboratory and University Laboratories. Environmental samples are analysed in the Public Health Laboratories and Chemistry Laboratories.

Transport of outbreak, surveillance and disaster samples for both MOH and DVS laboratories are through postal, courier and departmental transport, according to Biological Agents and Toxins (Transportation) Regulations of the International Air Transport Association. Other sample transport follows the MOH SOPs for Transport of Biological Specimens or the DVS Field Guide to Submission of Specimen. There are 63 trained personnel and 10 'train the trainers' for International Air Transport Association shipping in Malaysia.

All laboratories have the required equipment and maintenance contracts. Preventive maintenance is conducted regularly by concession companies if available or manufacturers. The Medical Device Act ensures the quality of devices used including in vitro diagnostic devices and their accessories for human diagnostics.

There is no licensing required for laboratories and laboratory accreditation is voluntary. However, there are 55 laboratories accredited for medical testing: 14 government laboratories, 34 private laboratories and seven public institutes. Malaysia has its own accreditation body, Standards Malaysia, who accredit to international standards of the International Organization for Standardization (ISO 15189 or ISO 17025). Some laboratories apply to other accreditation schemes administered by the College of American Pathologists, Joint Commission International or Malaysian Society for Quality in Health. External quality assessment (EQA) schemes are a requirement for all laboratories. All government hospital laboratories and reference laboratories participate in international EQA schemes, inter-laboratory comparisons (proficiency testing) and some reference laboratories provide EQA schemes, e.g. Institute for Medical Research, National Public Health Laboratory, National Blood Centre, National Veterinary Research laboratory and Veterinary Regional Laboratories.

Indicators and scores

D.1.1 Laboratory testing for detection of priority diseases. Score – 5.

Strengths and best practices

- The national laboratory system can conduct core tests for all 10 priority diseases as well as more specialized tests.
- There is susceptibility testing and quality assurance programmes in most hospital laboratories.
- Laboratories within the network have the required equipment, preventive maintenance schedules and perform a wide range of tests.
- National Public Health and Reference Laboratories can perform tests for emerging infectious diseases with well-equipped laboratories that include biosafety level 3 facilities.

Areas that need strengthening and challenges

- Ongoing budget allocations for laboratory equipment, reagents, training and human resources.
- Providing continuous training for certain specialized tests to achieve the appropriate level of competency.
- Supplying reference and hospitals laboratories with high-technology equipment.
- Reporting laboratory testing data electronically to the surveillance system.

D.1.2 Specimen referral and transport system. Score – 4.**Strengths and best practices**

- Guidelines for specimen collection and transportation from the field to national or regional laboratories are available and easily accessible for both MOH and DVS.
- Specimen transport is standardized and organized via hospital transport, national postal service and courier to the reference or national laboratory with appropriate triple packaging and labelling.
- Funding for transportation is through the existing government budget and contracts for private laboratories.

Areas that need strengthening and challenges

- Ensuring that daily mail services with proper packaging and good temperature monitoring through the national postal services are sustained.

D.1.3 Effective national diagnostic network. Score – 4.**Strengths and best practices**

- Advanced molecular and serological testing for referred samples and for diagnostic confirmation are available and standardized at the national and reference laboratories.
- Laboratory data is shared between MOH and veterinary laboratories at technical meetings at the national level and state level every three months and in real time during outbreaks.
- There are eight point of care tests used in Malaysia with supervision at health clinics led by a clinical microbiologist and results reported to the State Health Department.

Areas that need strengthening and challenges

- Developing an active mechanism for sharing specimens and reference material between the human and animal sectors.
- Expansion of point of care diagnostic testing, such as measles and HIV viral loads.
- Continuous development of new advanced technologies to provide faster results for detecting dangerous pathogens and potential emerging or re-emerging pathogens.

D.1.4 Laboratory quality system. Score – 3.**Strengths and best practices**

- The comprehensive laboratory accreditation and quality management system, including EQA schemes, throughout the hospital, government and private laboratories.
- The Inspection Bodies Accreditation Schemes, coordinated by the Department of Standards, is a competent authority for laboratory accreditation in Malaysia.

Areas that need strengthening and challenges

- Maximizing the national EQA programmes in veterinary services.
- Introducing mandatory licensing of private health laboratories to ensure all laboratories function legally and can provide quality results.
- Increasing the number of laboratories that subscribe to EQA programmes.

Recommendations for priority actions

- Strengthen collaboration between the human and animal laboratories and public and private laboratories through multisectoral laboratory networks.
- Expand laboratory capacity for advanced analytical and diagnostic technologies, e.g. point of care tests and molecular methods, through a systematic training approach.
- Establish regulation for laboratory licensing and compliance in quality standards for the national and international laboratory system.
- Strengthen national policy and guidelines to transfer specimens in a safe and secure manner.

SURVEILLANCE

INTRODUCTION

The purpose of real-time surveillance is to advance the safety, security and resilience of the nation by leading an integrated surveillance effort that facilitates early warning and situational awareness of all IHR hazard-related events.

Target

- 1) *Strengthened foundational indicator- and event-based surveillance 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 include epidemiologic, 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.*

LEVEL OF CAPABILITIES

Malaysia has an established a list of notifiable priority diseases for both human and animal health. For human health, the list is governed by the Prevention and Control of Infectious Diseases Act 1988 (Act 342) and comprises 31 notifiable infectious diseases. Under a directive from the Director-General of Health, other infectious diseases of public health importance can be added to the Case Definition on Infectious Diseases in Malaysia and they become mandatory for reporting. National syndromic surveillance is also conducted on eight priority syndromes.

For animal health surveillance, there are 125 mandatory notifiable animal diseases in the Animal Act 1953 (Act 647) in accordance to Animal Health Code diseases listed by the OIE. Of these, 14 are reported on a biannual basis to MOH at interagency meetings and 17 have been identified as a priority for ad hoc notification to MOH if there are unusual events.

At the national level, the MOH Disease Control Division is responsible for legislation, policy, norms and standards for human health surveillance, analysis, and reporting. At the state level, the State Health Departments are responsible to collate, analyse and interpret surveillance data and public health events reported within their state. At the district level, the District Health Officers, DVS staff and Point of Entry Health Offices are responsible for conducting data entry, analysis and interpretation, field investigations, initiating control measures and other actions as needed within their district.

Within MOH there are multiple surveillance systems. The eNotifikasi system is an electronic web-based system in which notifications of communicable diseases can be entered at clinic or district level, verified and then reported through the system to state and national levels. Program staff at district, state and national levels have restricted access to this system based on their level and location. There are separate systems for selected priority diseases – e-Dengue for dengue, SM2 for measles, MyTB for tuberculosis, MyKusta for leprosy and the National AIDS Registry for HIV/AIDS – that are linked to eNotifikasi. Preliminary data entry from eNotifikasi are transferred to these systems for further management.

The iDengue data is publicly available on a dedicated website that is updated daily with the number of cases by district and the number, duration, cumulative case numbers and maps of outbreaks by district. This interactive online reporting to the public is best practice and serves as a model for other priority diseases.

The eWabak system is an electronic reporting system for event-based surveillance that captures and reports verified outbreaks and public health emergencies that relate to human health, animal health and hazards originating from non-human sources, such as environmental, chemical, food and water safety. eWabak provides rapid information sharing of potential public health events with reports of a suspected event made by the District Health Office being preliminarily reported to the State Health Department within one hour, with verification and a risk assessment conducted and endorsed at the state level. The national CPRC closely monitors all reports received nationwide via the system and are made aware when an event is reported but not yet verified. Reporting of events of concern can occur 24 hours a day, seven days a week.

Syndromic surveillance is conducted for eight priority syndromes and it is mandatory for all clinical staff to notify these syndromes to the District Health Office. After further clinical investigation and laboratory testing, diseases that are laboratory confirmed are then entered into the eNotifikasi system.

Each notification entered into eNotifikasi, eWabak and the syndromic surveillance system prompts a field investigation conducted by a team from the District Health Offices. At a minimum this will involve obtaining the laboratory result for each case. Laboratory results are then manually entered into the relevant system.

The Rumour surveillance system involves the monitoring of multiple sources of information that are received through various communication channels, such as the eWabak system, phone calls, text messages and emails. Information received is assessed and reported daily at the national level. Rumour surveillance occurs across all sectors and the Disease Control Division shares the information with their counterpart in other sectors.

The laboratory-based surveillance system has two components. The Public Health Laboratory Information System at the National Public Health Laboratory records, manages and stores information of specimens sent for testing at the public health laboratories using a system called SIMKA. This system comprises tests for tuberculosis, measles, dengue, enteroviruses, respiratory viruses and commonly encountered viruses and bacteria. Clinicians and MOH staff can access the system to retrieve test results. MOH staff also access this system to verify cases notified to eNotifikasi based on clinical suspicion. However, data from these systems do not feed automatically into the MOH electronic notification systems. The eLBIS system comprises surveillance of four priority pathogens – *Salmonella* spp. including typhi and paratyphi, *Vibrio cholerae*, *Haemophilus influenzae* type B and *Neisseria meningitidis* – and includes testing conducted at reference laboratories for further typing, with weekly reports produced. Investigations are initiated if there is suspicion of a potential outbreak.

Surveillance and response activities for public health events are regularly evaluated at the national level through Epidemiology Technical Meetings and Inter-Ministerial Technical Meetings, both of which are held at least twice annually at the state level during Monthly Epidemiology Review Meetings and at the district level at weekly Epidemiology Review Meetings.

The Animal Disease Information Centre is responsible for collecting and collating animal disease information for Peninsular Malaysia (e.g. all states except for Sabah and Sarawak) through the web-based laboratory system eMakvet. Notifications are entered manually into a spreadsheet for analysis. A more advanced system is being developed to further enable users from various levels of the organization access the data to inform effective veterinary practice and management. In Sabah, a system called DAVETSA is used, while Sarawak uses a system similar to the one used on the peninsula. Data collected on 14 priority zoonotic diseases is shared between DVS-MOH staff in biannual meetings.

Indicators and scores

D.2.1 Surveillance systems. Score – 4.

Strengths and best practices

- Malaysia has established the required systems for public health surveillance that are capable of promptly detecting diseases, syndromes or events within the human and animal health sectors.
- The indicator-based, event-based, syndromic and laboratory-based surveillance systems are accessible across all districts, states and at the national level.
- Animal health surveillance data is shared with the MOH biannually.
- The surveillance systems are governed by domestic legal frameworks – the Prevention and Control of Infectious Diseases Act 1988 (Act 342) for human health and the Animal Act 1953 (Act 647) for animal health.
- There is an internal validation process within the reporting systems to ensure the completeness and timeliness of reporting from at least 80% of all reporting units are achieved.

Areas that need strengthening and challenges

- Updating SOPs and manuals for human and animal disease surveillance systems to reflect current systems and processes.
- Conducting evaluations of the surveillance system at the national level, as most evaluations have been limited to MOH systems at state level.
- Increasing the regularity of data sharing between MOH, DVS and laboratories for improved national level coordination, including the reporting of specific laboratory test results directly to MOH.
- Developing data dictionaries for each surveillance system to ensure consistency of data collection.
- Deploying the planned animal health surveillance system.

D.2.2 Use of electronic tools. Score – 3.

Strengths and best practices

- eNotifikasi and eWabak are available at all levels of government with additional electronic systems for priority diseases that automatically receive notifications from eNotifikasi.
- At the national level, the DVS is developing the Malaysia Animal Disease Information Centre for animal health surveillance data.
- Electronic tools are used for laboratory test results for both human and animal health.

Areas that need strengthening and challenges

- Developing linkages between the indicator-based and event-based surveillance systems within MOH (eNotifikasi and eWabak).
- Reporting laboratory results electronically to MOH systems directly, rather than having the laboratory system accessible to MOH staff.
- Further developing electronic tools in the animal health sector and integrating all systems in the Malaysia Animal Disease Information Centre.

D.2.3 Analysis of surveillance data. Score – 5*.

* Although the analysis of surveillance data has sustainable capacity, the reporting and dissemination of priority diseases is required publicly on a more than weekly basis for more than one disease.

Strengths and best practices

- The reporting of dengue in Malaysia through the iDengue website is a best practice model of publicly accessible daily reporting.
- There is a dedicated team at the national level for the analysis and reporting of surveillance data in human and animal health and within the National Public Health Laboratory system.
- Weekly epidemiological bulletins are disseminated from District Health Offices to clinical staff in public and private settings.
- There are regular multisectoral meetings to share information and surveillance data, particularly between MOH, DVS and the laboratories.
- There are regular meetings and informal information sharing between the states where international land borders are shared and their international counterparts.

Areas that need strengthening and challenges

- Expansion of current reporting and dissemination of epidemiological reports of priority diseases to increase the number of diseases that are reported more frequently than weekly.
- Public accessibility of regular reporting of all priority diseases.
- Increasing the regularity of information sharing between MOH, DVS and the laboratories.

Recommendations for priority actions

- Conduct national level evaluations of surveillance systems for identified priority human and animal notifiable diseases using international guidelines.
- Automate data sharing between the indicator-based (eNotifikasi) and event-based (eWabak) systems and consider automated notification of laboratory results.
- Develop capacity within the electronic notification systems of MOH to enable data analysis and automated reporting.
- Provide regular and frequent reporting for priority diseases and make them publicly available.

REPORTING

INTRODUCTION

Health threats at the human–animal–ecosystem interface have increased over the past decades, as pathogens continue to evolve and adapt to new hosts and environments, imposing a burden on human and animal health systems. Collaborative multidisciplinary reporting on the health of humans, animals and ecosystems reduces the risk of diseases at the interfaces between them.

Target

Timely and accurate disease reporting according to WHO requirements and consistent coordination with FAO and OIE

LEVEL OF CAPABILITIES

In Malaysia, the national level contact points and support teams responsible for reporting to WHO, OIE and FAO are clearly defined and supported by legislation through the Prevention and Control of Diseases Act 1988 and the Animals Act 1953. The NFP delegate is the Deputy Director-General of Health (public health) in the MOH, the designated OIE delegate is the Director-General of DVS and the designated FAO contact is the Senior Director of the MOH Food Safety and Quality Division.

The three contact points have SOPs or guidelines that outlines the roles and responsibilities for notification and communication of potential public health events and have a roster of duty officers available 24 hours a day, seven days a week. Duty Officers attend regular training and exercises to support their understanding of their responsibilities under the IHR (2005) and after-action reviews are conducted after real events and exercises to identify any gaps in the system. All three contact points have reported events within 24 hours, for example, the reporting of highly pathogenic avian influenza to the OIE in 2018, a case of MERS-CoV to WHO in 2018 and melamine contamination of infant formula to INFOSAN in 2008.

This reporting to WHO, OIE and FAO is supported by well-developed surveillance systems for human and animal diseases in Malaysia, including event-based and Rumour surveillance. There is daily Rumour surveillance reporting of information from a variety of sources, such as media, social media, phone calls and emails, both within and outside the health care system, and at the community level. Verified events that relate to human health, animal health and hazards originating from non-human sources, such as environmental, chemical, food and water safety are notified through the eWabak system. Risk assessments of these events are conducted at all levels of government and across agencies, although this has not been formalized within DVS. Protocols for communication and collaboration between human and animal health outlined in the draft Manual on Joint Response for Zoonoses in Malaysia and have been demonstrated in recent real events, such as investigations of highly pathogenic avian influenza in 2018, and in simulation exercises, such as for rabies in 2019.

Indicators and scores

D.3.1 – System for efficient reporting to FAO, OIE and WHO. Score – 4.

Strengths and best practices

- Clearly defined contact points for reporting to WHO, OIE, FAO and INFOSAN that have all reported real events within 24 hours.
- SOPs and trained staff who are available 24/7 to receive notifications and report.
- Regular formal and informal staff training across agencies through international meetings, workshops and simulation exercises.
- Informal communication through the NFP with WHO and neighbouring countries.

Areas that need strengthening and challenges

- Strengthening the capacity for risk assessment at national, state and district levels and ensuring that risk assessment tools are available at national levels across all agencies.
- Formalizing the processes for multisectoral risk assessment of events before reporting to WHO, FAO and OIE.

D.3.2 – Reporting network and protocols in country. Score – 4.

Strengths and best practices

- Event-based and Rumour surveillance systems for human health, animal health and hazards originating from non-human sources, with wide-ranging sources of information and a system accessible to staff at all levels of government 24/7.
- Daily reporting by the national MOH staff of information from multiple sources on events from across the country is disseminated to relevant staff at national, state and district levels.

Areas that need strengthening and challenges

- Reporting of potential events at the community level to build awareness, engage the community in the process and improve access to reporting mechanisms.
- National level compilation of data on the timeliness of reporting at each level of the system.

Recommendations for priority actions

- Strengthen the mechanisms for reporting potential public health events to the event-based surveillance system in human and animal health.
- Ensure risk assessment tools are available at the national level in all sectors and strengthen the capacity for multisectoral risk assessment at national and state levels.

HUMAN RESOURCES

INTRODUCTION

Human resources are important in order to develop a sustainable public health system over time by developing and maintaining a highly qualified public health workforce with appropriate technical training, scientific skills and subject matter expertise. Human resources include nurses and midwives, physicians, public health and environmental specialists, social scientists, communication, occupational health, laboratory scientists/technicians, biostatisticians, information technology specialists and biomedical technicians and a corresponding workforce in the animal sector: veterinarians, animal health professionals, para-veterinarians, epidemiologists, information technology specialists, etc.

The recommended density of doctors, nurses and midwives per 1000 populations for operational routine services is 4.45 plus 30% surge capacity. The optimal target for surveillance is one trained (field) epidemiologist (or equivalent) per 200 000 populations who can systematically cooperate to meet relevant IHR and PVS core competencies. One trained epidemiologist is needed per rapid response team.

Target

States Parties with skilled and competent health personnel for sustainable and functional public health surveillance and response at all levels of the health system and the effective implementation of the IHR.

LEVEL OF CAPABILITIES

Malaysia's human resource for health policies, strategies and plan are a component of the five-yearly national process for developmental policies coordinated by the Economic Planning Unit in the Prime Minister's Department and involve a wide range of stakeholders. The 11th Malaysia Plan 2016-2020 defined several strategies to improve the quality of health services and to provide universal access to health care. This included the development of human capital for health to ensure a sufficient supply of competent and skilled health care personnel and improved management of such personnel for optimum benefit of the population. The Human Resource for Health Master Plan 2016-2030 aims to increase the capacity of medical specialist training and to strengthen systems for human resource management.

The Ministry of Finance provides financial support and approval for human resources in the government sector. The Malaysia Public Service Commission is responsible for recruiting staff and the Malaysia Public Service Department governs the human resources rules, needs, pay, allowances and pension scheme. Human resource capacity, including vacancies, are updated and monitored through the Human Resources Management Information System.

In Malaysia, the MOH is the major provider in population health care. The distribution of doctors and health care professionals are mostly at the government health facilities with a small proportion of health care professionals serving in the private sector. The population ratio is 1:302 for nurses, 1:554 for doctors and 1:2773 for pharmacists. Human resource for health wages constitute about half of the MOH operating budget, with the wage structure based on educational qualifications. The attrition rate for human resource for health in the MOH is low and motivation rates are satisfactory.

The MOH has continuous professional development guidelines for all health professionals to improve knowledge, skills and competencies and to further support career development. These guidelines require annual practicing certificates, specialty registry renewal, a Seven Days-Training Policy and a performance logbook for support staff. The MOH supports long-term and short-term in-service training

for staff including diplomas, bachelor's degrees, master's degrees, PhDs and fellowships. Malaysia MOH participates in training networks, fellowships and attachments at WHO, ASEAN, Japan International Cooperation Agency, United States Agency for International Development, and various universities. MOH staff develop annual training plans based on their training needs.

MOH, DVS and other government agencies manage the deployment and distribution of staff, as well as application of additional post and additional human resources benefits. During a disaster or outbreak response, the national CPRC and state emergency operations centre members coordinate the surge capacity required, including human resource deployment and relocation, from staff at all levels of government. The MOH has a mechanism to provide human resource support to international emergency missions, as done for the Aceh tsunami, Indonesia earthquake, the African Ebola response and for secondments to WHO.

The Malaysian FETP is funded by MOH and includes basic (Advanced Diploma Training in Field Epidemiology), intermediate (Epidemic Intelligence Program) and advanced (Sub-specialist Training in Communicable Diseases) field epidemiology training. There are 39 graduates of the Epidemic Intelligence Program and nine current students, seven graduates of the advanced level and the basic level recently started with 24 students. One veterinarian has been trained in the FETP for veterinarians in Thailand. In addition, public health physician training programme comprises a one-year component in field epidemiology and each district has at least one physician who has completed this programme.

Indicators and scores

D.4.1 An up-to-date multisectoral workforce strategy is in place. Score – 5.

Strengths and best practices

- The multisectoral strategy for human resources for health is included in the 11th Malaysia Plan 2016-2020 and promotes accelerating human capital development for an advanced nation in its workforce strategy.
- The Disease Control Division has developed an emerging infectious disease workplan and conducts annual reviews to track progress in all areas, including workforce development.
- The MOH is drafting the Master Plan: Human Resource for Health to articulate the strategic plan for human resources.

Areas that need strengthening and challenges

- Further engagement with the private sector through public-private-partnership.
- Mapping the existing and future health workforce development plans from all sectors to develop an integrated multisectoral public health workforce plan.

D.4.2 Human resources are available to effectively implement IHR. Score – 4.

Strengths and best practices

- In the public sector, staff are centrally recruited and governed by a term of service. The deployment and distribution of health-related staff are managed by MOH.
- The public health workforce is financed from the government budget and there are incentives for all public health staff to attract and retain the workforce.
- The current human resource capacity is monitored through the Human Resource Management Information System.
- When disasters or outbreaks occur, committee members in various agencies at all levels are alerted regarding surge capacity requirements and experts from all over the country can be deployed to the affected area.

Areas that need strengthening and challenges

- The capacity of the health system to employ all new graduates due to the increased number of higher learning institutions.
- Continuing to contribute to the global health emergency workforce (e.g. sending and receiving personnel internationally, staff secondment and other regional and international collaboration in workforce development).
- Shortages in animal health staff at all three levels of government.

D.4.3. In-service trainings are available. Score – 5.**Strengths and best practices**

- Continuous in-service training for doctors and all health professionals already exist at the national, state and district levels.
- Doctors and paramedics are required to gain continuous professional development points annually to renew their licenses to practice.
- The government has a policy of providing seven days a year continuous professional educational development for all health care staff.

Areas that need strengthening and challenges

- Continuous updating the human health and animal health workforce with current knowledge in topics that support IHR capacities.

D.4.4 FETP or other applied epidemiology training programme in place. Score – 4.**Strengths and best practices**

- Malaysia has 39 graduates from the intermediate Epidemic Intelligence Program and seven graduates from the advanced sub-speciality training in communicable diseases.
- FETP graduates are working across national, state and district levels.
- Malaysia has commenced the first cohort of their basic FETP program in September 2019 with 24 students.

Areas that need strengthening and challenges

- Having multisectoral trainees in the FETP, such as animal health workers or laboratorians.

Recommendations for priority actions

- Increase staffing and competencies in the animal health sector and explore potential mechanisms for recruiting temporary and contract professionals in all areas.
- Continue to provide in-service training to enhance the skills and competencies of health professionals to function and respond at all levels of the health system.
- Expand and diversify the FETP by increasing the number of trainees and graduates at all levels and including veterinarians and laboratorians.
- Continue to contribute to the global health emergency workforce, with the objective of gaining global public health experience and establishing global networking.

RESPOND

EMERGENCY PREPAREDNESS

INTRODUCTION

Emergency preparedness is defined in A Strategic Framework for Emergency Preparedness as “the knowledge and capacities and organizational systems developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent, emerging or current emergencies”. A state of preparedness is the combination of planning, allocation of resources, training, exercising, and organizing to build, sustain, and improve operational capabilities at national, intermediate and local or primary response level based on strategic risk assessments. A strategic risk assessment identifies, analyses and evaluates the range of risks in a country and enables risks to be assigned a level of priority. Strategic risk assessments include analyses of potential hazards, exposures and vulnerabilities, identification and mapping of available resources, and analyses of capacities (routine and surge) at the national, intermediate and local or primary levels to manage the risks of outbreaks and other emergencies. Emergency preparedness applies to any hazard that may cause an emergency, including relevant biological, chemical, radiological and nuclear hazards, natural hazards, other technological hazards and societal hazards.

Target

- 1) *Existence of national strategic multi-hazard emergency risk assessments, risk profiles, and resource mapping;*
- 2) *Existence of multi-hazard emergency response plans; and*
- 3) *Evidence, from after-action and other reviews, of effective and efficient multisectoral emergency response operations for outbreaks and other public health emergencies.*

LEVEL OF CAPABILITIES

Emergency management in Malaysia is under the purview of NADMA in the Prime Minister’s Department. Multisectoral disaster management processes are described in the National Security Council Directives for the three levels of national, state and district. Directive 20 is the main guidance and encompasses emergency management processes for all response agencies. The national CPRC is the Public Health Emergency Operation Centre for the MOH, is located within the Disease Control Center, and is the lead agency for disasters involving health. The SOP for CPRC guides MOH staff in the management of all potential crises and disasters.

Malaysia has a robust early warning system for floods, meteorological, haze, landslide, radiological and nuclear monitoring. CPRC uses a smart electronic disease notification system (MyCPRC) for all 31 notifiable disease in Malaysia prompting early public health intervention and control measures. Risk assessments, health facilities and other risk information from the early warning system is overlaid across the system at the district level and can therefore operate as a platform for anticipating any emergencies and for resource management.

The MOH multi-hazard plan for coordinating emergency preparedness is the National Disaster Management Plan 2015 which includes strategic risk assessment planning, resource mapping, response plan, CPRC Plan, business continuity plan, exercises and training. The incident management system is used for emergency management with the Director-General of Health or the Deputy Director-General of Health (public health), the incident controller who chairs the activation at the national level and provides a high level of strategic and policy guidance. Subject matter experts provide inputs when considering activation. The CPRC operates under the CPRC SOP 2016 and also has draft guidelines for the management of chemical, biological, radiological, nuclear and explosives (CBRNe) and human resource mobilization.

MOH has several specific guidelines for managing disasters, such as the National Influenza Pandemic Preparation Plan 2006, the National Flood Management Plan 2015 and a business continuity plan. Deployment of resources occur according to the MOH Deployment and Stockpile Guidelines and MOH manages the stockpiles for pharmaceuticals, antivirals, vaccines and consumables including personal protective equipment (PPE). All guidelines are tested at national, state and district levels according to an exercise schedule. There are continuous improvements in the SOP, guidelines, surveillance and responses at all levels through the conduct of multisectoral after-action reviews. Malaysia is the lead country for ASEAN Emergency Operations Centre Network for regional preparedness and response partners.

NADMA has conducted a national level risk assessment, categorizing disasters into low, medium and high risk. Resources, including financial resources, are managed based on this assessment and assumed occurrence. At the national level, a country risk profile of natural disasters, technological disasters, outbreaks, crisis and emergencies has been drafted. Strategic emergency risk assessments are also conducted by many agencies in their areas of expertise including the Meteorological Department, Atomic and Energy Licensing Board, Fire and Rescue Department, Department of Survey and Mapping Malaysia, Department of Irrigation and Drainage and the Royal Malaysian Police. These emergency risk assessments are mapped, classified and used by the respective agencies.

MOH conducts risk assessments at the national level that comprise resource identification and mapping, including pharmaceutical and resource stockpiles. The MOH has drafted the Risk Profile of Malaysia and risk assessments have been conducted for Ebola, MERS-CoV, Zika and avian influenza.

Indicators and scores

R.1.1 Strategic emergency risk assessments conducted and emergency resources identified and mapped. Score – 5.

Strengths and best practices

- The CPRC risk assessment tools, especially the MyCPRC system which links disease notification data with risk information, has the capacity to monitor priority and emerging risks.
- There is a pool of nationally and internationally recognized subject matter experts utilized for risk assessments.
- Well-equipped emergency resources comprising human resources, transportation, heavy machinery and specialized laboratories are located across the country.
- Information sharing using information technology, mobile phone applications and smart electronic systems is routine and ongoing.
- There is good coordination with other agencies that also conduct strategic emergency risk assessments relevant to their expertise.

Areas that need strengthening and challenges

- Supporting NADMA to continuously update the country-specific risk profile.
- Continuing to facilitate the review and update cycle for plans and SOPs based on after-action reviews.

R.1.2 National multisectoral multi-hazard emergency preparedness measures, including emergency response plans, are developed, implemented and tested. Score – 4.*Strengths and best practices*

- The National Disaster Management Plan 2015, and the associated SOPs, are widely used and are routinely tested for responding to emergencies.
- NADMA and the CPRC have strong command, control and communication capabilities, as evidenced through exercises and real events.
- There is a continuous training programme that includes regular multisectoral simulation exercises and after-action reviews for continuous improvement.

Areas that need strengthening and challenges

- Articulating the roles and responsibilities of all agencies, taking advantage of the strengths and training of staff from each agency.
- Emergency preparedness and response resources in the animal sector for large or protracted emergencies.

Recommendations for priority actions

- Further strengthen coordination to ensure multisectoral implementation of preparedness and response plans.
- Use the lessons identified through simulation exercises and after-action reviews to update health emergency plans in a timely manner and share with stakeholders as appropriate.
- Develop a human resources resilience plan that includes senior leaders within MOH.
- Further enhance MyCPRC by incorporating machine learning to forecast, predict and provide insights on disease occurrence.

EMERGENCY RESPONSE OPERATIONS

INTRODUCTION

A public health emergency operations centre is a central location for coordinating operational information and resources for strategic management of public health emergencies and emergency exercises. Emergency operations centres provide communication and information tools and services, and a management system during a response to an emergency or emergency exercise. They also provide other essential functions to support decision-making and implementation, coordination and collaboration.

Target

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

LEVEL OF CAPABILITIES

NADMA is responsible for national disaster management planning and implementation for Malaysia with a disaster management committee specific to each emergency leading the response at national and subnational levels. In a health-related emergency, such as a major disease outbreak, the MOH will lead the Disaster Management Committee for Health to coordinate multisectoral operations. Within MOH, the Executive Committee for Disaster Management is activated during a crisis and forms the central decision-making committee chaired by the Director-General of Health.

Regular meetings of the national steering committee and technical committees, chaired by the Deputy Prime Minister and Director-General of NADMA respectively, are held with various agencies for coordination. Regular multiagency meetings are held between other agencies, such as the NADMA, Fire and Rescue Department, Royal Malaysian Police Force and Welfare Department. Coordination meetings are held every six months and daily during an activation.

The response to public health incidents is coordinated from the MOH CPRC using an all hazards approach, operating as per the National Security Council Directive No. 20. Regular multisectoral meetings are held between relevant public health sectors within MOH. The CPRC is staffed by duty officers who conduct initial information gathering, risk assessment, classification of incidents and consider appropriate escalation and options for response. The CPRC operates an on-call duty officer system for responding to all diseases of unknown origin and other public health emergencies. The CPRC has dedicated space and can accommodate surge staff. There is a continuum of training provided for permanent and surge staff of the CDPC. The CPRC SOPs have been routinely updated.

The CPRC demonstrated its capacity during outbreaks of dengue, MERS-CoV and rabies, as well as in support for various mass gathering events, such as the 2017 ASEAN Para Games and the 2017 Southeast Asian Games. The CPRC capability has also been demonstrated through a tabletop exercise in September 2017 and a command post exercise in October 2017. There are SOPs for the management and transport of potentially infectious patients in the community and at points of entry, all of which have been exercised. MOH provides guidance on case management to health care practitioners and institutions for new public health threats, such as MERS-CoV, Ebola and Zika virus and these are updated as required.

There is an alternate power supply (stand-alone generator) for the CPRC if there are interruptions to the electricity supply, with all important electronic devices connected to generator plugs that will not be disrupted during a power outage. The generator undergoes periodical maintenance and testing to ensure efficacy and efficiency. Reliable intranet, internet, secure MOH webmail and phone systems are available 24/7. CPRC has a well-equipped information technology communication structure which includes a videoconferencing system.

The incident management system is widely used at all levels of CPRC in Malaysia. Emergency exercise management programmes are a key performance indicator for the CPRC surveillance teams at the national, state and district levels. A national exercise is conducted annually involving MOH and other sectors. After-action reviews are routinely conducted to improve the guidelines.

CPRC activation in Malaysia usually occurs within 120 minutes from notification, in accordance to the criteria stated in the CPRC SOP, and is managed according to the MOH Disaster Management Plan 2015. Smart electronic systems aid early warning through analysis of their comprehensive surveillance system. Daily reports are disseminated to management officers and related divisions and institutions at national and state levels. Daily data at national, state and district level can be viewed using the disease notification systems (eNotifikasi and eWabak) and the disease-specific systems for dengue, tuberculosis, leprosy and measles.

Indicators and scores

R.2.1 Emergency Response Coordination. Score – 5.

Strengths and best practices

- There is a multisectoral coordination mechanism through the national Disaster Management Committee.
- The national health response is coordinated through the MOH CPRC using an all hazards approach, guided by the CPRC SOPs.
- There are surge capacity and human resource mobilization arrangements at all levels, with assistance from relevant agencies.

Areas that need strengthening and challenges

- Revision of the CPRC SOPs and guidelines every five years or for new revisions made by WHO or other relevant agencies.
- Integration of early warning systems by sharing information systems between agencies.

R.2.2 Emergency operations centre capacities, procedures and plans. Score – 5.

Strengths and best practices

- The CPRC plans have been tested through real events and exercises.
- There is a dedicated physical facility and staff available with officers on call 24/7.
- Surge staff have been pre-identified and trained accordingly.
- There is a database for CPRC management and operations that includes a register of trained staff and contact details of subject matter experts.

Areas that need strengthening and challenges

- CPRC members need to continually familiarize themselves with the SOPs.

R.2.3 Emergency Exercise Management Programme. Score – 5.***Strengths and best practices***

- Regular activations and exercises are conducted to test emergency operations and this includes multisectoral capacities.
- Advanced modern communication tools and early warning systems have been developed and are used for monitoring and response.
- There is frequent national, state and district level exercises that include after-action reviews.

Areas that need strengthening and challenges

- The follow-up of recommendations from after-action reviews.

Recommendations for priority actions

- Consider mechanisms to deal with computer system outage and dependence on smart phones.
- Further develop and strengthen electronic documentation filing systems.
- Ensure updating of SOPs and guidelines every five years, when revisions are published and as a consequence of after-action reviews.

LINKING PUBLIC HEALTH AND SECURITY AUTHORITIES

INTRODUCTION

Public health emergencies pose special challenges for law enforcement, whether the threat is manmade or naturally occurring. In a public health emergency, law enforcement will need to quickly coordinate its response with public health and medical officials.

Target

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.

LEVEL OF CAPABILITIES

National leadership for disasters, including security threats, are coordinated by the National Security Council. Malaysia has a trained multisectoral team to respond to bioincident events comprising the MOH, DVS, Royal Malaysia Police and the hazardous material team (HAZMAT) from the Fire and Rescue Department. The team has been formed under the Nucleus for Biological Weapon and Toxin by Science and Technology Research Institute for Defence at the Ministry of Defence and operates as per the National Security Directive No. 20 for natural causes and No. 18 for security threats, and the draft bioincident emergency response and joint investigation guide. The US Federal Bureau of Investigation and US Centres for Disease Control and Prevention The team was initially trained and the groups who had been conducting regular exercises since 2015 through Biological Response Investigation Training and Evaluation Workshops. This has included hazardous biological sampling, using PPE and reconnaissance.

Malaysia has updated their CBRNe Preparedness, Response and Recovery Plan as a result of after-action reviews following several chemical incidents.

Indicators and scores

R.3.1 Public health and security authorities (e.g. law enforcement, border control, customs) linked during a suspect or confirmed biological, chemical or radiological event. Score – 4.

Strengths and best practices

- National coordination of security threats is managed through the National Security Council.
- The public health role is outlined in the MOH Disaster Management Plan and the revised CBRNe Preparedness, Response and Recovery Plan.
- Multisectoral exercises have been regularly conducted on various CBRNe scenarios including deliberate attacks.

Areas that need strengthening and challenges

- Routine information sharing between public health and law enforcement.
- Increasing awareness among the scientific community on the danger of potential dual use research.

Recommendations for priority actions

- Formalize information sharing mechanisms between public health and security authorities, both for routine operations and during emergencies.
- Conduct a full-scale live exercise at the national level to test these information sharing modalities.
- Consider a mutual secondment of staff between the MOH and security authorities.

MEDICAL COUNTERMEASURES AND PERSONNEL DEPLOYMENT

INTRODUCTION

Medical countermeasures are vital to national security and protect nations from potentially catastrophic infectious disease threats. Investments in medical countermeasures create opportunities to improve overall public health. In addition, it is important to have trained personnel who can be deployed in case of a public health emergency for response. Regional (international) collaboration will assist countries in overcoming the legal, logistic and regulatory challenges to deployment of public health and medical personnel from one country to another. Case management procedures should be available to all staff and implemented across the system during health emergencies due to IHR-related hazards.

Target

National framework for transferring (sending and receiving) medical countermeasures, and public health and medical personnel from international partners during public health emergencies and procedures for case management of events due to IHR-related hazards.

LEVEL OF CAPABILITIES

The MOH Crisis and Disaster Management Plan for Pharmaceutical Services, developed in 2016, provides guidance on the management of pharmaceuticals and vaccines during public health emergencies. The National Pharmaceutical Regulatory Agency of the MOH Malaysia manages regulatory procedures of receiving medical countermeasures (registered products) from international partners. Malaysia has also established mechanisms to rapidly introduce unregistered products during public health emergencies. The Control of Drugs and Cosmetics Regulations provides power to the Minister of Health to grant exemption from obtaining normal regulatory approval of these products, based on assessment by the MOH Pharmacy Services Programme. Referring to the Guidelines in Applying and Using Medicines which Require Special Approval from the Director-General of Health and the Senior Director of Pharmaceutical Services, an exemption letter will be issued upon approval of the use of unregistered medicines and products. Malaysia was able to introduce the pandemic influenza vaccine in November 2009, during the 2009 influenza pandemic.

Malaysia has demonstrated the sending of medical countermeasures during the large-scale Malaysian Field Hospital operation in Cox's Bazar, Bangladesh from December 2017 to February 2018. Malaysia actively participates and leads the partnership with ASEAN countries to enhance subregional capacities on disaster health management. The SOPs for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations describe the procedures of sending and receiving assets and capacities including medical countermeasures.

The MOH Guidelines of Human Resource Mobilization During Public Health Emergencies 2019 provides the procedures for sending and receiving national and foreign health personnel during public health emergencies. This is complemented by Malaysian medical council guidelines and application forms for temporary practicing certificates, which grant foreign medical practitioners to temporarily practice in the country. Malaysia has been active in developing emergency medical teams (EMTs) and currently has 60 certified national EMTs; however, Malaysia does not have an internationally deployable EMT as classified by WHO.

Trained MOH personnel have been deployed to several international public health emergencies, for example, an earthquake in Pakistan in 2005 and a landslide disaster area in the Philippines in 2006. In 2018, the MOH staffed the Malaysian Field Hospital in Cox's Bazar, Bangladesh from December 2017 to February 2018 to ease the trauma and disease burden of more than a million Rohingya refugees fleeing Myanmar. Each deployment rotation comprised of 44 MOH doctors, paramedics and allied health professionals.

Malaysia has been an active participant in ASEAN disaster health management. Under the project for strengthening the ASEAN Regional Capacity on Disaster Health Management, regional collaborative drills have been regularly conducted with participation of ASEAN countries.

Case management guidelines are available for priority diseases, such as human infection of avian influenza, MERS-CoV, dengue, leptospirosis and brucellosis. The MOH CBRNe Preparedness, Response and Recovery Plan provides brief guidance on general case management for these hazards. Procedures and systems for transporting potentially infectious patients, including from the international airport, have been established and exercised.

Indicators and scores

R.4.1 System in place for activating and coordinating medical countermeasures during a public health emergency. Score – 5.

Strengths and best practices

- MOH Crisis and Disaster Management Plan for Pharmaceutical Services provides overall guidance on the management of pharmaceuticals and vaccines during public health emergencies.
- There is a mechanism to rapidly introduce unregistered medicines during a public health emergency.
- Malaysia has demonstrated the sending of medical countermeasures to the large-scale Malaysia Field Hospital operation in Cox's Bazar, Bangladesh.
- Malaysia actively participates in ASEAN efforts to enhance subregional capacities for sending and receiving assets and capacities, including medical countermeasures.

Areas that need strengthening and challenges

- Reviewing and updating the stockpiling policy and national deployment and vaccination plan for pandemic influenza.

R.4.2 System in place for activating and coordinating health personnel during a public health emergency. Score – 4.

Strengths and best practices

- There are procedures for sending and receiving national and foreign health personnel during public health emergencies.
- There are formal procedures to grant foreign medical practitioners temporary practice licenses.
- There are 60 certified national EMTs.
- MOH has sent medical and public health personnel to various health emergencies.
- Malaysia is an active participant in ASEAN disaster health management efforts.

Areas that need strengthening and challenges

- Further exercising current procedures for receiving international public health and medical missions.

R.4.3 Case management procedures implemented for IHR relevant hazards. Score – 4.

Strengths and best practices

- There are guidelines for the case management of priority diseases and IHR relevant hazards.
- Procedures and systems for transport of potentially infectious patients, including from points of entry.

Areas that need strengthening and challenges

- Updating some of the case management guidelines for priority diseases.
- Updating case management guidelines for non-biological IHR hazards (e.g. chemical, radiation) to include more detailed guidance.
- Systematic planning of resources (trained personnel, infrastructure and equipment) for case management for high threat pathogens and other IHR hazards.

Recommendations for priority actions

- Continue to support international deployment of trained public health and/or medical personnel to support regional and global responses to outbreaks and emergencies, as appropriate.
- Continue to review and update case management guidelines on IHR relevant hazards, based on the latest evidence, especially for high threat pathogens and chemical and radiation hazards, and continue to strengthen resources for case management at designated health care facilities.

RISK COMMUNICATION

INTRODUCTION

Risk communications should be a multilevel and multifaceted process which aims at helping stakeholders define risks, identify hazards, assess vulnerabilities and promote community resilience, thereby promoting the capacity to cope with an unfolding public health emergency. An essential part of risk communication is the dissemination of information to the public about health risks and events, such as disease outbreaks. For any communication about risk caused by a specific event to be effective, the social, religious, cultural, political and economic aspects associated with the event should be taken into account, including the voice of the affected population.

Target

State Parties use multilevel and multifaceted risk communication capacity. Real-time exchange of information, advice and opinions between experts and officials or people who face a threat or hazard (health or economic or social well-being) to their survival, so that informed decisions can be made to mitigate the effects of the threat or hazard and protective and preventive action can be taken. This includes a mix of communication and engagement strategies, such as media and social media communications, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement and community engagement.

LEVEL OF CAPABILITIES

Malaysia has a robust system to effectively communicate, actively listen and respond to public concerns in a timely manner using multiple channels of communication. For large-scale events, the Strategic Communications Unit of the Prime Minister's Office coordinates multisectoral and interagency communication, including management of rumours and public concerns, through the Heads of Corporate Communication from all ministries. For public health events, and the health component of a disasters, the MOH Corporate Communication Unit and Health Education Division, comprising professionals trained in communications, media relations and community engagement, are embedded in the national CPRC. Risk communication capacity-building and risk communication activities are part of the operational budget, with additional resources mobilized as needed. There is also a roster of trained communication officers that can be mobilized as surge capacity.

Risk communication is a component of many national strategies and response plans, including the National Security Council Directive No. 18, 20 and 21, MySED II, the MOH Crisis Communication Plan, MOH National Disaster Plan and the National Influenza Pandemic Preparedness Plan. There are established and well-practised SOPs for communication, including clearance procedures and timelines for media releases and announcements. Regular training and simulation exercises that include risk communication are conducted at national, state and district levels internally and between partners. Examples of exercises include those for highly pathogenic avian influenza in 2018 and in 2019.

Public communication for emergencies is conducted proactively through various channels, such as print media, social media, mass awareness campaigns, community engagement, press releases and press conferences. There is a pool of trained spokespersons within the MOH and a system for clearance of media and social media products. Messages are released according to target audiences with information provided in local languages as required. Where appropriate, risk communication for public health events is developed through dialogue with the public, community and concerned stakeholders. Information is exchanged and differences in risk perception between technical experts and the public are considered.

Malaysia has an innovative approach for community engagement through COMBI teams at district levels. There are 3700 teams composed of more than 60 000 volunteers who assist in community engagement for any health event, such as mass cleaning during a dengue response, promotion of personal hygiene during floods and providing education on wearing PPE to protect from haze. The COMBI teams have national, state and district levels structures that receive regular training, with teams actively participating in a biennial convention.

For the management of perception, risky behaviour and misinformation, the MOH has the Health Education Special Task Force that has a system for listening to public perceptions through face to face communication, dialogue sessions and site visits to affected areas. The Strategic Communications Unit of the Prime Minister's Office collects analytics from social media and analyses quantitative and qualitative information to tailor communication responses in a timely and proactive manner. The COMBI teams are also maximized to conduct surveys on public perception, especially during public health event or emergencies.

Indicators and scores

R.5.1 Risk communication systems for unusual/unexpected events and emergencies. Score – 5.

Strengths and best practices

- Risk communication is embedded in national strategies and response plans and is a key focus area of MySED II.
- There are systems and processes for multisectoral coordination for risk communication that are regularly tested in simulation exercises and real events, with lessons applied to planning future communications.
- The system for risk communications is fully funded, covers surge capacity and is managed by trained communication officers.

Areas that need strengthening and challenges

- Continuous training and updating of capacity on risk communication, especially for new members of the communications team and for new and emerging media technologies.
- Routinely conducting joint communications planning, after-action reviews and evaluation of communications interventions.

R.5.2 Internal and partner coordination for emergency risk communication. Score – 5.

Strengths and best practices

- Risk communication is a key function in the CPRC incident management system.
- There is high-level leadership for multisectoral communication during disaster response that is coordinated by the Strategic Communications Unit of the Prime Minister's Office.
- Communication and coordination protocols have been tested in real events and through exercises.

Areas that need strengthening and challenges

- Sharing resources for communication and conducting joint training in emergency risk communication.

R.5.3 Public communication for emergencies. Score – 4.*Strengths and best practices*

- The National Disaster Management Plan 2015 includes a comprehensive risk communication strategy that covers all hazards and emergencies.
- Malaysia uses a multitude of communication channels to reach audiences by maximizing traditional and social media, websites, public hotlines, printed materials, radio and mobile-based communication.
- Messages are developed in languages relevant to the many ethnicities in Malaysia.

Areas that need strengthening and challenges

- Regular engagement by MOH and other relevant government agencies with the media and journalists to ensure media reports are correct, credible and timely.

R.5.4 Communication engagement with affected communities. Score – 4.*Strengths and best practices*

- An innovative approach of organizing volunteers for community engagement through the COMBI teams at national, state and district levels.
- COMBI practices are documented and shared through the biennial COMBI Convention and incentives for innovative approaches.
- Researchers conduct surveys and studies to assess public perception, especially during public health event or emergencies.

Areas that need strengthening and challenges

- Sustaining community engagement by maintaining the number of members and regularly training new volunteers.
- Ensuring a strong commitment and dedication of volunteers in the COMBI teams.

R.5.5 Addressing perceptions, risky behaviours and misinformation. Score – 4.*Strengths and best practices*

- The COMBI teams serve as a cadre of volunteers at the community level to collect feedback and perceptions to help develop subsequent communication responses.
- The COMBI teams enable community ownership of response operations as evidenced by mass clean-up for dengue prevention and the promotion of personal hygiene and protection during national disasters.

Areas that need strengthening and challenges

- More robust and timely collection of risk perceptions, especially during public health events or emergencies to inform response and communication.

Recommendations for priority actions

- Continue to enhance the risk communication system through regular staff development and training of risk communication specialists at all levels (national, state and district) and across multiple sectors, including the strategic use of new and emerging communication technologies.
- Scale-up the innovative approach of using COMBI teams for community engagement to include all hazards, with appropriate capacity development activities.
- Continue to routinely conduct after-action reviews and evaluations of risk communication strategies jointly with relevant sectors, and use the lessons learned for future communications planning.
- Formalize the mechanism to systematically conduct risk perception assessment.

IHR-RELATED HAZARDS AND POINTS OF ENTRY

POINTS OF ENTRY

INTRODUCTION

All core capacities and potential hazards apply to “points of entry” and thus enable the effective application of health measures to prevent international spread of diseases. States Parties are required to maintain core capacities at designated international airports and ports (and where justified for public health reasons, a State Party may designate ground crossings), which will implement specific public health measures required to manage a variety of public health risks.

Target

States Parties designate and maintain core capacities at international airports and ports (and where justified for public health reasons, a State Party may designate ground crossings) that implement specific public health measures required to manage a variety of public health risks.

LEVEL OF CAPABILITIES

There are 63 points of entry in Malaysia – 14 airports, 35 seaports and 14 land border crossings, with 24 of these being designated as IHR points of entry. Health-related activities at points of entry are supervised and monitored by three separate divisions in the MOH – the Disease Control Division, Food Safety and Quality Programme and Pharmacy Enforcement Division.

Public health responses at points of entry are achieved through the coordinated activities among district public health departments, law enforcement agencies, emergency medical services, airlines, and the port and ground crossing operators. The MOH Disease Control Division, State Health Departments, immigration, customs, quarantine and inspection services, and points of entry authorities have mechanisms for sharing information and providing health and medical services for travellers. These agencies coordinate inspection and entry requirements, quarantine enforcement and detention, transportation from points of entry to medical facilities, disease prevention activities and entry inspection programmes under their respective legal authorities.

There are guidelines and mechanisms for the protection of travellers and to prevent introduction of communicable diseases into Malaysia and the three agencies have specific authorities to detain, test or remove materials to prevent hazardous or contaminated materials from entering Malaysia. Public health personnel are responsible for managing vector control, water quality, and proper sanitation and solid waste at points of entry. The control of vectors and vector reservoirs in and near points of entry is managed by district health officer or points of entry health office in coordination with points of entry

authorities. The Food Safety and Quality Programme is responsible for inspection of food items, and inspection of food premises and flight catering. The Pharmaceutical Service Programme is responsible for the inspection of drugs, cosmetics and pharmaceutical products. Agricultural, animal and fish products are inspected by the Malaysian Quarantine and Inspection Services.

Health authorities at points of entry are responsible for conducting risk assessments for travellers at risk of spreading communicable disease. Public health officers monitor the health of travellers through screening, report all illnesses and inspect conveyances.

All designated points of entry have an SOP for transporting sick travellers to the appropriate nearby medical facility. Upon a report of suspected illness, health officers at the points of entry will determine if the traveller requires further health assessments. If a traveller requires isolation or further management, they are referred to the appropriate hospital. There is a contact list of ambulances that have skilled health workers to transport affected travellers and a mechanism for coordination between the health authority at the points of entry and the designated hospitals with clear roles and expectations for both. For infectious diseases, all transport used undergoes a thorough disinfection procedure.

In Malaysia, the designated port health authority is the authority under the IHR to issue Ship Sanitation Control Certificates and Ship Sanitation Control Exemption Certificates. Law enforcement personnel, as well as air and ship crews, are trained to identify sick travellers or other public health risks and are required to report these immediately to health authority at the points of entry. For maritime conveyances, health authorities work with the maritime conveyance staff to ensure all measures to mitigate the spread of disease aboard cruise and other vessels travelling to Malaysia are undertaken.

During a public health emergency, the port of entry response is per the SOP of the MOH Crisis Management Plan. This plan has been adapted for each point of entry to account for the unique stakeholders and partners, specific structures and logistics systems. The Kuala Lumpur International Airport and Port Klang have their own SOPs for the Management of Public Health Emergency of International Concern. Point of entry authorities conduct a variety of exercises including drills, workshops, tabletop and functional exercises, both internally and externally, with district, state, and national emergency response team and points of entry partners. These exercises assist identify the strengths and gaps in the crisis management plans and SOPs.

Indicators and scores

PoE.1 Routine capacities established at points of entry. Score – 4.

Strengths and best practices

- There is adequate legislation and policies for the provision of health services at points of entry in Malaysia, with all designated points of entry having access to appropriate medical services. This includes transport of ill patients to hospitals with adequate staff, equipment and premises.
- The point of entry authorities conducts inspection programmes to ensure a safe environment at their facilities. There are control of vectors and reservoirs programmes in and near points of entry, with trained personnel for the inspection of conveyances available at designated points of entry.
- Regular internal and external evaluations on the public health capacity has been conducted and remedial action taken.

Areas that need strengthening and challenges

- Continuity of training for new officers in alignment with national Malaysian programmes and WHO training tools on issuing Ship Sanitation Control Certificates.
- Ensuring that all points of entry that are designated as IHR points of entry meet the requirements of the Ship Sanitation Control Certificate.

PoE.2 Effective public health response at points of entry. Score – 4.

Strengths and best practices

- Points of entry are part of the MOH Crisis Management Plan for responding to public health emergencies.
- The designated points of entry can apply the recommended health measures related to travellers, crews, conveyances, animals, goods and dangerous items.
- The points of entry have demonstrated capacity to disinfect, exterminate rats rates/rodents, decontaminate and conduct regular infectious control practices.
- Regular multisectoral training has been conducted at airports and evaluated by external expertise with after-action reviews disseminated to all agencies for corrective measures.
- Point of entry have experienced real events, such as travellers suspected with MERS-CoV and Zika.

Areas that need strengthening and challenges

- Sustaining regular exercises that involve all agencies at the points of entry, across all types of public health hazards.
- Conducting an exercise at the points of entry that comprise large numbers of potentially sick passengers, such as an infectious disease outbreak.

Recommendations for priority actions

- Continue to review and clarify the list of IHR authorized ports to issue Ship Sanitation Certificates.
- Continue to routinely conduct continuous education, training and exercises involving all agencies at points of entry.
- Conduct training to manage cruise ships for potential events with a large number of cases.

CHEMICAL EVENTS

INTRODUCTION

Timely detection and effective response of potential chemical risks and/or events requires collaboration with other sectors responsible for chemical safety, industries, transportation and safe disposal. This entails that State Parties need to have surveillance and response capacity to manage chemical risk or events and effective communication and collaboration among the sectors responsible for chemical safety.

Target

States Parties with surveillance and response capacity for chemical risks or events. This requires effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation and safe disposal, animal health and the environment.

LEVEL OF CAPABILITIES

Malaysia is a State Party to the Convention on the prohibition of the development, production, stockpiling and use of chemical weapons and on their destruction (Chemical Weapons Convention), the Rotterdam Convention on the prior informed consent procedure for certain hazardous chemicals and pesticides in international trade and the Basel Convention on the environmentally sound management of hazardous and other wastes during their whole life cycle.

The National Authority for the Chemical Weapons Convention regulates the scheduled chemicals under the Chemical Weapons Act of 2005 and the Chemical Weapons Convention Regulations 2007. The MOH Department of Occupational Safety and Health manages the Chemical Information Management System, which includes a national chemical profile, and regulates workplace Chemical Health Risk Assessments. The MOH NPRA is the Malaysian Drug Control Authority as per the Poisons Act 1952 and the Food Act 1983. MOH works closely with the Department of Environment that manages the Environmentally Hazardous Substances Notification and Registration scheme.

Several organizations are responsible for chemical surveillance in Malaysia:

- The Department of Occupational Safety and Health manages surveillance monitoring at workplaces, including chemical plants and factories;
- The Department of Environment monitors chemical effluent;
- The Department of Chemistry conducts on-site real time and off-site detection of chemical exposure;
- The MOH monitors consumer foods for chemical hazards; and
- The Ministry of Energy, Science, Technology, Environment and Climate Change monitors water, air, soil and sediment for potential chemical contamination.

During a chemical emergency, Malaysia utilizes the Malaysian Emergency Response System 999, comprising the MOH Ambulance Response Team, the Royal Malaysian Police, Fire and Rescue Department and Civil Defence. The HAZMAT from the Fire and Rescue Department are responsible for conducting early chemical detection and monitoring and for search and rescue operations. The medical emergency response team from MOH is responsible for triaging and treating patients on-site and referring patients, if necessary, to hospitals. The Police Chief is the on-scene commander under the incident management system. Information sharing between agencies occurs at the Incident Site Control Post and the Disaster Control Operations Centre.

When a chemical incident is escalated to a disaster of natural origin, the National Security Council Directive No. 20 is activated, and the response is coordinated by the NADMA. If the chemical incident is due to act of terror, the National Security Council Directive No. 18 is activated, and the response is coordinated by the National Security Council. In both instances, all response agencies form the incident command structure, led by the Royal Malaysian Police in the field. MOH is responsible for providing medical emergency and public health services to those affected, including responders.

There are five hospitals designated for managing casualties from chemical events. There is a National Poison Centre based at Universiti Sains Malaysia.

Malaysia demonstrated their capabilities in managing chemical events due to potential chemical warfare agents and toxic industrial chemicals during the response to recent incidents. This included a venomous agent X nerve agent attack with one death at the Kuala Lumpur International Airport 2 in February 2017 and a chemical disaster due to illegal dumping of toxic wastes affecting thousands of the population in March 2019 in Johor State. Following these events, and as a result of the after-action review, MOH updated its CBRNe Preparedness, Response and Recovery Plan, which is pending approval.

Indicators and scores

CE.1 Mechanisms established and functioning for detecting and responding to chemical events or emergencies. Score – 4.

Strengths and best practices

- Malaysia has up-to-date legislation and functioning arrangements to manage chemical risks and respond to chemical events.
- Collaboration between response agencies have been demonstrated and improved during response to real chemical incidents.
- Multiagency exercises for various CBRNe scenarios, including a deliberate attack, are regularly conducted.

Areas that need strengthening and challenges

- Interpretation of technical findings by different agencies during chemical events, e.g. laboratory results and modelling projections.
- Training for responders, including the members of the MOH Rapid Assessment Team and Rapid Response Team.
- Equipping response teams and agencies with up-to-date detection and analysis technologies.
- The interoperability among various response teams and agencies.

CE.2 Enabling environment in place for management of chemical events. Score – 5.

Strengths and best practices

- Malaysia has strong national leadership for disasters coordinated by NADMA for natural causes and the National Security Council for security threats under Directive No. 20 and Directive No. 18 respectively.
- NADMA also has a specific SOPs for industrial chemical disasters.
- The MOH Disaster Management Plan 2015 includes a subplan for CBRNe events.

Areas that need strengthening and challenges

- Enforcement of surveillance for managing toxic industrial chemicals by industry and non-state actors.
- Capability in managing chemical wastes.

Recommendations for priority actions

- Improve national response and investigation capabilities during chemical events by investing in state-of-the-art equipment for on-site detection and laboratory reach-back analyses.
- Provide further multisectoral training on responding to chemical events for first responders, including the MOH Rapid Assessment Team and Rapid Response Team.
- Improve interoperability among response agencies in the interpretation of testing results and model projections through joint training sessions and simulation exercises.

RADIATION EMERGENCIES

INTRODUCTION

To counter radiological and nuclear emergencies, timely detection and an effective response towards potential radiological and nuclear hazards/events/emergencies are required in collaboration with sectors responsible for radiation emergency management.

Target

States Parties should have surveillance and response capacity for radiological emergencies and nuclear accidents. This requires effective coordination among all sectors involved in radiation emergencies preparedness and response.

LEVEL OF CAPABILITIES

Malaysia has ratified the Convention of Early Notification of a Nuclear Accident, Convention of Assistance in the Case of the Nuclear Accident or Radiological Emergency and the Comprehensive Nuclear Test Ban Treaty and is a member of the Unified System for Information Exchange in Incidents and Emergencies managed by the International Atomic Energy Agency.

The use of radioactive materials in Malaysia is governed by the Atomic Energy Licensing Act 1984 (Act 304). The Atomic Energy Licensing Board is the lead agency for a radiation emergency and regulates the use of all radiological materials, except for those used for medical purpose which are regulated by the MOH. A SOP for responding to radiological emergencies has been drafted at national and ministerial level, which involves various government agencies that may be involved in a radiation emergency. MOH manages the National Disaster Management Plan 2015 that comprises an annex for the CBRNe Preparedness, Response and Recovery Plan.

Malaysia has capabilities to detect, monitor and measure radionuclides in air, water and food samples. There are several capable laboratories at the Malaysia Nuclear Agency:

- The Radiochemistry and Environment Laboratory, which is accredited to ISO 17025, provides radiochemical analysis for alpha, beta and gamma emitting radionuclides in a wide range of matrices, such as soil, sediment, sludge, water, food, smear test, fauna and flora;
- The Whole-Body Counter Laboratory assesses internal radionuclide burden in human body and is used for routine monitoring of radiation workers and for emergency monitoring of responders and the public;
- The Secondary Standard Dosimetry Laboratory provides services for the supply and analysis of personal and area dosimeters for external dose assessment; and
- The laboratory for biological dosimetry testing, a member of the WHO BioDosNet, used for assessing overexposed individuals during an accident or emergency.

In addition, as a member country of the Comprehensive Nuclear Test Ban Treaty, Malaysia operates a monitoring station for radionuclides in the air which can be used for detection of nuclear tests or accidents. Radiation portal monitors are used throughout the country at the point of entries of airports and seaports for the detection of radiation from vehicles, cargo containers, individuals and postal services courier.

During a radiation emergency, the National Centre for Nuclear Response Management is responsible for initial information, media statements and response and emergency team coordination. Various agencies, such as Malaysia Nuclear Agency, the Atomic Energy Licensing Board, MOH, the Department of Environment, and Royal Police, are involved. These agencies provide services for the detection, monitoring and dosimetry services to responders, workers and the public. Many hospitals with specialists can manage radiological exposure and contaminated cases and two have decontamination facilities. Most state hospitals can manage radiation burns.

Annual training courses on nuclear and radiological emergency preparedness are offered by the Malaysia Nuclear Agency to train first responders in nuclear and radiological accidents with participants including the Malaysian Armed Forces, Fire and Rescue Department, Malaysia Civil Defence Force, hospitals, Malaysia Nuclear Agency, MOH and Atomic Energy Licensing Board. Malaysia also contributes to international training for radiation emergency preparedness and response.

Indicators and scores

RE.1 Mechanisms established and functioning for detecting and responding to radiological and nuclear emergencies. Score – 4.

Strengths and best practices

- Malaysia has the necessary regulations, functioning coordination mechanisms and essential response capabilities for the detection, surveillance and monitoring, assessment and medical management of radiation events.
- One agency is responsible for the primary surveillance and monitoring of radiation in the environment, goods and food.
- There are national capabilities for managing exposure to radiation and radioactively contaminated individuals.
- Training on basic radiation, radiation protection and radiation emergency are regularly provided to emergency responders.

Areas that need strengthening and challenges

- Systematic information exchange and information workflow among relevant response agencies.
- Technical expertise and capabilities in monitoring and managing radiation exposure and radioactive contamination.
- Having adequate medical and health personnel with knowledge of basic radiation, radiation protection and radiological emergencies.
- Equipping frontline response personnel with knowledge, skills and equipment to manage radiological emergencies.
- Having decontamination facilities and equipment in all major hospitals.

RE.2 Enabling environment in place for management of radiation emergencies. Score – 4.

Strengths and best practices

- Malaysia is a signatory to the Early Notification and Assistance in Case of a Nuclear Emergency Conventions and cooperates with international bodies on radiation emergencies.
- The legal structure for radiation safety and management of radiation emergencies, including related regulations and technical documents.
- The multisectoral coordination mechanism for managing radiological emergencies.
- National SOPs for Radiological Emergencies have been drafted.

Areas that need strengthening and challenges

- Regular training and exercises in managing radiation emergencies.
- Communication mechanisms, including systematic information sharing between public health authorities and other radiation response agencies.
- Guidance on monitoring the long-term health effect of radiation exposure.

Recommendations for priority actions

- Improve capacity and capabilities of hospitals designated for managing radiation casualties, including decontamination, radiation monitoring and specialized expertise, by investing in facilities, equipment, training and international collaborations.
- Improve timely and effective information exchange between public health authorities and other agencies involved in radiation emergency response through exercises, including a full-scale exercise.

APPENDIX 1: JEE BACKGROUND

Mission place and dates

Putrajaya, Malaysia; 21 to 25 October 2019.

Mission team members:

- Dr Mark Salter (team lead), Consultant in Global Health, Public Health England, United Kingdom
- Dr Masaya Kato, Programme Area Manager, Country Health Emergency Preparedness and IHR, WHO Regional Office for the Western Pacific
- Dr Kathleen M Gallagher, Program Director, Division of Global Health Protection US Centers for Disease Control and Prevention, United States
- Dr Masahiro Ishikane, Chief, Operational Intelligence Branch, MOH, Japan
- Dr Chun Kang, Director, Division of Viral Diseases, Korea Centers for Disease Control and Prevention Korea, Republic of Korea
- Dr Chunsheng Li, Research Scientist, Radiation Protection Bureau, Health Canada, Canada
- Dr Kerry Lodo, Epidemiologist and Surveillance Coordinator, Communicable Diseases Prevention Unit, Tasmanian Department of Health, Australia
- Mr Mathias Kalkowski, Port Health Inspector, Hamburg Port Health Authority, Germany
- Dr Nikša Barišić, Head of International Trade Division, Veterinary and Food Safety Directorate for OIE, Republic of Croatia
- Mr Joy Caminade, Technical Officer, External Relations and Risk Communications, WHO Papua New Guinea Country Office
- Mr Andrew Pavitt, Consultant, Food Safety Systems, WHO, Regional Office for the Western Pacific

Mission support and report writing:

- Dr Anna Drexler, Technical Officer, Country Health Emergency Preparedness and IHR, WHO Regional Office for the Western Pacific
- Ms Michelle McPherson, Independent Consultant

Objective

To assess Malaysia's capacities and capabilities relevant to the 19 technical areas of the JEE tool for providing baseline data to support Malaysia's efforts to reform and improve their public health security.

The JEE process

The JEE process is a peer-to-peer review. The entire external evaluation, including discussions around the priority actions, the strengths, the areas that need strengthening, best practices, challenges and the scores are collaborative, with JEE team members and host country experts seeking full agreement on all aspects of the final report findings and recommendations.

Should there be significant and irreconcilable disagreement between the external team members and the host country experts, or among the external experts, or among the host country experts, the JEE team lead will decide the outcome; this will be noted in the final report along with the justification for each party's position.

Limitations and assumptions

- The evaluation was limited to one week, which limited the amount and depth of information that could be managed.
- It is assumed that the results of this evaluation will be publicly available.
- The evaluation is not just an audit. Information provided by Malaysia will not be independently verified but will be discussed and the evaluation rating mutually agreed to by the host country and the evaluation team. This is a peer-to-peer review.

Key host country participants and institutions

- Dato' Dr Chong Chee Kheong, Deputy Director-General of Health Public Health Malaysia
- Dr Norhayati Rusli, Director, Disease Control Division, MOH Malaysia
- Dr A'aisah binti Senin, Head of Sector, Vaccine Preventable Disease/Food and Water Borne Disease Sector, Disease Control Division, MOH Malaysia
- Dr Ahmad Riadz bin Mazeli, Senior Principal Assistant Director, Occupational and Environmental Health Sector, MOH Malaysia
- Mr Amrish Shah Osman, Science Officer, National Public Health Laboratory, MOH Malaysia
- Dr Asiah binti Ayob, Deputy Director, Surveillance Section, Disease Control Division, MOH Malaysia
- Dr Badrul Hisham bin Abd Samad, Senior Principal Assistant Director, Disaster, Outbreak, Crisis and Emergency Sector, Disease Control Division, MOH Malaysia
- Dr Azmi bin Abdul Rahim, Head, International Health Regulations and Travel Health Sector, Disease Control Division, MOH Malaysia
- Dr Hani binti Mat Hussin, Director, National Public Health Laboratory, MOH Malaysia
- Dr Harishah binti Talib, Senior Officer, Kuala Lumpur International Airport Health Office, MOH Malaysia
- Dr Hazlina binti Yahaya, Senior Principal Assistant Director, Disaster, Outbreak, Crisis and Emergency Sector, Disease Control Division, MOH Malaysia
- Dr Husnina binti Ibrahim, Deputy Director, Policy and Public Health Development Section, Public Health Development Division, MOH Malaysia
- Dr Jamiatul Aida binti Md Sani, Senior Principal Assistant Director, Vaccine Preventable Disease/Food and Water Borne Disease Sector, Disease Control Division, MOH Malaysia
- Mr Kuan Thai Khim, Senior Principal Assistant Secretary, Finance Division, MOH Malaysia
- Dr Maheshwara Rao A/L Appannan, Senior Principal Assistant Director, Disaster, Outbreak, Crisis and Emergency Sector, Disease Control Division, MOH Malaysia

- Dr Maria binti Suleiman, Head, Disaster, Outbreak, Crisis and Emergency Sector, Disease Control Division, MOH Malaysia
- Mr Mohd Salim bin Dulatti, Senior Director, Food Safety and Quality Programme, MOH Malaysia
- Dr Nur Zahrin Hasran, Senior Principal Assistant Director, National Public Health Laboratory, MOH Malaysia
- Dr Rohani binti Jahis, Head, Zoonosis Sector, Disease Control Division, MOH Malaysia
- Dr Siti Aisah Mokhtar, Senior Principal Assistant Director, Surveillance Sector, Disease Control Division, MOH Malaysia
- Dr Suraya binti Amir Husin, Senior Principal Assistant Director, Medical Development Division, MOH Malaysia
- Dr Thilaka A/P Chinnayah (Co-Lead), Head, Malaysia Epidemic Intelligence Program
- Dr Wan Noraini binti Wan Mohamed Noor, Head, Surveillance Sector, Disease Control Division, MOH Malaysia
- Dr Zuhaida binti A. Jalil, Head, Information and Documentation Sector, Disease Control Division, MOH Malaysia
- Ms Zawiyah binti Sharif, Senior Principal Assistant Director, Food Safety and Quality Programme, MOH Malaysia
- Dr Zulhizzam bin Haji Abdullah, Deputy Director, Public Health Development, MOH Malaysia

Participating institutions

MOH, Malaysia

- Disease Control Division – Coordinator of JEE Malaysia 2019
- Family Health Development Division
- Public Health Development Division
- Medical Development Division
- Health Education Division
- Institute for Medical Research
- Human Resource Division
- Pharmacy Services Programme
- NPRA
- Food Safety and Quality Programme
- Finance Division
- Planning Division
- Training Management Division
- Information Management Division
- Medical Practice Division
- National Public Health Laboratory
- Corporate Communication Unit
- Institute for Medical Research

- Director-General's Office
- Health Informatics Centre
- Legal Advisor Office
- Medical Radiation Surveillance Division
- Negeri Sembilan State Health Department
- Selangor State Health Department
- Kuala Lumpur International Airport Health Office

Prime Minister's Department

- National Security Council
- NADMA

Ministry of Transport

- Civil Aviation Authority of Malaysia
- Marine Department of Malaysia
- Land Public Transport Commission

Ministry of Home Affairs

- Royal Malaysia Police
- Immigration Department of Malaysia

Ministry of Finance

- Royal Malaysian Customs Department

Ministry of Agriculture and Agro-based Industry

- DVS
- Malaysian Quarantine and Inspection Services (MAQIS)

Ministry of Energy, Science, Technology, Environment and Climate Change

- Malaysian Nuclear Agency
- Atomic Energy Licensing Board
- Chemical Department Malaysia
- Department of Environment Malaysia
- Malaysian Meteorological Department

Ministry of Defence

- Science and Technology Research Institute for Defence (STRIDE)
- Malaysian Armed Forces

Ministry of Education

- Hospital Universities
- Faculty of Veterinary Medicine

Ministry of Water, Land and Natural Resources

- Department of Wildlife and National Parks Peninsular
- Department of Irrigation and Drainage

Ministry of Communications and Multimedia

- Department of Information
- Department of Broadcasting

Ministry of Women, Family and Community Development

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 - » Appendix 1: Peer Appraisal International Atomic Energy Agency
 - » Appendix 3: Nursing, Security and Necessity
 - » Appendix 4: Radiological Material Transborder
 - » Appendix 5: Blood Sampling Abberation Chromosone
 - » Appendix 6: 'myATOM' Hotline App
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