

IHR JOINT EXTERNAL EVALUATION OF TAIWAN

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UPMC CENTER FOR HEALTH SECURITY



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EXECUTIVE SUMMARY

Joint External Evaluation Process

This is an independent assessment of Taiwan’s capabilities under the International Health Regulations – 2005 (IHR) using the IHR Joint External Evaluation (JEE) tool. The purpose of the evaluation is to guide Taiwan in its progress toward full development of IHR capabilities to prevent, detect, and respond to public health threats, whether they are naturally occurring, deliberate, or accidental. This tool provides a standard metric by which countries can assess their current baseline capabilities and measure future progress. The JEE was used to assess Taiwan’s collective capabilities, not just those of the Ministry of Health and Welfare (MOHW) or Taiwan Centers for Disease Control (TCDC). Many of the required capabilities involve other governmental agencies as well, such as agriculture, defense, border control, environmental protection, and nuclear power. Therefore, the external evaluation of Taiwan’s capabilities emphasized cross-sectoral and interagency collaboration.

An External Assessment Team consisting of 5 US subject matter experts from the UPMC Center for Health Security and 1 former US CDC official conducted the evaluation in collaboration with a multi-sectoral team of officials from relevant agencies from the Government of Taiwan. The evaluation involved 2 visits to Taipei, Taiwan, including a pre-assessment orientation visit in March 2016 and the evaluation mission which took place from June 21 through July 1, 2016. Prior to the evaluation mission, the Government of Taiwan completed a self-assessment using the JEE tool. During the evaluation mission, Taiwan presented the results of the self-assessment to the External Assessment Team—over the course of 8 working days—followed by structured discussions of each indicator among the Taiwan experts and the External Assessment Team. The External Assessment Team considered the self-assessment, interviewed officials on 19 separate self-assessment teams, and reviewed supporting documentation. The JEE tool addresses 48 indicators that relate to 19 capabilities (elements), with hundreds of corresponding Contextual and Technical Questions. Based on the answers to these questions and supporting documentary evidence, scores were assigned for each of the indicators on a 5-point scale. The scores range from 1 (indicating No Capacity) to 5 (indicating Sustainable Capacity). The scores only apply to the host county and how it compares to the evaluation criteria; the JEE tool is not designed to compare countries to one another.

Taiwan’s current strengths, areas which need strengthening, recommended priority actions, and scores were developed through a process of consensus among the External Assessment Team and Taiwan team members. Additionally, the External Assessment Team conducted site visits to a regional health bureau and hospital in the City of Taichung, a large teaching hospital in Taipei, and the TCDC Emergency Operations Center (EOC).

At this time, only 7 other countries have completed and published an external assessment using the JEE tool, and Taiwan is the 8th country to publish its results.

Findings from the Joint External Assessment

Throughout the external assessment, Taiwan’s robust strengths in public health were obvious. Taiwan is doing an excellent job in meeting most of the IHR goals. There is clear, Sustainable Capacity (Level 5) for many of the indicators, including points of entry and disease surveillance, and Demonstrated Capacity (Level 4) for many others, such as the development of national policy and antimicrobial stewardship. For some indicators in which a lower capacity is evident, it is often only a small part of a criterion that is missing.

While Taiwan demonstrates considerable capacity in most of the assessed areas, it does face some challenges. These fall into 3 overarching themes that emerged during the evaluation:

- Because of its unique international political status, Taiwan is not a full member state in the WHO and, therefore, cannot participate in some international programs that support IHR capabilities.
- Like many countries, interagency and cross-sectoral collaboration in Taiwan is not optimal for fully achieving some IHR capabilities. For example, closer collaboration between the human public health, animal health, and food inspection sectors at both the local and national levels would enhance food safety and improve outbreak investigation capabilities in Taiwan.
- Personnel and budgetary constraints and cutbacks limit some activities needed to fully achieve some IHR goals. Limited budgets also seem to hinder Taiwan’s ability to be more engaged internationally. This inhibits Taiwan’s ability to learn from bilateral or multilateral engagement and to share its considerable expertise with other countries.

Summary of Scores

Element	Indicator	Score
National Legislation, Policy, and Financing	P.1.1- Legislation, laws, regulations, administrative requirements, policies, or other government instruments in place are sufficient for implementation of IHR	4
	P.1.2- The state can demonstrate that it has adjusted and aligned its domestic legislation, policies, and administrative arrangements to enable compliance with the IHR (2005)	4
IHR Coordination, Communication, and Advocacy	P.2.1- A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR	4
Antimicrobial Resistance	P.3.1- Antimicrobial resistance (AMR) detection	5
	P.3.2- Surveillance of infections caused by AMR pathogens	5
	P.3.3- Healthcare-associated infection (HCAI) prevention and control programs	4
	P.3.4- Antimicrobial stewardship activities	4
Zoonotic Disease	P.4.1- Surveillance systems in place for priority zoonotic diseases/pathogens	5
	P.4.2- Veterinary or animal health workforce	5
	P.4.3- Mechanisms for responding to infectious zoonoses and potential zoonoses are established and functional	5
Food Safety	P.5.1- Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination	3
Biosafety and Biosecurity	P.6.1- Whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities	3
	P.6.2- Biosafety and biosecurity training and practices	3
Immunization	P.7.1- Vaccine coverage (measles) as part of national program	5
	P.7.2- National vaccine access and delivery	5
National Laboratory System	D.1.1- Laboratory testing for detection of priority diseases	5
	D.1.2- Specimen referral and transport system	5
	D.1.3- Effective modern point-of-care and laboratory-based diagnostics	5
	D.1.4- Laboratory quality system	5
	D.2.1- Indicator- and event-based surveillance systems	4

Real-Time Surveillance	D.2.2- Interoperable, interconnected, electronic real-time reporting system	4
	D.2.3- Analysis of surveillance data	5
	D.2.4- Syndromic surveillance systems	4
Reporting	D.3.1- System for efficient reporting to WHO, FAO, and OIE	5
	D.3.2- Reporting network and protocols in country	5
Workforce Development	D.4.1- Human resources are available to implement IHR core capacity requirements	4
	D.4.2- Applied epidemiology training program in place such as FETP	4
	D.4.3- Workforce strategy	5
Preparedness	R.1.1- Multi-hazard national public health emergency preparedness and response plan is developed and implemented	5
	R.1.2- Priority public health risks and resources are mapped and utilized	5
Emergency Response Operations	R.2.1- Capacity to activate emergency operations	5
	R.2.2- Emergency Operations Center operating procedures and plans	5
	R.2.3- Emergency operations program	5
	R.2.4- Case management procedures are implemented for IHR-relevant hazards	5
Linking Public Health and Security Authorities	R.3.1- Public health and security authorities (e.g., law enforcement, border control, customs) are linked during a suspect or confirmed biological event	4
Medical Countermeasures and Personnel Deployment	R.4.1- System is in place for sending and receiving medical countermeasures during a public health emergency	4
	R.4.2- System is in place for sending and receiving health personnel during a public health emergency	3
Risk Communication	R.5.1- Risk communication systems (plans, mechanisms, etc.)	4
	R.5.2- Internal and partner communication and coordination	4
	R.5.3- Public communication	5
	R.5.4- Communication engagement with affected communities	4
	R.5.5- Dynamic listening and rumor management	4
Other IHR Related Hazards and Points of Entry (PoEs)	PoE.1- Routine capacities are established at PoE	5
	PoE.2- Effective Public Health Response at Points of Entry	5
Chemical Events	CE.1- Mechanisms are established and functioning for detecting and responding to chemical events or emergencies	3
	CE.2- Enabling environment is in place for management of chemical Events	5
Radiation Emergencies	RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies	3
	RE.2- Enabling environment is in place for management of Radiation Emergencies	5

PREVENT

National Legislation, Policy, and Financing

Target

States Parties should have an adequate legal framework to support and enable the implementation of all of their obligations and rights to comply with and implement the IHR (2005). In some States Parties, implementation of the IHR (2005) may require new or modified legislation. Even where new or revised legislation may not be specifically required under the State Party's legal system, States may still choose to revise some legislation, regulations, or other instruments in order to facilitate their implementation and maintenance in a more efficient, effective, or beneficial manner.

States Parties should ensure provision of adequate funding for IHR implementation through their national budget or other mechanisms.

Taiwan Level of Capabilities

Though not an official member state in the WHO, Taiwan has cooperated with the WHO by adopting the IHR since 2007. Taiwan has amended its Communicable Disease Control Act to in accordance with the IHR and has designated the TCDC as the National Focal Point for IHR implementation. In 2009, Taiwan received notification from WHO of approval for its participation in the IHR.

In 2012, Taiwan completed and submitted to WHO its IHR Core Capacity Monitoring Framework self-assessment. For this self-assessment, Taiwan was able to answer in the affirmative to all questions pertaining to the core capacity of "National Legislation, Policy, and Financing." External assessments of IHR capabilities at Taiwan's international airport and seaport also earned full scores.

P1.1 Legislation, laws, regulations, administrative requirements, policies, or other government instruments in place are sufficient for implementation of IHR — Score: 4

Strengths

- Since adoption of the IHR in 2005, the MOHW developed a Task Force—including TCDC and other entities—to review applicable laws and policies in Taiwan to ensure that they comply. The Communicable Disease Control Act, Disaster Prevention and Protection Act, Point of Entry (PoE) regulations, and a number of other legislation and policy were updated to bring them into compliance.

Areas which need to be strengthened

- While there are strong laws and regulations currently in place in Taiwan for communicable diseases and public health, additional legislation, regulation, and financing related to other sectors—including law enforcement/security, agriculture, and customs—should be considered in order to strengthen a multi-sectoral approach to health security.

P1.2 The state can demonstrate that it has adjusted and aligned its domestic legislation, policies, and administrative arrangements to enable compliance with the IHR (2005) — Score: 4

Strengths

- Despite not being a full member state in the WHO, Taiwan has shown earnest commitment to compliance with IHR regulations.

- Taiwan regularly reviews IHR compliance during exercises and actual PHEICs.
- Taiwan has in place agreements and MOUs with many of its neighboring countries to improve cooperation during international public health emergencies.
- There are opportunities for cross-sectoral collaboration between TCDC (National Focal Point) and other ministerial agencies when the Executive Yuan activates the Central Epidemic Command Center (CECC; EOC for epidemics) during national emergencies (e.g., Executive Yuan regularly convened the MOHW and Environmental Protection Administration on “mosquito-borne disease prevention”).

Areas which need to be strengthened

- Though ministerial agencies appear to coordinate well during emergencies, additional collaboration across Taiwan government agencies and sectors during non-emergency periods is needed to ensure that existing national legislation, policies, and financing fulfill IHR responsibilities.
- Additional personnel dedicated to reviewing and drafting policy and legislation could strengthen Taiwan’s capacity in this area.
- While TCDC has performed a comprehensive review of national legislation and policy related to communicable diseases and public health, other sectors and agencies such as chemical, agricultural, and food safety have not fully reviewed legislation and regulations to determine if any changes are needed to meet IHR obligations.

Recommendations for Priority Actions

- Taiwan has robust programs for detection and reporting of PHEICs caused by communicable disease. Though TCDC has agreements with ministerial agencies to detect and report PHEICs, there is a lack of evidence from these other agencies to determine the robustness with which they are committed and capable of detecting and reporting non-communicable disease emergencies.
- Taiwan’s inability to serve as a full member state of the WHO limits its ability to fully participate in IHR implementation. Though Taiwan regularly reports PHEICs, some of its reports have not been distributed to other member states.

Relevant Documentation

- Disaster Prevention and Protection Act (2016)
- Communicable Disease Control Act (2015)
- Toxic Chemical Substances Control Act (2013)
- Nuclear Emergency Response Act (2003)
- Statute for Prevention and Control of Infectious Animal Diseases (2014)
- Budget Act, Executive Yuan (2013)
- IHR Questionnaire for Monitoring Progress in the Implementation of the IHR Core Capacities in States Parties (2012)
- IHR Assessment Tool for Core Capacity Requirements at Designated Airports, Ports, and Ground Crossings (2009)
- Taiwan’s Public Health Emergency Preparedness Programs 10 Years after SARS (2012)
- Opening Up and Guarding the Country: Benefits of the 16 Cross-Strait Agreements (2012)
- Legislative documents of the Communicable Disease Control Act (2007)
- Press release for CECC activation in response to a dengue outbreak (2015)
- Directions for establishing a Taipei International Airport Health Security Working Group (2013)
- Taipei International Airport Health Security Working Group roles and responsibilities chart (2013)

- Regulations on Implementation of Communicable Disease Surveillance and Alert System, MOHW (2015)
- Enforcement Rules for the Implementation of the Nuclear Emergency Response Act (2012)
- Press release regarding the first meeting of the Vectorborne Disease Control and Prevention Joint Meeting (2016)

IHR Coordination, Communication, and Advocacy

Target

The effective implementation of the IHR (2005) requires multi-sectoral/multidisciplinary approaches through national partnerships for effective alert and response systems. Coordination of nationwide resources, including the sustainable functioning of a National IHR Focal Point (NFP), which is a national center for IHR (2005) communications, is a key requisite for IHR (2005) implementation. The NFP should be accessible at all times to communicate with the WHO IHR Regional Contact Points and with all relevant sectors and other stakeholders in the country. States Parties should provide WHO with contact details of NFPs, and continuously update and annually confirm them.

Taiwan Level of Capabilities

Though not a full member state in the WHO, Taiwan has developed a framework for detecting and reporting PHEICs as required by the IHR. There is strong evidence of Taiwan's commitments and ability to detect and report PHEICs that are caused by communicable disease. Additionally, IHR obligations are strengthened through legal agreements between TCDC and the Council of Agriculture (CoA) regarding animal and human health surveillance for zoonotic disease and for some foodborne diseases. Additionally, CoA and TCDC laboratories share sequence data for avian influenza viruses.

P2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR — Score: 4

Strengths

- Taiwan's Standard Operating Procedures (SOP) for IHR guidelines is written to be consistent with requirements specified by WHA 58.3.
- There are specific risk-based protocols for ministerial coordination and evidence that the NFP distributes IHR-related information with national and local partners.
- There is a well-established mechanism for activating a government-wide CECC during large health emergencies and PHEICs.
- There is strong commitment between CDC and CoA for conducting One Health Surveillance and sharing data to detect and report PHEICs of zoonotic origin.
- Lists of ministerial contact points are updated regularly, and there is evidence of *ad hoc* cross-sectoral collaboration during non-emergency periods and during certain emergency situations (e.g., response to the Fukushima nuclear disaster).

Areas which need to be strengthened

- Though ministerial agencies appear to coordinate during serious national emergencies via the CECC convened by the Executive Yuan, collaboration between agencies outside of national-level events appears to be conducted largely on an *ad hoc* basis. IHR compliance may be strengthened if cross-sectoral and inter-ministerial meetings are convened more frequently or more regularly to discuss smaller health events.
- Taiwan should ensure that its guidelines and SOPs are updated and coordinated across all sectors.
- Taiwan should update its official document for WHA 58.3 that requires ministerial agencies to report potential PHEICs to Taiwan's NFP.

Recommendations for Priority Actions

- Taiwan should ensure that there is high-level support for IHR detection/reporting obligations across all relevant government sectors by regularly scheduling meetings of ministerial officials to examine and discuss mutual IHR-related obligations and by updating cross-ministerial agreements for IHR reporting to the NFP.

Relevant Documentation

- INFOSAN Emergency- Final Update: Melamine-contaminated milk and other food products (2009)
- Event information update: Fukushima earthquake and Dai-ichi and Dai-ni nuclear accidents (2011)
- OIE notification: Rabies (2013)
- Manual for Biohazard Response and Verification and Expert Team
- TCDC EOC Activation Levels algorithm
- Biological Disaster Response Plan, 3rd Edition (2012)
- Taiwan Ministry IHR Contact Points list
- National Focal Point SOPs (2012)
 - Including Flow Chart for International Referrals
- Integrate and Promote the Network on Detection, Surveillance, and Control of Foodborne Diseases in Taiwan (2013)
- Example weekly avian influenza and rabies reports from CoA to TCDC- via SMS/e-mail
- Example weekly foodborne illness report from TFDA to TCDC- via SMS/e-mail (2016)
- Taiwan's Response Effort to the 2013 Rabies Outbreak (2014)
- Guidelines for Dengue/Chikungunya Control, 8th edition (2015)
- Influenza Pandemic Strategic Plan, 3rd edition (2012)
- TCDC Annual Report (2015)
- Example international reporting/referral e-mail regarding tuberculosis and Zika (2016)

Antimicrobial Resistance

Target

Support work is being coordinated by WHO, FAO, and OIE to develop an integrated and global package of activities to combat antimicrobial resistance, spanning human, animal, agricultural, food and environmental aspects (i.e., a One Health approach), including: a) Each country has its own national comprehensive plan to combat antimicrobial resistance; b) Strengthen surveillance and laboratory capacity at the national and international level following agreed international standards developed in the framework of the Global Action plan, considering existing standards; and c) Improved conservation of existing treatments and collaboration to support the sustainable development of new antibiotics, alternative treatments, preventive measures, and rapid point-of-care diagnostics, including systems to preserve new antibiotics.

Taiwan Level of Capabilities

Taiwan has advanced capabilities for antimicrobial resistance (AMR) detection and reporting, which began in 2007. There are multiple systems for surveillance of resistant organisms in the human health and animal health sectors. With respect to human health, Taiwan maintains a National Reference Laboratory that is capable of advanced/confirmatory testing and a network of authorized laboratories at hospitals nationwide. Taiwan has been working to increase the number of authorized laboratories, so as to further decentralize testing efforts. With respect to animal health, Taiwan operates a national laboratory and a network of 28 laboratories that test for and report cases of AMR.

There are multiple, dedicated efforts for verifying laboratory test results through internationally recognized external quality assurance methods.

P.3.1 Antimicrobial resistance (AMR) detection — Score: 5

Strengths

- The National Action Plan on AMR is a multi-faceted, multidisciplinary approach, which works through the implementation of antimicrobial stewardship programs by hospitals, programs for surveillance of resistance, regular review of surveillance patterns and national policies, and allocation of additional resources to conduct enhanced surveillance/research for AMR.
- Taiwan has the capacity to detect and respond to emerging resistant pathogens.
- Hospitals in Taiwan participate in different AMR pathogen detection mechanisms and are able to test any WHO priority AMR pathogens.
- Within the human health sector, AMR testing is verified by external quality assurance (e.g., CAP, Taiwan Accreditation Foundation, proficiency testing by Taiwan Society of Laboratory Testing).
- Taiwan refers to OIE standards to conduct surveillance of AMR and to monitor indicator bacteria within the animal sector. Testing is conducted in accordance with ISO 17025 and the Clinical and Laboratory Standards Institute requirements.

Areas which need to be strengthened

- Additional coordination at the laboratory level is needed between the human health and agricultural sectors. Sharing of data and bacterial isolates and susceptibility information could be improved among TCDC, Taiwan Food and Drug Administration (TFDA), and CoA laboratories.

P.3.2 Surveillance of infections caused by AMR pathogens — Score: 5

Strengths

- All hospitals in Taiwan have responsibility for surveillance of infections caused by AMR pathogens; some hospitals also participate as sentinel sites for monitoring of specific pathogens.
- TCDC and local public health laboratories as well as hospitals can report AMR (and access data) through the National Notifiable Disease Surveillance System (NNDSS), and hospitals can report AMR infections and AMR susceptibility through the Taiwan Nosocomial Infection Surveillance System (TNIS). The Taiwan Surveillance of Antimicrobial Resistance (TSAR) is a biennial longitudinal surveillance program conducted at the national level by the National Health Research Institute.

Areas which need to be strengthened

- For AMR surveillance in animals, TFDA only monitors for AMR at slaughterhouses, not at farms, which provides only a small window into resistance patterns. Trace-back to affected farms and removal of animals with resistant organisms from the food supply do not occur.

P.3.3 Healthcare-associated infection (HCAI) prevention and control programs — Score: 4

Strengths

- Taiwan has a national plan to prevent HCAI, which is applicable to all hospitals. It is tied to healthcare performance promotion efforts and is reviewed and updated annually; however, not all designated hospitals have implemented all HCAI programs for 5 years.
- Some hospitals have negative pressure isolation suites and rooms for special management of highly infectious patients and MDR diseases.

Areas which need to be strengthened

- None

P.3.4 Antimicrobial stewardship activities — Score: 4

Strengths

- Taiwan has multiple systems in place to assess antibiotic use patterns for all hospitals. This is accomplished through development of medical quality indicators administered through the National Health Insurance plan, which are tied to hospitals' annual budgets, and through hospital accreditation, which has three indicators related to antimicrobial stewardship.
- The Veterinary Drugs Control Act requires prescriptions for antibiotic use in animals, save for 9 antimicrobials that are not used in humans.
- Taiwan initiated a 3-year National Antimicrobial Stewardship Program (Taiwan ASP) in 2013.

Areas which need to be strengthened

- Not all hospitals have resources to report AMR data. Additional resources and funding at community hospitals would be helpful to promote AMR surveillance, reporting, and management.
- Decisions on antimicrobial use are made at the hospital level and may vary significantly among hospitals. Additional national guidance on AMR stewardship may be helpful.

Recommendations for Priority Actions

- Taiwan should further develop its nationwide antimicrobial stewardship. While Taiwan implemented the National Antimicrobial Stewardship Program in 2013, evidence indicates that there is still considerable variability in antimicrobial use across healthcare facilities. Considering that the program was just initiated in 2013, its full impact may not yet be realized. Effective data collection and analysis could inform program review and adjustment over the next several years.
- Taiwan should work to further improve connections between surveillance systems for foodborne pathogens and AMR organisms.
- Taiwan should consider expanding efforts to test for AMR in the animal sector (prior to slaughterhouses) to ensure that resistance can be traced back to farms.

Relevant Documentation

- Communicable Disease Control Act (2015)
- Categorization of Communicable Diseases
- Regulations on Implementation of Communicable Disease Surveillance and Alert System, MOHW (2015)
- Regulations Governing Inspection and Implementation of Infection Control Measures in Medical Care Institutions, MOHW (2016)
- Regulations Governing Laboratory Testing for Communicable Diseases and Management of Laboratory Testing Institutions, MOHW (2015)
- Statistics of Communicable Diseases and Surveillance Report, 2013
- Annual Surveillance Report of Healthcare-associated Infections Among Medical Centers and Regional Hospitals, 2014
- Annual Surveillance Report of Healthcare-associated Infections in ICUs Among Local Hospitals, 2014
- List of hospitals reporting at least 1 of 8 communicable diseases to NNDSS
- National Patient Safety Goals
- Regulation and standards of hospital accreditation and infection control inspection related to the availability of functioning IPC policy, operational plan and SOPs at hospitals
- Standards for standard pressure and negative pressure isolation room
- Distribution of medical centers with negative pressure isolation room
- The Organizational Structure and Staffing Standards for Hospitals, the standard for IPC professionals staffing
- Criteria of IPC professionals staffing level in infection control inspection and hospital accreditation standards
- Infection Prevention and Control Standards (2016)
- National Health Insurance Pharmaceutical Reimbursement Principle
- Taiwan Guidelines for TB Diagnosis and Treatment (2015)
- International Standard of Tuberculosis Care (2009)
- National Health Insurance Global Budget Payment System Hospital Quality Assurance Program
- National Health Insurance Guaranteed Hospital Global Budget Program, 2015
- Standard Criteria for Hospital Antimicrobial Stewardship Accreditation and Hospital Infection Control Inspections
- National Health Insurance Medical Quality Information website
- Pharmaceutical Affairs Act, MOHW (2015)
- Veterinary Drugs Control Act, CoA (2013)
- TCDC Medical Infection Control Measures Guidelines
- Institute of Labor, Occupational Safety and Health Needlestick prevention advocacy website

- National Notifiable Disease Surveillance System (NNDSS) overview
- Taiwan Nosocomial Infection Surveillance System (TNIS) overview
- Taiwan Surveillance of Antimicrobial Resistance (TSAR) overview
 - List of participating hospitals
- National Antimicrobial Stewardship Program, TCDC (2013)
 - Antimicrobial Stewardship-Related E-Learning Courses List
 - Manual for Antimicrobial Stewardship
 - Assessment Items for Antimicrobial Stewardship Program (2015)
 - Index of Antimicrobial Stewardship Program (2015)
 - Promotional Products for Antimicrobial Stewardship Programs
- Example AMR surveillance and epidemiology research projects
- Master Plan for Healthcare Associated Infections Prevention and Biosafety and Biosecurity Practices, Executive Yuan (2009)
- Healthcare Performance Promotion Program, Executive Yuan (2009)
- Nationwide Campaign on Hand Hygiene
 - List of participating hospitals
- Nationwide Campaign on Central Line Bundle, TCDC (2014)
 - List of participating hospitals and program workbooks/forms
 - Revised implementation and funding (2015)
- Nationwide Campaign on Care Bundles to Prevent CAUTI & VAP, TCDC (2015)
 - List of participating hospitals and program workbooks/forms
- Example Quarterly Surveillance Report of Taiwan Nosocomial Infection Surveillance System (2015)
- Analysis report of surveillance indexes of National Antimicrobial Stewardship Program in 2015
- Example External Quality Assurance certificates for TCDC

Zoonotic Disease

Target

Adopted measured behaviors, policies, and/or practices that minimize the transmission of zoonotic diseases from animals into human populations.

Taiwan Level of Capabilities

Taiwan has a number of policies and practices in place to prevent and respond to zoonotic disease transmission in the country. TCDC has real-time human surveillance capabilities in place through the NNDSS for a number of important diseases that may be transmitted from animals to humans—including influenza, SARS, MERS, Rabies, Japanese Encephalitis, bovine tuberculosis, and hantavirus. In addition, CoA has established surveillance and reporting requirements for diseases of human importance in animal populations, including for highly pathogenic avian influenza viruses, bovine spongiform encephalopathy, brucellosis, and rabies. Wild animal populations are monitored passively and the public is encouraged to report sick animals to the local agricultural authority. Human and animal health data are collected and reported regularly, made publicly available on TCDC and CoA websites, and shared across government agencies via e-mail and interagency meetings. CoA coordinates and trains veterinary staff and leads animal screening, vaccination, quarantine, and mitigation efforts.

P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens — **Score: 5**

Strengths

- There are strong surveillance systems in place for zoonotic diseases/pathogens. CoA conducts surveillance of disease in domestic and wild animals. Surveillance systems are updated regularly (weekly), and the data and analyses are made available publicly on the Ministry of Agriculture website.
- CoA has a list of priority pathogens for animal and zoonotic diseases.

Areas which need to be strengthened

- Greater coordination between CoA and TCDC is needed. The two agencies currently coordinate on more of an *ad hoc* basis, and surveillance systems are not directly linked. The 2 agencies, however, share information relatively frequently.
- Currently, there is no One Health policy in Taiwan; however, there is a project being planned to draft a formal One Health policy for the Taiwan government. This project will start at the beginning of 2017.

P.4.2 Veterinary or Animal Health Workforce — **Score: 5**

Strengths

- CoA provides short, 3-day training sessions to local Bureau of Agriculture staff, including veterinary officers responsible for prevention and control of animal diseases.

Areas which need to be strengthened

- Training of public health staff on controlling zoonotic diseases is minimal.
- Currently, there are no exchanges of staff between CoA and FETP, and FETP staff are not trained as part of the CoA program.

P.4.3 Mechanisms for responding to infectious zoonoses and potential zoonoses are established and functional

— **Score: 5**

Strengths

- TCDC response to human infections is very well coordinated and managed. With real-time surveillance in place, TCDC can respond, isolate, and investigate cases very quickly. During the recent H7N9 outbreak, TCDC isolated and investigated all cases within 24 hours of the patients entering the healthcare system.

Areas which need to be strengthened

- None

Recommendations for Priority Actions

- Develop and implement One Health policies that help clarify roles at the executive, regional, and local government levels and increase coordination among programs for animal and human health preparedness, surveillance, and response.
- Link human health and surveillance systems seamlessly so that TCDC and CoA share human and animal health data automatically.
- Provide additional training to local and regional agricultural staff, and conduct One Health trainings that involve veterinary and animal health workers, human epidemiologists, and public health agency staff.

Relevant Documentation

- One Health Approach to Global Health Security: An Integrated Study of Infectious Disease Prevention and Control (2016)
- Prevention and Control Project of Zoonotic Animal Diseases Program (2016)
- Taiwan's Response Efforts to the 2013 Rabies Outbreak (2014)
- Public Health Responses to Reemergence of Animal Rabies, Taiwan, July 16–December 28, 2013 (2015)
- Taiwan Epidemiology Bulletin, Rabies Issue (2013)
- Communicable Disease Control Act (2015)
- Statute for Prevention and Control of Infectious Animals Disease (2014)
 - Including Enforcement Rules (2009)
- Seasonal Influenza Vaccination Program (2015)
- Voluntary Pre-Pandemic (A/H5N1) Vaccine Immunization Program (2016)
- Enforcement Rules of Statute for Prevention and Control of Infectious Animal Diseases (2009)
- List of Major Zoonotic Diseases: Article 17 of Chapter 3 Epidemic Control, Statute for Prevention and Control of Infectious Animal Disease - announcement on April 24, 2015
- Animals Emergency and Epidemic Situation Reporting Process
- Bureau of Animal and Plant Health, Inspection, and Quarantine weekly surveillance reports
- National Infectious Disease Statistics System
- Application form for furnishing biological material
- Spacer oligonucleotide typing (spoligotyping) Standard Operating Procedures
- Geographical Distribution of Avian Influenza Outbreaks in Taiwan (2016)
- Training Program for Veterinary Clinical Epidemiologists
- Manual for Tuberculosis Control, Chapter 4: Case Management, *M. bovis* infection (2015)

Food Safety

Target

States Parties should have surveillance and response capacity for food- and waterborne disease risks or events. It requires effective communication and collaboration among the sectors responsible for food safety and safe water and sanitation.

Taiwan Level of Capabilities

Taiwan has established regulations and protocols, based on international standards, to govern food safety in the country. While Taiwan cannot participate directly as a member state in the WHO International Food Safety Authorities Network (INFOSAN), the government is in direct contact with INFOSAN in order to gather relevant international information related to food safety and to share information and data from Taiwan with the international community. TFDA has established a Product Management Distribution System (PMDS) to manage food safety inspections nationwide; this system incorporates information on food source, supplier, and supply chain. TFDA has also established PulseNet, a foodborne illness surveillance and reporting system. TFDA shares data on foodborne illness events, food product/environmental sample results, and results from human specimen testing directly and daily with TCDC through PMDS, which is connected seamlessly with TCDC information systems. TFDA, TCDC, and CoA have existing interagency coordination mechanisms and guidelines that govern information sharing between the agricultural and human health sectors and outline procedures for monitoring foodborne pathogens in agricultural, aquatic, and livestock product sources; pathogens in food product sources; and foodborne diseases in the human population. In 2014, Taiwan rapidly and effectively mobilized a response to an incident involving illegally recycled food oil—involving local health bureaus, TFDA, TCDC, MOHW, and law enforcement authorities—to identify the source, resolve the incident, and improve food safety standards in Taiwan.

P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination — Score: 3

Strengths

- TFDA has a good foodborne illness surveillance and reporting system in place (PulseNet), data from which is widely available on the MOHW website.
- Legislation is in place governing safety of food manufacturing, processing, packaging, transportation, storage, sale, importation, preparation, and service.
- At the national level, TCDC and TFDA regularly work together to share data and control large outbreaks of foodborne illness when they occur. Local health bureau personnel are able to complete Rapid Assessment Forms for outbreak investigations, and FETP-trained personnel from TFDA and TCDC are available to support local food safety and foodborne illness investigations as necessary.
- TFDA capabilities for surveillance, investigation, and response to food contamination incidents involving chemicals or other non-microbiological contaminants are strong.
- TFDA provides annual food hygiene and foodborne illness investigation training and coordinates with outside agencies (e.g., academic programs, private entities) to conduct other rigorous food safety and foodborne illness investigation training courses throughout the country. Trainings include epidemiology theory and practice as well as biostatistics and survey design, culminating with a practical simulated investigation (at least 60 hours of total training).

Areas which need to be strengthened

- Taiwan does not currently participate in INFOSAN, but is striving to participate in some capacity.
- While TFDA and TCDC work well together, there seems to be less collaboration at both the national level between TCDC and CoA and the local level between public health and agricultural authorities.
- At the local and regional levels, sharing of information and isolates between TCDC, TFDA, and CoA does not seem to be frequent or routinized. This may inhibit rapid identification and control of foodborne illness and prevention of food contamination and outbreaks stemming from contamination.
- Currently, TFDA and CoA do not routinely monitor food ingredients for microbiological contamination. Farms are not routinely inspected, only slaughterhouses or production facilities, so microbial outbreaks are rarely traced back to an individual farm or responsible ingredient. There is some reluctance on the part of TFDA and CoA to implement this kind of surveillance.
- While training opportunities for food safety and foodborne illness investigation do exist, many local officials reportedly are unable to participate because they often cannot take the time off from their daily duties and responsibilities to complete the training.

Recommendations for Priority Actions

- Additional routine coordination and communication between the human and animal health sectors could reduce the incidence of foodborne disease and improve investigation and response to outbreaks.
- Making training more available and accessible to local public health officials responsible for health inspection, foodborne illness investigation, and case reporting would be very beneficial. Standardized training at the local level could help reduce the incidence and spread of foodborne illness.
- Additional focus by TFDA and CoA is needed on monitoring pathogens in food product sources and in agricultural, aquatic, and livestock product sources. Regular inspection of farms could help with early identification of contamination in livestock and plant products, would provide surveillance data to assist with detection and trace-back of responsible food products in an outbreak, and would prevent some downstream human illness. More routine testing of food products being sold to restaurants and markets would also provide important surveillance data and would help to prevent illness.

Relevant Documentation

- Executive Yuan Chronicle of the Handling of the Recycled Oil Incident
- Product Management Distribution System website
- TFDA Annual Report (2015)
- Journal of Food and Drug Analysis

Biosafety and Biosecurity

Target

A whole-of-government national biosafety and biosecurity system is in place, ensuring that especially dangerous pathogens are identified, held, secured, and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach are 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 are in place as appropriate.

Taiwan Level of Capabilities

Taiwan has a multi-sectoral plan for ensuring biosafety at laboratories within the country, which include ISO accreditation, inspection/oversight, and continued training of laboratory workers. It has identified which laboratories house dangerous pathogens and is currently developing regulations and procedures for enhancing biosecurity.

P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities — Score: 3

Strengths

- Biosecurity programs are well established in Taiwan. The Communicable Disease Control Act and Regulations Governing Management of Infectious Biological Materials (2005) regulate possession, storage, and handling of dangerous biological pathogens.
- MOHW has established a Laboratory Biosafety Information Management System to monitor numbers and types of collections of dangerous pathogens in the country.
- Medical and research laboratories are typically accredited under ISO 17025 or ISO 15189. Laboratories at the BSL-3 level or above are licensed and are inspected regularly. Licensed laboratories are required to have Institutional Biosafety Committees, training programs, safety equipment, emergency plans, and SOPs for good laboratory practices.
- Access to potentially dangerous pathogens and sensitive information about inventory are restricted to authorized personnel.
- Taiwan has made significant efforts to consolidate dangerous pathogens and toxins to a minimum number of laboratory facilities and will continue these efforts going forward.
- Taiwan's MOHW has developed rules for dual-use research.

Areas which need to be strengthened

- Currently, Taiwan does not have a Select Agent program; however, Operation Directions Governing Management of Select Agents are in the process of being drafted to address this. This program is scheduled to take effect in 2016.
- Biosecurity policies and practices are limited. Aside from access controls, additional security practices such as background checks or personnel reliability programs could enhance biosecurity in Taiwan.
- Consolidation of dangerous pathogens is not yet completed according to TCDC goals.

P.6.2 Biosafety and biosecurity training and practices — **Score: 3**

Strengths

- Training programs on biosafety and biosecurity are in place (since 2006) for BSL-3 and above laboratories. These trainings are conducted every year.
- Laboratory workers participate in annual exercises and external inspections.
- Regular inspection of high-containment laboratories indicates high compliance with biosafety procedures.
- Taiwan strives to meet both WHO and US CDC guidelines on biosafety/biosecurity policy.
- The government, private sector, and academic institutions cooperate well on biosafety/biosecurity.
- MOHW is planning to increase biosecurity and biosafety trainings for personnel working with Select Agents (the Select Agent Program is expected to begin in 2016).
- Taiwan has in place a program to regularly conduct security-related review of laboratory personnel in high-containment laboratories; however, this does not extend to other personnel that handle dangerous pathogens, such as those who work in the field (e.g., bioterrorism response, specimen collection).

Areas which need to be strengthened

- Training programs are currently not specifically focused on dangerous pathogens. TCDC recognizes the need for additional training in this area and plans to implement training and management for dangerous pathogens in the coming year as part of their Select Agent program.
- Additional expertise and guidance related to high-containment facilities would be helpful in implementation of biosecurity and biosafety measures for select agents.

Recommendations for Priority Actions

- Taiwan should continue with their plan to implement a Select Agent program—including consolidation of dangerous pathogen and toxin inventories—and improve training, physical security, and personnel monitoring (including non-laboratory personnel with access to dangerous agents) accordingly.
- Consolidation of dangerous pathogens into a small, controlled set of laboratories would reduce the risk from work on these pathogens and reduce the resources required to safeguard them.

Relevant Documentation

- Operation Directions Governing Management of Select Agents (Draft), MOHW (2016)
- List of Select Agents kept in Installation Unit in Taiwan, MOHW (2016)
- Regulations Governing Management of Infectious Biological Materials, MOHW (2014)
- Operation Directions Governing Management of Infectious Biological Materials, MOHW (2014)
- Frameworks of National Biosafety and Biosecurity Legislation, Regulations, MOHW (2016)
- Laboratory Biosafety Management: A Compilation of Regulations and Administrative Guidance, 2nd edition, TCDC (2015)
- The Pass Rate of Lab Inspection Criteria (GHS related items) of BSL-3 laboratories in 2014-2015, MOHW (2016)
- Guideline for Review for Research Projects of Highly Dangerous Pathogens and Biotoxins, MOHW (2016)
- The Implementation of Laboratory Biorisk Management System for High-Protection Laboratories: Research Project Plan in 2015, MOHW
- The Implementation of Laboratory Biorisk Management System for High-Protection Laboratories: Research Project Plan in 2016, MOHW

- The Study of Establishing Laboratory Biorisk Management System in Biotechnology-Related Laboratories: Research Project Plan in 2016, MOHW
- Guideline for Appraisal of the Biosafety Competency of Laboratory Personnel , MOHW (2016)
- Testing Methods of Select Agents Corresponding to Notifiable Infectious Diseases, MOHW (2016)
- Course list of biosafety education and training organized by TCDC in 2006-2015
- Training Course List for the Workers in Facilities Housing or Working with Dangerous Pathogens (Draft), MOHW (2016)
- Course list of laboratory biosafety e-learning courses recorded by TCDC in 2010-2015
- Survey results of laboratory biosafety incident exercises for installation units possessing select agents, MOHW (2016)
- Course list for the biosafety train-the-trainer program organized by TCDC in 2010-2015
- Status of biosafety education and training for installation units possessing select agents, MOHW 2016
- BSL-3 laboratory personal protective equipment inventory status, MOHW (2016)

Immunization

Target

A functioning 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.

Taiwan Level of Capabilities

Taiwan has a robust national-level immunization program, which provides WHO Expanded Programme on Immunization (EPI) vaccines to children at no cost. Taiwan's National Vaccine Action Plan is also closely aligned with the WHO Global Vaccine Action Plan (GVAP). TCDC reviews and updates immunization programs and plans every 5 years to reflect changes in epidemiology, availability of vaccines, and advice from the Taiwan Advisory Committee on Immunization Practices (ACIP). The national vaccination program in Taiwan achieves very high immunization rates, with coverage of over 96% of children for primary doses of vaccines including HepB3, DTaP-IPV-Hib3, varicella, MMR1 and JE2, and over 93% for booster doses when needed. The Ministry of Health and Welfare also provides HPV vaccine at no cost to teenage girls in remote areas and from medium-low income households. Taiwan has strong vaccine delivery systems but limited domestic vaccine production capacity. Taiwan established a National Vaccine Fund in 2010, but further effort is needed to ensure steady funding and the ability to add vaccines (e.g., rotavirus vaccine) to the immunization program in the future.

P.7.1 Vaccine coverage (measles) as part of national program — Score: 5

Strengths

- Taiwan has a comprehensive program for routine childhood immunization, including nationally important vaccines beyond the scope of the WHO Global Vaccine Action Plan.
- Routine vaccination is promoted through the Plan for the Establishment of a National Vaccine Fund and Strengthening Public Immunity.
- Taiwan has an adverse event surveillance system and an immunization compensation fund to which vaccine manufacturers are required to contribute.
- Taiwan has a comprehensive National Immunization Information System (NIIS), which tracks vaccination rates through electronic medical records and school enrolment records. All data are available in real time in a central database and are routinely accessed by public health personnel.
- Coverage of the overall population for childhood vaccines is very high (98% for MMR1). Coverage of aboriginal peoples living in the mountainous regions of Taiwan is more difficult, but vaccination coverage is still high (over 90%).

Areas which need to be strengthened

- There is no penalty for non-compliance with mandatory vaccination. Children are not barred from entering school if they have not been vaccinated.
- Limited funding for the national vaccination program hinders Taiwan's ability to subsidize vaccine costs as well as efforts to add new vaccines to the national immunization schedule. The national vaccine fund does not cover the costs of new vaccinations that should be added according to the WHO recommendations, including Rotavirus and Hepatitis A vaccines.

P.7.2 National vaccine access and delivery — **Score: 5**

Strengths

- Taiwan has operational procedures, plans, and equipment in place to ensure cold chain for vaccines, with redundant systems for use during emergencies when power is discontinued. Vaccine management staff monitor vaccine temperatures regularly.
- Taiwan signs long-term contracts with vaccine manufacturers for high-quality vaccines in order to ensure an uninterrupted supply of vaccines for the country.
- Because Taiwan is a small island, much of the population is easily accessed and covered by routine vaccinations. Reaching aboriginal populations is more difficult, but this is being accomplished through targeted campaigns.
- Vaccination promotion information is available in many languages, and marginalized populations receive targeted attention and greater subsidization for vaccine services.

Areas which need to be strengthened

- Domestic vaccine production capacity for the country is currently limited to influenza and Japanese Encephalitis vaccine, but Taiwan is seeking to establish additional capacity in country.

Recommendations for Priority Actions

- Additional funding should be allocated to support Taiwan's National Vaccine Fund to enable an expanded national vaccine program. Steady funding for the National Vaccine Fund should be a priority.
- Taiwan should explore whether establishing additional in-country vaccine production capacity would be cost-effective and feasible for any of the vaccines covered under the national program.

Relevant Documentation

- Communicable Disease Control Act
- Current immunization schedule in Taiwan
- Survey of Willingness and Perceptions of Influenza Vaccination Among Elderly Persons Over the Age of 65, Global Views Survey Research Center (2016)
- The Hepatitis Control Program, Phase I to Phase VI (1981-2010)
- Program of Eradication of Poliomyelitis, Congenital Rubella Syndrome, Neonatal Tetanus and Measles, Phase I to Phase IV (1991-2010)
- Acute Infectious Disease Epidemic Risk Monitoring and Management Program, Phase I to Phase II, 2011-2020
- Plan for the Establishment of a National Vaccine Fund and Strengthening Public Immunity, Phase I to Phase II, 2008-2018
- List of target immunization coverage rates for each EPI vaccine (2015)
- Vaccine cold chain management handbook

DETECT

National Laboratory System

Target

Real-time biosurveillance with a national laboratory system and effective, modern point-of-care and laboratory-based diagnostics.

Taiwan Level of Capabilities

Taiwan has advanced capability for laboratory testing of 10 core tests. There are a total of 1,251 microbiological laboratories in a tiered system that addresses medical, agricultural, food, and environmental needs, including 31 national labs (national level), 23 local health bureau labs (regional level), 405 hospital labs (regional level), 530 university and research institute labs (district level), and 262 private labs (district level). Among these, 13 national labs as well as 16 commissioned regional-level labs, 75 private labs, 18 clinics, 67 district hospital labs, 85 regional hospital labs, 31 medical center labs, and 14 local health bureau labs are authorized to report on various notifiable diseases.

For the animal health sector, the Taiwan Animal Health Research Institute (AHRI) is capable of diagnosing avian influenza and *Mycobacterium bovis*. Additionally, 4 local laboratories spread throughout the country perform active surveillance for avian influenza in the field.

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

Strengths

- Taiwan's national laboratory system is a tiered system and has the capability to test for priority diseases, including all 10 core tests.
- Taiwan ensures the standardization of testing throughout the tiered laboratory system through the Manual of Standard Operating Procedures of Communicable Diseases.
- Taiwan has official agreements with international governments for specialized testing and pathogen confirmation.

Areas which need to be strengthened

- None

D.1.2 Specimen referral and transport system — Score: 5

Strengths

- There are documented regulations governing the specimen referral network for each of the core tests, and there is evidence of a functioning referral system for each of the core tests.
- Courier contracts for specimen transport are funded by TCDC on an annual basis.
- Taiwan participates in several regional and international laboratory networks in both the human and animal health sectors.

Areas which need to be strengthened

- None

D.1.3 Effective modern point-of-care and laboratory-based diagnostics — Score: 5

Strengths

- Commercial point-of-care tests are available and routinely used at clinical sites for influenza and dengue.
- During outbreaks, Taiwan pays the fees for diagnosis using these tests.
- Taiwan has developed and commercialized several point-of-care infectious disease diagnostic tests.
- Taiwan has in-country production and procurement processes for acquiring necessary media and reagents.

Areas which need to be strengthened

- None

D.1.4 Laboratory quality system — Score: 5

Strengths

- Taiwan maintains multi-layered system for laboratory data validation.
- Laboratories are licensed by TCDC and inspected by local health bureaus. Laboratories are accredited by Taiwan Accreditation Foundation and via ISO certification.
- In-vitro diagnostics are regulated by TFDA.
- Laboratory equipment is maintained through maintenance contracts.
- Though laboratories in Taiwan are not able to be accredited by WHO, some laboratories have voluntarily participated in WHO-coordinated proficiency testing for some pathogens/diseases, including polio, *Salmonella*, tuberculosis, and measles, to ensure diagnostic quality.

Areas which need to be strengthened

- None

Recommendations for Priority Actions

- Taiwan should work to improve the interoperability of data systems for human public health and animal health laboratories.
- Due to Taiwan's unique political status, its public health laboratories are unable to be accredited by WHO, which limits Taiwan's ability to fully participate in global laboratory/surveillance networks.

Relevant Documentation

- Manual for Infectious Specimen Collection (2015)
- Taiwan Guidelines for TB Diagnosis and Treatment (2015)
- Certificate of Accreditation (ISO 15189) for TCDC national laboratories (2015)
- Certificate of Accreditation (ISO 17025) for Animal Health Research Institute (AHRI) national laboratories (2016)
- Certificate of Participation in *Salmonella* External Quality Assurance for TCDC Central Region Laboratory (2013-2014)
- Certificate of Participation in WHO Global Foodborne Infections Network (GFN) External Quality Assurance System for TCDC Center for Research and Diagnostics (2014)
- Results of 2015 blood-parasitology peer testing conducted by the College of American Pathologists
- Regulations Governing Laboratory Testing for Communicable Diseases and Management of Laboratory Testing Institutions (2015)
- Requirements for the Quality Assurance Operation to Laboratory Testing Institutions (2015)

- Guidelines for Authorizing Laboratory Testing Institutes, MOHW (2016)
- Malaria Microscopy Training Course: *Plasmodium* spp. Morphology Identification Test (TCDC)
- Monitoring Project for the Quality Control of AIDS and Hepatitis C Virus
- Implementation Regulations Governing Materials for Communicable Disease Control and Establishment of Resources
- Standard Operating Procedures for PPE Used in BSL-3 Laboratories (2013)
- Technical Training Program for New Employees at the TCDC National Laboratory
- Regulations Governing Management of Infectious Biological Materials (2014)
- Rule for approved training courses for new staff in BSL-3 and above laboratories
- Standard Operating Procedures (SOPs) for the Performance of 10 Core Laboratory Tests (2016)
- Standard Operating Procedure for Detection of Highly Pathogenic Avian Influenza Viruses
- Creutzfeldt-Jakob report from the UK (2013)
- Manual of Communicable Disease Standard Operating Procedures (2014)
- Number of clinical specimens submitted to national laboratories for core testing (2013-2015)
- Number of virus isolates submitted to national laboratories for influenza, enteroviral, and other diseases (2013-2015)
- Document of participation in PulseNet Asia Pacific/PulseNet International for *Salmonella* and other pathogens
- WHO Conference Report: Strengthening the influenza vaccine virus selection and development process: outcome of the 2nd WHO Informal Consultation for Improving Influenza Vaccine Virus Selection held at the Centre International de Conférences (CICG) Geneva, Switzerland, 7 to 9 December 2011 (2013)
- Document of attending the 2nd, 3rd, and 4th Vaccine Preventable Diseases Laboratory Network in the Western Pacific Region meetings (2010, 2011, 2013)
- National Documentation for Maintenance of Poliomyelitis Eradication in Taiwan (2015)
- Measles and rubella serology proficiency results , Center for Research, Diagnostics, and Vaccine Development (2015)
- 2015 WPRO Polio PT virus isolation results, HIV and Viral Emerging Infectious Disease Laboratory
- Certificate of Proficiency for tuberculosis phenotypic drug susceptibility testing, TB Reference Laboratory (2015)
- The number of laboratories accredited by TAF in Taiwan
- The number of laboratories accredited by CAP in Taiwan
- Program for Quality Monitoring at Tuberculosis Laboratories in Taiwan (2015)
- Supervision Checklists for TB Laboratories
- Operations for Quality Improvement in National Laboratories of Taiwan CDC (2015)
- Self-Reports for Abnormal Diagnostic Quality in Laboratories (2015)

Real-Time Surveillance

Target

Strengthened foundational indicator- and event-based surveillance systems that are able to detect events of significance for public health, animal health, and health security; improved communication and collaboration across sectors and between sub-national, national, and international levels of authority regarding surveillance of events of public health significance; improved country and regional capacity to analyze and link data from and between strengthened, real-time surveillance systems, including interoperable, interconnected electronic reporting systems. This can 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 IHR and OIE standards.

Taiwan Level of Capabilities

Taiwan has highly developed and varied indicator- and event-based surveillance systems and deep expertise in data management, analysis, and visualization. Taiwan shares its surveillance information with national and local government stakeholders and with the public via open data initiatives. TCDC has developed a “data warehouse” that houses data from many of the disease surveillance systems. This data can be accessed by all local health departments, and users can retrieve, filter, and analyze relevant data. Taiwan regularly tries to improve its surveillance capabilities through cloud-based computing and big data initiatives. A particular strength is the requirement that clinicians view laboratory test results through NNDSS.

D.2.1 Indicator- and event-based surveillance systems — Score: 4

Strengths

- Taiwan consults many, varied data sources to supplement traditional indicator-based surveillance (e.g., NNDSS) and to verify disease/event-based signals.
- Taiwan conducts routine testing of its event-based surveillance systems.
- Taiwan maintains indicator-based surveillance systems that provide complete and timely data to support a range of public health analysis and response.

Areas which need to be strengthened

- Due to its unique political status, Taiwan is unable to participate in formal international surveillance networks; however, the Taiwanese desire to use their expertise to help other countries bolster their indicator- and event-based surveillance systems.

D.2.2 Interoperable, interconnected, electronic real-time reporting system — Score: 4

Strengths

- Taiwan has highly trained surveillance staff. Public health and clinical staff are routinely trained on use of surveillance systems, and feedback is solicited regarding user-friendliness of systems in order to make system improvements. Public health staff also receive training on various surveillance packages to improve their analytic skills.
- Taiwan’s Real-time Outbreak and Disease Surveillance (RODS) system routinely monitors a number of diseases and conditions—including enterovirus; influenza-like illness; acute diarrhea; acute hemorrhagic conjunctivitis; hand, foot, and mouth disease; and herpangina. Many of Taiwan’s surveillance streams are available publicly and in near-real time—including dengue, enterovirus, influenza, and acute diarrhea.

- Taiwan has been working to improve clinicians' use of NNDSS by reducing barriers to log-on.
- TFDA's Product Management Distribution System is interconnected to the TCDC data warehouse.

Areas which need to be strengthened

- Public health and veterinary surveillance systems are not yet interconnected.

D.2.3 Analysis of surveillance data — **Score: 5**

Strengths

- Laboratory diagnoses of specimens collected from suspected patients for notifiable diseases are required to be finished within a predefined turnaround time.
- Healthcare workers report and access test results for notifiable diseases via NNDSS which is interoperable with the Laboratory Information Management System used by Taiwan's reference laboratories.
- The Laboratory Automated Reporting System submits daily positive results of diagnoses by clinical laboratories for 20 microbiological organisms of public health concern (but not officially designated as notifiable).
- An agreement between TCDC, TFDA, and CoA established a foodborne diseases information exchange platform that provides notification of positive test results.

Areas which need to be strengthened

- None

D.2.4 Syndromic surveillance systems — **Score: 4**

Strengths

- Taiwan has multiple, well-established healthcare-based syndromic surveillance systems in routine use, and all utilize electronic reporting.
- Syndromic surveillance systems have extensive coverage of hospitals and populations within Taiwan.
- Taiwan maintains a number of ongoing, multi-faceted data validation efforts to ensure data quality and utility.

Areas which need to be strengthened

- Due to its unique political status, Taiwan is unable to participate in formal international surveillance networks (with the exception of PulseNet International); however, Taiwan desires to use its expertise to help other countries bolster their syndromic surveillance systems.

Recommendations for Priority Actions

- Through its collaboration with Public Health England to develop an application to support surveillance during mass gatherings, Taiwan has demonstrated its potential to share its knowledge and experience with international partners. Taiwan should continue to share its expertise with other countries to boost international surveillance efforts.

Relevant Documentation

- Communicable and Emerging Infectious Disease Report Form (2016)
- Standard operating procedures for the 1922 disease reporting hotline (2010)
- Standard operating procedures for international epidemic surveillance
- Standard operating procedures for the Media Watch Room
- Taipei City Department of Health website

- Event-based surveillance in New Taipei City (2015)
- Operating Manual for National Notifiable Disease Surveillance System (2013-2015)
- Operating Manual for Symptom Surveillance System (2015)
- Operating Manual for School-Based Surveillance System (2015)
- Statistics of Communicable Diseases and Surveillance Reports (2006-2015)
- TCDC website international epidemic information
- Flowchart for testing the 1922 disease reporting hotline
- User operation manuals for indicator-based surveillance systems, TCDC website
- Manuals for training workshops for Department of Health staff
- National Notifiable Disease Surveillance System website
- Taiwan National Infectious Disease Statistics System website
- Taiwan government open data set list website
- Example food-related illness data sharing between TFDA and TCDC (e-mail; 2015)
- Example Disease Surveillance Weekly Meeting Report (TCDC/EIS; 2016)
- TCDC Press Release website
- TCDC Information for Health Professionals website
- TCDC Weekly Report of Enterovirus Infection (weekly reports) website
- TCDC Influenza Express (weekly reports) website
- TCDC Disease Surveillance Express (weekly reports) website
- TCDC Laboratory Automated Reporting System website
- Tuberculosis Case Management System Manual
- TCDC Monitor website- MDR-TB cases and rates
- TCDC Foodborne Diseases Information Exchange platform website
- MOHW annual death registry and statistics
- Universal Health Coverage in Taiwan, Bureau of National Health Insurance (2012)
- Human Surveillance in Response to the 2013 Re-emergence of Animal Rabies in Taiwan (2013)
- Norovirus Surveillance in Taiwan (2015)
- Influenza Express weekly reports, 2015-16 flu season
- Case definitions for national notifiable diseases
- Principle for completeness and timeliness of National Notifiable Infectious Disease Surveillance System evaluation (2009)
- Standard operating procedures for completeness and quality of National Notifiable Infectious Disease Surveillance System evaluation
- Standard operating procedures for timeliness of National Notifiable Infectious Disease Surveillance System evaluation
- TCDC laboratory surveillance testing quality and efficiency assurance program description
- Collaboration with Public Health England to develop mass gatherings medical surveillance app
- Taiwan country page on the PulseNet International website

Reporting

Target

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

Taiwan Level of Capabilities

Though not an official UN member state, Taiwan has developed and demonstrated its capacity to report significant events to WHO, FAO, and OIE contact points. Taiwan was granted access to the WHO's Event Information Site in 2009, as part of Taiwan's efforts to implement the 2005 IHRs, to provide a secure communication mechanism for Taiwan's IHR National Focal Point (NFP) to report health events. Taiwan CDC maintains and regularly updates the list of contact points for IHR reporting and has standard operating procedures in place for approving and reporting on a potential PHEIC to WHO within 24 hours. All relevant ministries in the Taiwan government are aware of the requirements and protocols to report to WHO, and TCDC has reported real events successfully—well within the required 24-hour reporting timeline. In addition to its WHO reporting activities, Taiwan maintains formal and informal relationships with NFPs in other countries in the region and around the world for the purpose of information exchange and collaboration.

D.3.1 System for efficient reporting to WHO, FAO, and OIE — Score: 5

Strengths

- Taiwan maintains a functional IHR NFP in TCDC, providing the capability to rapidly report PHEICs to the WHO and distribute IHR-related information to other governmental contacts. Additionally, Taiwan maintains an OIE contact point in the Bureau of Animal and Plant Health, Inspection, and Quarantine (BAPHIQ; under CoA).
- Taiwan has demonstrated the capability to rapidly report required PHEIC information to the WHO via the IHR NFP. Taiwan reported their first imported Zika case in January 2016 within the required 2 hours of laboratory confirmation.
- The Statute for Prevention and Control of Infectious Animal Disease mandates information sharing between the IHR NFP and OIE contact point for relevant zoonotic disease events.
- Taiwan maintains bilateral reporting agreements with the People's Republic of China (Cross-Strait Cooperation Agreement on Medicine and Public Health Affairs), facilitating past information exchange such as for avian influenza in 2013. Taiwan's CoA maintains a MOU with New Zealand for food safety and quarantine of animal and plant diseases.
- Taiwan has coordinated informally with the NFPs in Hong Kong, Republic of Korea, Thailand, Japan, New Zealand, and the United States.

Areas which need to be strengthened

- While Taiwan has access to the WHO Event Information Site to report health events, the NFP is still required to make additional reports to the WHO via e-mail, due to limitations of its unique political status.

D.3.2 Reporting network and protocols in country — Score: 5

Strengths

- The CECC facilitates interagency collaboration, information sharing, and communication across governmental ministries and agencies. Communication mechanisms between human and animal health sectors are outlined in national-level legislation.

- Taiwan has a designated National Focal Point that, in addition to reporting to WHO, distributes pertinent IHR-related information to its ministerial partners.
- Taiwan has a sustainable process for maintaining and improving reporting mechanisms supported by legislation.

Areas which need to be strengthened

- There are no formalized protocols for multi-sectoral coordination in reporting for health events. Coordination is determined on an *ad hoc* basis by the CECC. Outside of national emergencies, inter-ministry and interagency coordination occurs on an *ad hoc* basis.
- Taiwan has legislation regarding the decision-making protocol for the assessment and notification of PHEICs (based on WHA 58.3); however, it has not been assessed or updated since 2012. Taiwan has not yet assessed PHEIC reporting efficiency outside the context of infectious diseases.

Recommendations for Priority Actions

- Taiwan should continue to work to gain access to the official WHO reporting mechanism, even if it is unable to obtain full member state status with the WHO.
- The Taiwan government should strive to continue to improve and systematize communication and coordination across and among government agencies for public health events that may not meet the threshold of a PHEIC or activation of the CECC, but may still require the resources and input of multiple agencies in order to respond effectively.
- Taiwan should examine protocols and reporting performance for non-infectious disease public health emergencies. The government should ensure that plans are in place and are exercised to enable quality response and timely reporting of other public health emergencies.

Relevant Documentation

- TCDC Annual Report (2015)
- Example NFP e-mail report to IHR for imported Zika case (2016)
- OIE Exceptional Epidemiological Events website
- Major Zoonotic Infectious Animal Diseases (2015)
- The 180 Permanent Delegates of the OIE website
- Memorandum informing relevant sectors in Taiwan about the IHR reporting mechanism (2012)
- Cross-Strait Cooperation Agreement on Medicine and Public Health Affairs
- National Health Command Center website
- Press release for second imported Zika case (2016)

Workforce Development

Target

States Parties should have 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 (2005).

Taiwan Level of Capabilities

Taiwan has the workforce needed to comply with IHR requirements, but staffing is limited and hiring is difficult. There are professional staff at every local health bureau but not great depth of staffing. Taiwan operates a FETP program, but it is constrained in how many personnel can participate. The full 2-year FETP course trains several personnel each year, but the shorter course aimed at local public health practitioners is difficult for many to attend due to existing work commitments. Taiwan has limited opportunities to send its public health personnel to international events.

D.4.1 Human resources are available to implement IHR core capacity requirements — **Score: 4**

Strengths

- Taiwan has the capability to deploy personnel domestically to support IHR requirements. There is also the capability and willingness to deploy internationally.
- TCDC employs personnel with a variety of specialties at all levels of public health (national, intermediate, local). Local health bureaus typically have at least one doctor on staff to perform clinical work. All intermediate public health agencies have epidemiology and laboratory capacity to support local responses. Many counties have laboratory personnel on staff, although some do not perform laboratory activities.

Areas which need to be strengthened

- The hiring process is fairly rigid, at times making it difficult to bring in personnel with specific needed skill sets. For example, positions for social scientists (including anthropology/medical anthropology) and informatics are not currently available at TCDC. Additional biostatisticians would be beneficial as well.
- While Taiwan maintains the capability and willingness to deploy personnel internationally, it is unclear whether other nations would be willing to accept assistance from Taiwan. Financial restrictions impair the ability to deploy personnel internationally.
- Limited trained epidemiologists are available at the city/county level. Local health bureaus have personnel that can conduct case investigations, but they have no formal training in conducting outbreak investigations.

D.4.2 Applied epidemiology training program in place such as FETP — **Score: 4**

Strengths

- The FETP in Taiwan supports public health response capacity across the country. There are currently approximately 50 FETP graduates across the country available to support incident response.
- TCDC also sends personnel to serve in the US CDC EIS program and the European Program for Intervention Epidemiology Training (EPIET) at ECDC.
- While it is sometimes difficult to deploy FETP-trained personnel to other nations, Taiwan maintains a cross-strait agreement with mainland China to collaborate on cross-strait investigations as necessary.

Areas which need to be strengthened

- There are currently only two levels of training courses available (1-month course and full 2-year program). The 1-month course provides only minimal training for local public health professionals. It is unclear how effective the short course actually is, because there is no required examination for the participants.
- Currently trained field epidemiologists are not tracked, although it is presumed that most work for TCDC.
- There are no long-term training programs in public health for physicians, nurses, veterinarians, or laboratorians. These personnel learn on the job.
- The FETP program is limited to public health personnel only. There are no participants representing animal health or academia.

D.4.3 Workforce strategy — **Score: 5**

Strengths

- Taiwan has a national public health workforce strategy. Allotments for positions within MOHW are assessed and updated regularly.
- TCDC has a wealth of experience in its workforce. The median length of employment is 10 years, and the mean is 14.7 years. 65% of the workforce remains at TCDC until retirement.
- There are a number of efforts to encourage retention of the public health workforce, including partial scholarships for graduate studies, annual leave, and pension plans.
- Personnel can take leave to participate in overseas training and education programs or participate in local programs without sacrificing too much pay.

Areas which need to be strengthened

- The workforce status is reviewed every year by MOHW, but it is not always reported externally.
- The allotments for personnel do not always align with the needs of individual departments and agencies within MOHW.

Recommendations for Priority Actions

- Flexibility in hiring at the TCDC should be sought to allow an optimal mix of professionals.
- Public health training programs for clinicians and laboratorians should be considered.
- TCDC should explore participation in the Global Outbreak and Response Network (GOARN) as a way to gain international experience and share its expertise with others.

Relevant Documentation

- Organization of Taiwan Centers for Disease Control
- MOHW promotion criteria (2014)
- TCDC Promotion Sequence Table (2015)
- TCDC Work Education Regulations (2014)
- MOHW awards regulations (2013)
- MOHW gift certificates memorandum (2016)
- Field Epidemiology Training Program curriculum (2016)
- TCDC personnel allotment table

RESPOND

Preparedness

Target

Preparedness includes the development and maintenance of national, intermediate, and community/primary response level public health emergency response plans for relevant biological, chemical, radiological, and nuclear hazards. Mapping of potential hazards, identification and maintenance of available resources—including national stockpiles—and the capacity to support operations at the intermediate and community/primary response levels during a public health emergency.

Taiwan Level of Capabilities

The Disaster Prevention and Protection Act is the overarching regulatory document for preparedness and response in Taiwan and covers 19 different disaster types—including natural disasters as well as chemical, biological, and nuclear threats. As a requirement of the Disaster Prevention and Protection Act, Taiwan established the Disaster Prevention and Protection Basic Plan (Basic Plan)—a 5-year framework for defining priority disaster types, health risks, policies, and countermeasures—in 2007 and updated it in 2013. The Basic Plan addresses the responsibilities of individual ministries for different types of disasters as well as implementation of IHR core capacities as they relate to emergency preparedness and response. For hazards not covered by the Disaster Prevention and Protection Act, the Executive Yuan Central Disasters Prevention and Protection Council assigns a lead regulatory agency to execute preparedness and response activities.

Taiwan has the capability to establish emergency operations centers (EOCs) at various agencies and levels of government—including 6 Regional Emergency Operations Centers (REOCs), the National Health Command Center (NHCC) and CECC at TCDC and the Central Emergency Operations Center (CEOC) at the Executive Yuan—to provide robust flexibility in disaster response. Stockpiled resources are available for a number of different disaster types—including biological and radiological—and can be rapidly deployed in response to domestic or international incidents. Additionally, antivirals and vaccines are stockpiled for influenza. Disaster response plans are tested regularly and have been activated recently for a myriad of actual incidents. Taiwan also maintains a medical response network that includes 40% of all hospitals nationwide—public and private—to allow for transfer of patients to decompress medical surge during a response.

Taiwan conducts national risk assessments every 5 years—via the Central Disaster Prevention and Protection Commission—and preparedness and response plans are reviewed and updated every 2 years by the applicable authorities. The National Epidemic Risk Assessment is conducted weekly (or as often as twice daily during an incident response).

R.1.1 Multi-hazard national public health emergency preparedness and response plan is developed and implemented — Score: 5

Strengths

- The laws and planning in Taiwan for emergency preparedness and response at the national level are fairly comprehensive. The Disaster Prevention and Protection Act covers 19 different disaster types—including natural disasters and chemical, biological, and nuclear hazards. The Disaster Prevention and Protection Basic Plan identifies lead authorities at the ministry level for different types of disasters.

- Taiwan has the capacity to stand up multiple EOCs in applicable agencies and at multiple levels of government. This provides central leadership and coordination if necessary for cross-sectoral responses and enables responses to scale as required for different incidents.
- Taiwan operates an emergency medical network consisting of 40% of the nation's hospitals—public and private—to provide surge capacity and allow for surge decompression during incident response.
- Plans are reviewed and tested regularly and are updated to reflect lessons learned from exercises or real events.

Areas which need to be strengthened

- The national response system is organized more around natural disasters rather than infectious disease threats. Greater awareness and implementation of infectious disease response is needed at the national level. Taiwan has implemented national infectious disease response plans for a number of diseases and conditions, including HIV, TB, acute infectious diseases, and influenza. Taiwan approved the Risk Surveillance and Preparedness Plan for Emerging Infectious Diseases in 2015 to strengthen preparedness and countermeasures for emerging infectious diseases and implemented the plan in 2016. There are currently no operational plans for compound disasters involving infectious diseases; however, Taiwan does have plans for other types of compound disasters.
- The budget for planning for infectious disease emergencies has been cut substantially in recent years. Funding is a concern for incident response.
- Taiwan needs a central platform to provide real-time resource management across multiple ministries during a response.

R.1.2 Priority public health risks and resources are mapped and utilized — Score: 5

Strengths

- MOHW units are required to undergo risk assessment and report major health risks to the Ministry, which weights and combines the reported risks into a national level risk assessment. Risk assessments are regularly revisited and revised.
- Resource mapping and operational plans are created at the ministry level, and resources such as supplies, hospital beds, and medical countermeasures (MCMs) are incorporated into central databases that enable tracking and reallocation of resources by the competent authorities.

Areas which need to be strengthened

- Annual budgets are insufficient to continually strengthen and improve risk assessment and resource mapping each year.
- The process to obtain funding from the Executive Yuan is slow and could potentially delay emergency response activities. An emergency response fund would provide rapid access to funding as necessary to initiate response actions, particularly for infectious disease incidents.
- It would be helpful to have a single platform that incorporates resource status from various ministries and sectors for a common operating picture. This capability to view the status of all resources in one place would help the Executive Yuan to better manage major disasters in the country.
- Local governments conduct regular training and exercises for preparedness activities; however, there are no metrics for determining the effectiveness of preparedness programs, particularly at the local level.

Recommendations for Priority Actions

- Taiwan needs a mechanism (e.g., standing emergency fund or expedited process) to rapidly allocate funding for emergency response. Delays in obtaining funding could postpone or otherwise negatively impact response activities, particularly with continually decreasing operating budgets.
- A central, cross-sectoral platform for providing real-time resource tracking would benefit central command and control of complex emergencies.
- Established metrics are needed to assess the effectiveness of preparedness programs, particularly at the local level.

Relevant Documentation

- Disaster Prevention and Protection Basic Plan (2013)
- Disaster Prevention and Protection Act (2016)
- List of Disaster Prevention and Protection operation plans
- Biological Disaster Prevention and Response Plan (2012)
- All-Out Defense Mobilization Readiness Act (2014)
- Introduction to Emergency Medical Services System
- Emergency Medical Services Act (2013)
- Regulations for Regional Emergency Medical Operation Centers (2008)
- Regulations for Public Health Authorities and Medical Institutions in Management of Emergency Medical Services for Mass Casualties (2000)
- Communicable Disease Control Act (2015)
- Implementation Regulations Governing Materials for Communicable Disease Control and Establishment of Resources (2016)
- Emergency Management Information Cloud (EMIC) introduction
- Central Epidemic Command Center (CECC) Dengue Fever epidemic report (2015)
- Dengue Fever response SWOT analysis (2016)
- Dengue prevention and control measures press release (2016)
- The Enforcement Rules of the Disaster Prevention and Protection Act (2011)
- List of “intolerable risks” from the Major Risk Analysis and Management Program (2015)
- TCDC Disease Control Consultation Committee member lists (2016)
- Directions for the Establishment of the Central Disaster Prevention and Protection Commission (2014)
- Budget Act (2013)

Emergency Response Operations

Target

Countries will have a public health Emergency Operation Center functioning according to minimum common standards; trained, functioning, multi-sectoral rapid response teams and “real-time” biosurveillance laboratory networks and information systems; and trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency.

Taiwan Level of Capabilities

Taiwan has robust emergency response operation capacity across a range of disaster types. Taiwan operates EOCs at a variety of agencies and levels of government, providing flexibility and scalability for response operations. Specialized EOCs such as TCDC’s CECC provide capabilities such as real-time surveillance for biological event response, and the CEOC at the Executive Yuan provides central leadership and cross-sectoral coordination capacity for complex incidents. These EOCs have redundant communications (including video and teleconference) and power sources and space for more than 100 responders operating 24 hours a day. Response and national government leadership can access real-time information via the Emergency Management Information Cloud (EMIC) and NNDSS to support timely decision making.

The Central Disaster Prevention and Response Council consists of a representatives from across many sectors pertaining to health and security. The Council meets twice yearly and holds topic-specific meetings with relevant entities on a more frequent basis. According to the Disaster Prevention and Protection Act, TCDC is designated as the lead agency for epidemic response. TCDC regularly coordinates with other applicable agencies during public health response, including the National Immigration Agency, CoA, Taiwan EPA, Ministry of Foreign Affairs (MOFA), Ministry of the Interior (MOI), and the Executive Yuan. The county and local level governments have their own Councils to facilitate preparedness and response activities at the appropriate level. Public health is involved in a number of disasters at the national level, and counties have their own health departments to support public health response at the subnational levels. The Communicable Disease Control Medical Network and Emergency Medical Services Network can mobilize resources and manpower to provide support for local incidents, and the Taiwan government is authorized by law to engage NGOs in emergency response.

TCDC operates the 1922 hotline (24/7) to provide information and assistance for civilians as well as clinicians regarding infectious diseases, including zoonotic diseases such as rabies. Additionally, BAPHIQ has established a hotline for animal disease consultation.

R.2.1 Capacity to Activate Emergency Operations — Score: 5

Strengths

- There are robust EOCs established at the national and ministry levels. These EOCs are well-resourced, with sufficient communication capabilities and redundant power sources to support 24/7 operations.
- There are also Regional Emergency Medical Operations Centers (REMOC) and local EOCs, which coordinate local response and report up to the national-level CEOC.
- The CECC serves as the EOC for significant infectious disease events. It has a sophisticated public health surveillance system and resource databases available in the NHCC.
- Responders at the national and subnational level conduct regular training and exercises, including an annual large-scale exercise involving 22 county governments. Additional basic and advanced training is conducted for specialized units such as the Disaster Medical Assistance Teams and Vector Control Technicians.

- Specialized training and regular exercises are conducted for EOC staff at the national and subnational level in accordance with the Disaster Prevention and Protection Operation Plan in order to familiarize responders with EOC facilities, communication and coordination systems, and response protocols. Just-in-time training is also conducted as necessary for each exercise or event.

Areas which need to be strengthened

- Taiwan has had few opportunities to join international trainings or meetings to discuss emergency operations, both to share expertise and gain expertise from other countries. While Taiwan may not be able to formally participate in many international training and education opportunities, it should continue to engage internationally, possibly through non-governmental organizations like GOARN or bilateral partnerships, to gain additional experience with emergency response operations.

R.2.2 Emergency Operations Center Operating Procedures and Plans — **Score: 5**

Strengths

- Taiwan has protocols in place describing which EOC, potentially including the CEOC, is activated for different types of disasters. It is also clear (depending on the type of disaster) which Ministry leads the EOC operations and which representatives are required to staff each EOC.
- There are robust operational procedures, training programs, and plans in place for the EOCs at the national level, particularly for the CECC. These are reviewed and updated every 2 years or as part of incident after-action plans as necessary.
- Taiwan has mechanisms in place to disseminate information for a variety of audiences, ranging from senior response leadership to the public health and medical community to the general public.

Areas which need to be strengthened

- EOC training (US FEMA IS-775 course) is required for EOC staff, but Incident Command System (ICS)-type training is not. It is recommended that basic ICS or similar training (based on the specific system used in Taiwan) be required for all potential responders at the local, regional, and national levels (e.g., FEMA ICS-100/200 for all responders and IS-700/800 and ICS-300/400 for leadership positions) to support consistent and cohesive response activities and provide scalable response capacity.
- TCDC EOC training is currently not conducted in collaboration with other agencies. It would be beneficial for operators to train together, especially for national emergency activations.
- Long-term planning for large emergencies does not appear to be a major consideration in EOC operations.
- Greater consideration for inclusion of external partners in EOC response (e.g., hospital associations, NGOs) would benefit emergency operations.
- There is currently no group, independent of the response, that follows the event and makes independent recommendations. This can help to provide an outside perspective and help avoid groupthink and biases, which can lead to response errors.

R.2.3 Emergency Operations Program — **Score: 5**

Strengths

- In preparation for a potential case of Ebola Virus Disease, Taiwan conducted a no-notice exercise in 2014 involving a symptomatic traveler returning from an affected West African country. This exercise was conducted at 99 regional hospitals and medical centers to assess healthcare response for a potential Ebola patient (including recording travel history and potential exposures).

- In preparation for a potential Zika virus infection, Taiwan conducted tabletop exercises in 22 local governments over a period of just 3 months in 2016. These exercises often involved participation from local health departments, healthcare facilities, and other relevant entities.
- EOCs at the national level are regularly activated for natural disasters and infectious disease emergencies. These emergencies have tested the capabilities of the EOCs. Activation within MOHW can occur within 30 minutes, and all Ministries are capable of activating their EOCs in under 2 hours.
- Exercises are conducted on a regular basis in addition to a number of actual emergency activations (41 total activations in the past 5 years, including 5 activations for public health events).
- After-action reports and improvement plans are regularly produced following activations and exercises, and updates are made to EOC procedures and operations.

Areas which need to be strengthened

- None

R.2.4 Case management procedures are implemented for IHR-relevant hazards — **Score: 5**

Strengths

- TCDC has developed case management guidance for 65 infectious diseases. Guidelines for other IHR-related hazards have been developed by relevant agencies, including the Atomic Energy Council (AEC) for nuclear/radiological events and Taiwan EPA for chemical events.
- SOPs are also in place to handle quarantine and transport of potentially infectious patients at the local level and points of entry.
- Procedures and SOPs for case management of IHR relevant hazards are in place and have been tested.
- Staff are also trained for case management of IHR relevant hazards—including vector control, bioterrorism, Ebola and other highly infectious diseases, chemical events, and nuclear/radiological events—to support a myriad of incident response types.

Areas which need to be strengthened

- None

Recommendations for Priority Actions

- Due in part to its unique political status, Taiwan has had little opportunity to participate in international training and educational opportunities with respect to emergency response operations. Taiwan has considerable expertise to share, and the Taiwanese are eager to learn from and engage with other countries. Taiwan needs to keep working to obtain seats at international events and possibly identify creative ways to engage with other countries for mutual benefit. Taiwan has been able to engage internationally outside of the WHO/UN in many other instances; non-governmental organizations such as GOARN could be good options for Taiwan to increase its international emergency response footprint. Taiwan applied for GOARN membership but received no response.
- Additionally, EOC training and exercises should regularly include coordination outside of TCDC. Involvement of multiple agencies, levels of government, and non-governmental organizations or entities (e.g., private healthcare facilities) will improve response capabilities, particularly for large and complex incidents.
- Long-term planning for incident response is not currently a priority for EOC operations. While immediate response activities should be a high priority, a formal process to look ahead to long-term response goals, resource requirements, and recovery would be beneficial.

Relevant Documentation

- Disaster Prevention and Protection Act (2016)
- Organization Framework of the Central Disaster Prevention and Protection System
- Central Emergency Operations Center Floor Plan
- TCDC Emergency Operations Center floor plan/physical structure
- TCDC Emergency Operations Center staff responsibility table (2016)
- TCDC power system scheduled maintenance contract and maintenance reports (2016)
- TCDC Emergency Operations Center/National Health Command Center phone list/chart
- Emergency radio information list
- Mobile satellite communication user's manual
- Police emergency phone/contact list
- Example incident phone/contact list (2015)
- Enforcement Regulations Governing the Central Epidemic Command Center (2008)
- National Health Command Center Communication Framework
- Example of multilateral videoconference capability
- Example TCDC incident Morning Meeting records (2016)
- Example MOHW Conference records (2016)
- Example Zika Virus response weekly situation report (2016)
- Disaster Management Report (2016)
- Global Summary of MERS Epidemic (2015)
- Records of Vector-borne Infectious Disease 2nd Coordination Meeting (2016)
- Records of Avian Influenza Virus 106th Coordination Meeting (2014)
- Example Disaster Prevention and Protection drill report (2015)
- Example Medical Officer Monthly Speech (2016)
- Epidemiological Investigation Basic Training Course agenda
- List of the Central Disaster Prevention Response Council duties
- Disaster Prevention and Protection Network framework
- Civil Defense Act (2014)
- Communicable Disease Control Act (2015)
- All-Out Defense Mobilization Readiness Act (2014)
- Report of Preparedness and Mobilization for Public Health Emergencies (2013)
- Example of Central Epidemic Command Center Activation Levels for Zika Virus Infection
- Example incident response surge staff timetable (2015)
- Disaster Prevention and Protection Basic Plan (2013)
- Disaster Medical Assistance Team (DMAT) Basic and Advanced Certificate Education curricula (2012/2014)
- Disaster Medical Assistance Team (DMAT) Community Emergency Response and Special Disaster Education Training Program curriculum (2016)
- Disease Vector Control Technician training course curriculum (2016)
- Disease Vector Control Technician contact list
- Emergency Management Information Cloud (EMIC) Regular Education Program curriculum (2016)
- Scenario/exercise descriptions for May 2016 tabletop exercises with central and local government
- Central Epidemics Command Center (CECC) Staff Training Program curriculum
- Example FEMA EOC Management and Operations (IS-00775) training certificate (2016)

- Biological Disaster Prevention and Response Plan (2012)
- Arrangement Operation Education curriculum (2015)
- Regional Training Center for Healthcare Workers to Work in West Africa- tentative training curriculum to support deploying healthcare workers to work in Ebola treatment units (2015)
- The Development and Promotion Project for Communicable Disease Control Medical Network Responding Hospitals (2015)
- Central Emergency Operations Center (CEOC) Operating Guidelines (2015)
- Central Emergency Operations Center (CEOC) Response Framework
- Central Epidemic Command Center (CECC) Level Three Activation Framework
- Example list of emergency response guideline with update dates and review frequency
- TCDC Professional website
- Emergency response decision-making framework
- Central Epidemic Command Center (CECC) Organizational Framework
- Example Letter to the Medical Community (2016)
- International epidemic tracking and travel advisory spreadsheet (2016)
- Example Disease Surveillance Express report (2016)
- “A No-Notice Drill of Hospital Preparedness in Responding to Ebola Virus Disease in Taiwan” (2015)
- Zika virus tabletop exercise summary (2016)
- Central Epidemic Command Center Dengue Fever report summary (2016)
- Emergency Operations Center activation event list (2011-2016)
- Central Epidemic Command Center activation event list (2006-2016)
- TCDC Communicable Diseases & Prevention case management guidelines (2016)
- Nuclear Emergency Response Basic Plan (2014)
- Operating Procedures for Nuclear Emergency (2016)
- Toxic Chemical Disaster Response Plan (2015)
- Operating Procedures for Toxic Chemical Disaster Evacuation (2006)
- Emergency Medical Services Act (2013)
- Points of Entry Standard Operating Procedures
- Inbound Quarantine Standard Operating Procedure (2014)
- Compulsory Patient Transfer Standard Operating Procedure (2014)
- List of contracted referral hospitals for transport of patients identified at points of entry
- Operation Role of Communicable Disease Control Network Designated Hospital Activation and Supporting Personnel Mobilization (2015)
- Preparedness Plan for Communicable Disease Control
- Flow Chart for Medical Air Transport
- Toxic Chemical Disaster Drill Seminar curriculum (2016)
- Nuclear Disaster Emergency Response Basic Education Program curriculum (2016)
- Radiological Disaster Response Workshop announcement (2015)

Linking Public Health and Security Authorities

Target

In the event of a biological event of suspected or confirmed deliberate origin, a country will be able to conduct a rapid, multi-sectoral response, including the capacity to link public health and law enforcement, and to provide and/or request effective and timely international assistance, including to investigate alleged use events.

Taiwan Level of Capabilities

Taiwan has a strong system in place for comprehensive cross-sectoral coordination, and collaboration between public health and security authorities in Taiwan is mandated by national legislation—including the Disaster Prevention and Protection Act and Communicable Disease Control Act. Other national-level legislation, policies, and SOPs direct collaboration and information sharing between various agencies and organizations to support routine and emergency operations. Additionally, Taiwan has established several national-level joint working groups to address specific topics, such as food safety, that include representatives from across relevant ministries, including public health and security authorities. Joint and cross-sectoral training is conducted at the national level to provide interdisciplinary and multi-sectoral familiarization of agency roles and responsibilities. At the local level, the Disaster Prevention and Protection Act provides mechanisms for cooperation between public health and security agencies via the incident commander for emergency responses; however, budgetary constraints and lack of firsthand experience have limited the ability of local governments to develop and implement response procedures for bioterror events. Public health and security authorities have demonstrated the capability to collaborate in a myriad of routine activities, exercises, and actual responses.

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

Strengths

- National-level legislation and policy are in place to ensure cross-sectoral collaboration between public health and security authorities. Relevant documents include the Communicable Disease Act, Administrative Procedure Act, National Police Agency Organization Act, All-Out Defense Mobilization Readiness Act, Statute for Prevention and Control of Infectious Animal Disease, and interagency cooperative agreements such as the Cooperative Agreements on Prevention and Response between the Ministry of National Defense (MOND) and MOHW. These policies direct collaboration between agencies during emergency response as well as daily operations and exercise/training.
- Joint working groups and other national-level collaborations bring together representatives from across many agencies to address issues such as food safety and security, and SOPs outline information sharing mechanisms and requirements between a range of agencies and organizations.
- The Disaster Prevention and Protection Act and the Communicable Disease Control Act facilitate collaboration between public health and security authorities for a range of incidents at the local level via the incident commander.
- Information about health events and threats is shared regularly at the national level between MOHW and the Homeland Security Council.
- The Executive Yuan's Office of Homeland Security coordinates regular exercises for complex incidents that involve participants from MOHW, MOND, Taiwan EPA, AEC, National Police Agency, Customs Administration, and others.

- Regular exercises are conducted at the national level that specifically involve cooperation and coordination between public health and security authorities, including bioterror incidents at Points of Entry.
- There is a Response Plan for Biological and Bioterrorism Event in place, which requires the MOHW and Office of Homeland Security to coordinate and share information and conduct risk assessment during public health events. Additionally, joint SOPs are in place to facilitate response at major Points of Entry to Taiwan.
- Taiwan has legislation in place that provides public health authorities with the power to detain/quarantine individuals who present a public health risk.
- Public health and security authorities regularly collaborate on actual responses, including investigation of foodborne illnesses, isolation and quarantine of potentially infectious patients, Points of Entry surveillance and monitoring, and response to an animal avian influenza outbreak.
- Taiwan conducts several joint/cross-sectoral training opportunities for public health and security personnel. These trainings address Points of Entry surveillance and monitoring (including CBRN threats), food and drug inspections, and animal health and smuggling; however, these trainings seem to be more cross-sectoral (one agency training another) than joint (multiple agencies coordinating in an integrated training session).
- Taiwan has regular security reviews for personnel working in high-containment laboratories.

Areas which need to be strengthened

- There is little coordination between public health and security authorities at the local level to jointly investigate health events with security considerations. Budgetary concerns and lack of firsthand experience have limited the ability of local governments to fully develop and implement bioterror response protocols.
- Increased information sharing between public health and security authorities is needed for suspected intentional biological incidents. Security intelligence could be vital to enabling public health to properly investigate the health effects of these types of events, which in turn, could further benefit security investigations.
- The security review for laboratory personnel mentioned above does not extend to other personnel that handle dangerous pathogens, such as those who work in the field (e.g., bioterrorism response, specimen collection).
- Taiwan is prevented from participating as a State Party or Observer Country to the Biological and Toxin Weapons Convention (BWC) or as a member country in INTERPOL, although it strives to comply with the BWC and coordinate with other INTERPOL member countries to access information on security threats.

Recommendations for Priority Actions

- Formal coordination mechanisms between public health and security authorities at the local level for non-emergency activities could strengthen relationships necessary for identifying health events with security considerations and conducting subsequent investigations. Additionally, Taiwan should direct the development of formal collaboration protocols at the local level to support public health involvement in investigations for these types of incidents.
- The development of a personnel reliability system for high-containment laboratories would provide an additional layer of biosecurity for highly dangerous pathogens.
- The use of more joint training (as opposed to cross-sectoral) would be beneficial for Taiwan. Rather than having one agency host training for other agencies, Taiwan should direct the development of more robust training courses in which participants from multiple agencies perform integrated tasks and improve collaboration across areas of expertise.

Relevant Documentation

- Communicable Disease Control Act, MOHW (2015)
- National Police Agency Organization Act, Ministry of the Interior (2013)
- All-Out Defense Mobilization Readiness Act, Ministry of National Defense (2014)
- Ministry of Health and Welfare/Ministry of National Defense Prevention and Response Cooperative Agreement
- Administrative Procedure Act, Ministry of Justice (2015)
- Statute for Prevention and Control of Infectious Animal Disease (2014)
- Enforcement Rules for Statute of Prevention and Control of Infectious Animal Diseases (2009)
- Disaster Management and Response Plan for Animal and Plant Diseases (2015)
- Disaster Prevention and Protection Act (2016)
- Scenario analysis workshop document for Jinhua communication exercises (2015)
- National Disaster Prevention and Relief Defense Mobilization Exercise plan (2016)
- Kaohsiung International Airport Biological Disaster Response Plan (2013)
- Kaohsiung International Airport Biological Disaster Emergency Operating Procedures (2015)
- Taipei International Airport Biological Disaster Emergency Response Management Operating Procedures (2015)
- Taichung Airport Biological Disaster Emergency Operating Procedures (2016)
- Taichung Port Services Biological Disaster Response Plan
- Taoyuan International Airport Biological Disaster Emergency Operating Procedures
- Port of Keelung Biological Disaster Response Plan
- Disaster Prevention and Response Basic Plan (2013)
- Immigration Act (2015)
- Biological Incident Exercise Plan for Taipei International Airport (abstract)
- Executive Yuan incident management timeline for 2014 gutter oil/food oil incident
- Executive Yuan policy for establishing and operating the Homeland Security Council (2014)
- Directions of Executive Yuan Food Safety Board Establishment (2015)
- Chemical, Biological, Radiological, and Nuclear incident response training course curriculum for Taichung Port (2015)
- Food, Drug, and Cosmetic legal education and inspector training curriculum

Medical Countermeasures and Personnel Deployment

Target

A national framework for transferring (sending and receiving) medical countermeasures and public health and medical personnel among international partners during public health emergencies.

Taiwan Level of Capabilities

Taiwan has a fairly robust set of mechanisms to send, receive, and produce MCMs during an emergency. The Communicable Disease Prevention Act, Pharmaceutical Affairs Act, and Disaster Prevention and Protection Act all provide regulation for the import of pharmaceuticals and medical equipment and address provisions for procuring or producing materiel during an emergency. Additionally, national response plans include logistics protocols that can facilitate distribution of resources in an emergency. Taiwan maintains a stockpile of influenza antivirals and H5N1 vaccine, and hospitals nationwide are required to maintain a stockpile of certain pharmaceuticals and medical equipment for emergency use. Additionally, Taiwan has domestic production capacity for antibiotics and vaccines, and locations are designated throughout the country to store and dispense MCMs during emergency responses. With respect to animal diseases, BAPHIQ is responsible for purchasing and maintaining epidemic prevention and response materiel, including vaccines, and coordinating distribution of these resources during an epidemic. Taiwan is not currently part of any formal international MCM sharing agreements, but the Taiwanese desire to increase their capacity to provide international assistance.

While Taiwan desires to increase international engagement for health emergencies, particularly personnel support, a number of limitations prevent deploying or receiving personnel assistance. Currently, Taiwan does not address liability protection for medical personnel deployed to other countries. While Taiwan has procedures in place for identifying need and requesting international support, there are no mechanisms in place to address licensing or regulatory issues for foreign medical personnel; currently foreign medical teams deployed to Taiwan can perform rescue operations or provide medical advice only (no clinical services). The Taiwan applied for GOARN membership, which could enable them to deploy FETP-trained personnel internationally. The Taiwan International Health Action (TaiwanIHA) task force deployed to Nepal in 2015 to perform evaluation/assessment activities, but they did not perform any medical services. Under several bilateral agreements, Taiwan has recently deployed medical personnel to a number of countries in Asia and the South Pacific outside of emergencies. Taiwan has established the Global Assistance Corps of Taiwan (GOACT) to deploy in support of international infectious disease prevention and outbreak response activities. GOACT has deployed internationally in the past, but due to budgetary constraints, it is not currently active.

R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency

— **Score: 4**

Strengths

- Taiwan has laws in place for importing needed drugs or vaccines from international sources during emergencies. Additionally, Taiwan has legislation that enables the government to appropriate pharmaceuticals, supplies, or equipment in order to manage distribution of resources in response to or to prevent a shortage.
- Local MCM storage and dispensing sites have been identified nationwide for use in an emergency, and TCDC maintains a central stockpile of influenza MCMs and other medical materiel during non-emergency periods. Emergency transportation of drugs and vaccines to dispensing sites is organized and arranged by TCDC. The

logistics of MCM distribution and dispensing are coordinated by TCDC in coordination with TFDA, Department of Medical Affairs, and MOFA.

- The All-Out Defense Mobilization Readiness Act and the Pharmaceutical Policy Mobilization Readiness Plan contain logistics considerations and plans to facilitate the distribution of resources such as MCMs during an emergency.
- Taiwan has demonstrated the capability to distribute MCMs within 48 hours of the decision to do so in both actual events and exercises.
- Taiwan is among a small handful of countries with domestic production capacity for influenza vaccines. Taiwan also has considerable domestic capacity to produce antibiotics. Additionally, the Ministry of Economic Affairs (MOEA) can support domestic production and distribution of commercial products such as surgical masks during an emergency.
- During an emergency, staff from across relevant agencies are specifically designated to manage the logistics and tracking of MCM distribution and dispensing.
- Taiwan has implemented a pandemic influenza preparedness plan and maintains a national stockpile of influenza antivirals and vaccines as well as national, regional, and local PPE stockpiles. Taiwan also has a designated network of response hospitals in each region to support response and MCM dispensing activities.
- There are plans in place for emergency procurement and dispensing of animal drugs, and BAPHIQ maintains stockpiles of drugs, vaccines, and other countermeasures for animals.

Areas which need to be strengthened

- There are currently no arrangements to provide security during transportation or dispensing of MCMs during an emergency, although there is security at storage locations.
- Taiwan is not currently party to any formal international agreements to share MCMs during an emergency; however, it has demonstrated the capability to deploy significant quantities of PPE both domestically and internationally.

R.4.2 System is in place for sending and receiving health personnel during a public health emergency — **Score: 3**

Strengths

- Taiwan is willing to participate in global humanitarian and international emergency responses. MOFA is responsible for addressing international requests for medical response teams and coordinating their deployment.
- Medical personnel that deploy internationally are required to have special health insurance during their deployment to cover accident/injury, illness, and accidental death/disability.
- Depending on the requirements of the incident, applicable ministries will be involved to coordinate personnel deployment.
- Taiwan has plans and capabilities to send health personnel to respond to disasters and health emergencies both inside and outside of the country and has demonstrated the ability to deploy medical personnel internationally in non-emergency settings.
- Taiwan has a rescue team that trains together and can and has been deployed internationally and domestically for disasters such as earthquakes.
- The Central Disaster Response Center is responsible for monitoring response capacity for domestic emergencies and determining the need to request international assistance.
- Taiwan has recently deployed personnel to countries in Asia and the South Pacific. In support of the Nepal earthquake response in 2015, Taiwan deployed a team to provide post-disaster evaluations and assessments;

however, clinical services were outside of their assigned duties. Through a series of bilateral agreements, Taiwan has also deployed non-emergency medical personnel to a number of countries—including Palau, Kiribati, Nauru, Tuvalu, Marshall Islands, Solomon Islands, Fiji, and Papua New Guinea in the South Pacific and Sri Lanka, Turkey, Indonesia, and India in Asia.

Areas which need to be strengthened

- Taiwan has a desire to deploy medical personnel to support international responses; however, budgetary constraints and international trepidation regarding its unique political status have precluded any recent deployments. International response personnel are not currently internationally certified, partially due to restrictions on Taiwan's participation in international organizations.
- While not currently a formal member of any international organization to deploy response personnel internationally, Taiwan has applied for GOARN membership but received no response.
- There is currently no mechanism (licensure or regulatory provisions) for foreign medical teams to be able to provide medical care in Taiwan. This may change in an emergency, but there is currently no official language in law or regulation.
- During international deployment of health personnel, there are currently no liability protections to personnel who are not employed by the Taiwan government.
- Taiwan does not currently have an international dispatching center to facilitate tracking of deployed personnel and materials; however, TCDC has expressed interested in establishing one.

Recommendations for Priority Action

- Taiwan should develop, test, and implement plans to provide security during transportation and dispensing of emergency MCMs.
- Due to Taiwan's unique political status, it has been unable to engage in formal agreements to provide international support during health emergencies. Taiwan has expressed interest in providing equipment/supplies, pharmaceuticals, and personnel in support of international emergency response. It is recommended that Taiwan continue to explore all options—including expanded role in the WHO, bilateral agreements, or non-governmental organizations (e.g., GOARN, International Association of National Public Health Institutes [IANPHI])—as mechanisms to increase international engagement.
- Taiwan needs to address licensing and regulatory concerns for receiving foreign medical teams in advance of an emergency that would require such assistance. Additionally, Taiwan needs to proactively address liability protection for medical response teams deploying to other countries.

Relevant Documentation

- Communicable Disease Control Act, MOHW (2015)
- Pharmaceutical Affairs Act, MOHW (2015)
- Disaster Prevention and Protection Act (2016)
- All-Out Defense Mobilization Readiness Act, Ministry of National Defense (2014)
- Criminal Code of the Republic of China- Article 251, Ministry of Justice (2014)
- Press release documenting Taiwan's international deployment of PPE to support the West Africa Ebola response (2014) and domestic deployment of PPE in response to an avian influenza outbreak (2015)
- The Mobilization of Reserve Medicines and Medical Devices Regulations, MOHW (2014)
- Reserve medicines and medical devices inventory list
- Annual Government Epidemic Inventory Warehousing and Transportation Procurement Project (2016)
- Infectious Biomaterial and Associated Biological Specimen Material Import/Export Regulations (2015)

- National Influenza Pandemic Preparedness Plan- Phase III (2015)
- Influenza Pandemic Strategic Plan, 3rd Edition (2012)
- Statute for Prevention and Control of Infectious Animal Disease (2014)
- Veterinary Drugs Control Act, CoA (2013)
- Regulations for Veterinary Drugs Dealers (2012)
- Notice for Coordination in International Disaster Rescue Supports (2011)
- Procedure for Receiving or Dispatching Support Teams During a Disaster
- Civil Servant Service Act (2000)
- Regulations Governing Safety and Sanitary Protection of Civil Service, Civil Service Protection and Training Commission (2015)
- Regulations for Applying the International Trip Allowance (2012)
- Global Outbreak Assistance Corps of Taiwan (GOACT) introduction (2008)

Risk Communication

Target

States Parties should have risk communication capacity which is a multi-level and multi-faced real time exchange of information, advice and opinion between experts and officials or people who face a threat or hazard to their survival, health or economic or social well-being so that they can take informed decisions to mitigate the effects of the threat or hazard and take protective and preventive action. It includes a mix of communication and engagement strategies like media and social media communication, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement, and community engagement.

Taiwan Level of Capabilities

Taiwan maintains strong programs for risk communication for public health issues. TCDC staff communicates on a routine basis with members of the public via traditional and new media channels. It regularly monitors traditional and new media for the appearance of rumors or misinformation. Opinion polling conducted annually and during emergencies is used to update and target communication messages and approaches. After-action analyses are used to update communication plans and messages.

R.5.1 Risk Communication Systems (plans, mechanisms, etc.) — Score: 4

Strengths

- Communication and information sharing between agencies during an emergency is, in many cases, mandated by legislation, special agreement, or other formal mechanism.
- For incident responses managed at the Executive Yuan level, the communication team will often be comprised of representatives from across the affected agencies. Designated members of the communications staff have clearly defined responsibilities.
- Ministries and agencies across the Taiwanese government have 24/7 communications capabilities.
- While funding for incident response is not guaranteed and must be obtained explicitly for each event, communication is a high priority for distribution of funding once it is allocated.

Areas which need to be strengthened

- TCDC has concerns about the current and expected funding/resource level compared to that required to grow the program. Consistent, dedicated funding for public communications, particular during emergencies, would enable implementation of long-term training programs and improve public risk communications efforts.
- Because special funding is required to support incident response, any delays in allocating resources can impair communication efforts.
- Recent budget cuts have resulted in shortfalls for some ongoing risk communication and health promotion campaigns, requiring applications for special project funding in order to continue these programs.
- Staffing level is a concern for communication programs. Taiwan experiences a considerable number of public health emergencies, and surge staffing is required for these responses. Surge staff do not receive regular training on risk communication.

R.5.2 Internal and Partner Communication and Coordination — Score: 4

Strengths

- The CECC facilitates interagency communication during incident response and allows the incident response to coordinate public communications across agencies to mitigate the impact of inconsistent messaging. Taiwan has strong protocols in place to govern partner communication during national emergencies.
- Despite not being a formal member state in the WHO, Taiwan maintains an IHR NFP for international communication about health events, and informal bilateral agreements (e.g., with China, Japan, United States) further facilitate international communications and information sharing.
- Non-governmental organizations—including local health authorities, healthcare entities, and civil society groups—receive official communications directly from the Taiwan government during responses to health events as well as ongoing public health programs. Additionally, these partners are invited to participate in official meetings to coordinate formal communications.

Areas which need to be strengthened

- During several past public health emergencies, poor communication between national governmental agencies led to dissemination of conflicting information to the public. Taiwan has attempted to address this through the creation of the CECC. This is a good start, but Taiwan should work to improve routine collaboration and communication between agencies to ensure strong relationships exist between departments and to improve the consistency of messages that are issued in situations that do not warrant activation of executive-level CECC.
- Non-emergency communication between governmental ministries and agencies is currently conducted on an *ad hoc* basis. These processes could be more formalized and streamlined. Formal protocols will reduce communication mishaps for routine communication efforts and improve collaboration and coordination during emergencies.
- There is a dedicated budget for external support for public communications, but recent budget cuts have impaired this program.

R.5.3 Public communication— Score: 5

Strengths

- TCDC has a dedicated public relations office to manage public communication and social media efforts. Weekly press conferences are held to provide updated health information, and these can be scheduled more frequently during an incident response as necessary.
- Message content, media platform, and language are tailored as necessary to reach the target audience for specific events or programs.
- Mechanisms are in place to monitor public sentiment and rapidly respond to rumors and misinformation. TCDC has regular social media communication with the public, particularly on Facebook, where a minimum of 36 messages are posted monthly.
- The 1922 hotline call center provides 24/7 capacity to respond to public inquiries regarding epidemic control.
- Communication standards and guidelines are assessed and updated as necessary to provide sustainable, continuous improvement for risk communication efforts. Additionally, regular analysis of individual communication efforts and messaging enables TCDC to continually improve public messaging across traditional and social media platforms.

Areas which need to be strengthened

- The public relations office in TCDC is staffed by only 10 people. Additional staff would be beneficial, particularly to provide surge capacity. Currently, surge staff receive minimal orientation training.

R.5.4 Communication Engagement with Affected Communities — Score: 4

Strengths

- TCDC's Public Relations Office regularly engages with media and community leaders on health promotion issues. During incident response, TCDC officials are deployed to the affected area and coordinate communication efforts directly with affected community leaders.
- As evinced by the recent response to dengue, local health authorities have strong connections with their respective communities.
- Social mobilization is explicitly included in the National Influenza Pandemic Preparedness Plan.
- Public health officials routinely reach out to coordinate with existing community groups (e.g., HIV/AIDS support, LGBT centers).
- Surveys on traditional and social media messaging and regular meetings with at-risk populations provide data to improve community engagement campaigns.

Areas which need to be strengthened

- Further efforts are needed with respect to fully engaging affected communities. Communities are not currently viewed as equal partners in incident response. Engaging with the public and community groups during non-emergency periods can facilitate relationship building that will benefit public communications during emergencies.

R.5.5 Dynamic Listening and Rumor Management — Score: 4

Strengths

- The capability exists to monitor public sentiment and identify and respond to emerging rumors and misinformation. Rumors and misinformation are addressed in formal communications including press conferences and press releases as well as social media messages.
- TCDC regularly monitors the media and key social media sites to identify potential rumors and events and performs data analysis of information posted via these platforms.
- Taiwan conducts opinion polls annually and during emergencies to determine whether rumors and misinformation are spreading and whether correct information is being taken up by the intended audience.
- The official TCDC website has an area specifically dedicated to addressing rumors and misinformation.
- Big data approaches are utilized to collect information from online and social media platforms to assess public opinion and identify emerging issues. This data facilitates updates to current messaging efforts to address changes in public opinion and awareness.

Areas which need to be strengthened

- Data indicates that the public still struggles with trusting official information, and rumor control remains a challenge. Establishing relationships and trust during non-emergency periods is vital to maintaining them during emergencies. Another key to maintaining public trust is transparency; be honest about what you know, what you don't know, and what you are doing to gather more information.

Recommendations for Priority Actions

- TCDC has developed very strong risk communication programs with a small number of staff; during emergencies, the response must rely on surge staff pulled from other divisions, who have no regular training
- TCDC needs more collaboration with external partners, including community groups and private entities to increase the impact of public communication. A future priority for TCDC is to establish equal partnerships with community groups to develop/disseminate communication plans/materials.
- The extent to which effective risk communication occurs during non-communicable disease emergencies could not be assessed.

Relevant Documentation

- Risk Communication and Response to Major (Emerging) Infectious Diseases Operating Standards

OTHER IHR RELATED HAZARDS AND POINTS OF ENTRY

Points of Entry (PoEs)

Target

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

Taiwan Level of Capabilities

Taiwan has advanced programs for detecting and responding to public health risks at its international airports and seaports. This capacity includes quarantine officers employed by TCDC, medical evaluation units, and established protocols for medical assessment and care of ill passengers. The system at Taiwan's ports of entry is regularly tested through real-world events, such as detection of cases of dengue and Zika virus among infected travelers. TCDC has established MOUs with other agencies such as local hospitals, BAPHIQ, Customs Administration, AEC, Ministry of Transportation, and Immigration. The division responsible for overseeing Taiwan's public health response at its PoEs regularly evaluates the effectiveness of this response, as evidenced through many academic publications and governmental reports. Though not a full member state in the World Health Organization, Taiwan has completed and published a self-assessment of the extent to which its detection and response capacities at PoEs fulfill expected obligations under the IHR.

PoE.1 Routine capacities are established at PoE — Score: 5

Strengths

- There are established protocols for evaluating public health threats that are tiered, risk-based, and scalable.
- Ill travelers are detected and evaluated through multiple approaches (e.g., fever screening, self-referral, reports from carriers, or PoE personnel). Trained personnel and appropriate facilities are available at PoEs for evaluation of ill travelers.
- Advanced animal and plant health inspection and vector-control programs exist and function regularly.
- Taiwan has established MOUs with between public health authorities and other agencies for reducing the risk to passengers during different public health emergencies.
- Trained personnel and well-established protocols support routine inspection at PoEs to detect hazardous imports. Taiwan has established protocols for detection of disease among imported animals, including birds.

Areas which need to be strengthened

- There are relatively high-rates of turnover among contract workers at PoEs. Dedicated effort to retain personnel would result in reduced resources to train new personnel and improve consistency and continuity for long-term, sustainable success for PoE monitoring and security.
- If resources are limited in the future, it may be useful to undertake a cost/benefit analysis of current PoE screening processes to confirm the necessity and efficacy of current practices.

PoE.2 Effective Public Health Response at Points of Entry — Score: 5

Strengths

- SOPs for evaluating public health risks at PoEs include designated roles and responsibilities with multiple government agencies and other stakeholders.

- Medical assessment capabilities are present at PoEs and existing agreements with local hospitals ensure appropriate evaluation, transport, and care for sick travelers.
- The systems in place for detecting and responding to public health threats at PoEs have been exercised during numerous real world events, such as the global response to MERS. The system has successfully detected cases of dengue and Zika among international travelers.
- Taiwan routinely evaluates the effectiveness of its capacities at PoEs and publishes these assessments in readily accessible government reports and peer-reviewed literature.

Areas which need to be strengthened

- Taiwan noted that while there are existing regulations that require transportation carriers to provide potable water to passengers, more work (inspections) are needed to ensure appropriate levels of compliance with existing requirements.

Recommendations for Priority Actions

- Taiwan has well-developed programs for implementing IHR-related obligations at PoEs. It regularly evaluates its capabilities in this regard and shares lessons learned with internal stakeholders and the international community.

Relevant Documentation

- Communicable Disease Control Act
- Point of Entry Quarantine or Medical Transport to a Local Health Bureau Procedures (2014)
- Point of Entry SOP for Medical Evacuation of Travelers (2016)
- Points of Entry Quarantine Standard Procedures: Airport Quarantine and Seaport Quarantine (2015)
- Compulsory patient/traveler transfer protocol (2014)
- TCDC case referral contract
- Medical Assessment Reply Form for compulsory hospitalization
- Rat Monitoring and Management Standard Operating Procedures and records
- Mosquito Monitoring and Management Standard Operating Procedures and records (2015)
- Local Vector Monitoring and Control Programs, Health and Environmental Protection Bureaus (2016)
- Sanitation Operating Regulations
- Point of Entry documentation:
 - Guidelines for Notifiable Communicable Disease Surveillance (2010)
 - Point of Entry quarantine SOP/port sanitation SOP (2014)
 - Example Vector Prevention and Control Technician and Bioterrorism Response Team licenses
 - Aviation Police: Entry conveyance security checking guidelines (2016)
 - Example PoE contact lists and procedures
 - Example cooperative agreements with local emergency response agencies—e.g., fire, police, emergency medical services
- Ministry of Transportation and Communication:
 - Disaster Prevention and Protection Act (2016)
 - Air Disaster Prevention and Rescue Program
 - Civil Aviation Act
 - Commercial Port Law (2011)
 - Regulations on Port Services at Commercial Ports (2015)
- National Immigration Agency:

- Immigration Act (2015)
- Procedures for Customs, Immigration, and Quarantine fast-tracking
- Bureau of Animal and Plant Health, Inspection, and Quarantine:
 - Statute for Prevention and Control of Infectious Animal Diseases
 - Quarantine Requirements for the Importation of Animals and Products
 - Reporting protocols for animal and plant disease and prevention emergency events
 - SOP for handling illegal animal and product importation (2013)
- Aviation Police:
 - SOP for passenger sudden, severe illness and death fast-tracking (2016)
- Atomic Energy Council:
 - Radio-Nuclear Emergency Response Program (2016)
- Example guidelines for various communicable disease prevention and protection programs (2016)
- TCDC website
- National Security Bureau website

Chemical Events

Target

States Parties should have surveillance and response capacity for chemical risk or events. It requires effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation, and safe disposal.

Taiwan Level of Capabilities

Compared to many other countries in the region, Taiwan's chemical safety and response program is robust. In fact, several neighboring nations have visited Taiwan to learn about its chemical safety program, including China and Japan. Taiwan EPA has established and maintains the System for Emergency Response for Toxic Substance Disasters to improve policies and procedures for prevention, preparedness, response, and recovery for chemical incidents.

Taiwan has recently conducted several chemical safety assessments to support subsequent risk assessments and develop and implement recommended exposure limits. Taiwan EPA conducted an evaluation of 40 kinds of toxic substances from 2010-2014, and the Taiwan Institute of Labor, Occupational Safety, and Health performed a study of workplace chemical hazards in 2013. While Taiwan is unable to be a formal signatory to a number of international chemical safety conventions due to its unique political status—including the Stockholm, Rotterdam, Basel, and Mercury Conventions; the UNECE Convention on the Transboundary Effects of Industrial Accidents; and ILO Conventions 170 (Safety in the Use of Chemicals at Work) and 174 (Prevention of Major Industrial Accidents)—it supports and adheres to these regulations voluntarily. Additionally, the Taiwan EPA participates in the Strategic Approach to International Chemicals Management (SAICM).

CE.1 Mechanisms are established and functioning for detecting and responding to chemical events or emergencies — **Score: 3**

Strengths

- Taiwan has implemented effective mechanisms for detecting, monitoring, reporting, and responding to chemical incidents across multiple sectors of human and animal health—including the Ministry of Labor, MOI, MOHW, EPA, MOEA, TFDA, and CoA—and these policies and procedures are reviewed and updated regularly (annually for most).
- Surveillance and monitoring of chemical accidents and hazards are conducted by the Emergency Response Information Center (ERIC), which has the capability to notify relevant authorities of incidents, including the fire department and Taiwan EPA, and coordinate responses.
- TFDA and CoA both have responsibility over monitoring consumer products with regard to chemical hazards. TFDA has primary responsibility for chemical hazards related to consumer products (e.g., imports of fruit, vegetables, meat, and other food products are subjected to inspection and testing by TFDA for pesticides), and CoA is primarily responsible for regulations related to the management of agro-pesticides and the manufacture and import of feed and feed additives.
- Workers at industrial facilities are required to have baseline health assessments as well as annual follow-up assessments to monitor health.
- Risk assessments and exposure models are utilized to determine the appropriate response to chemical incidents, including personnel or community evacuation and cleanup. Accident reports are completed after each incident, and environmental sampling results are published in annual reports.

- MOHW operates the National Poison Center at the Veterans General Hospital to provide 24-hour support and expertise for chemical events.

Areas which need to be strengthened

- While there is cross-sectoral collaboration for chemical safety issues, there is no single national coordinating body for chemical safety. A number of governmental sectors are involved with chemical safety in Taiwan, and collaboration occurs on an *ad hoc* basis. Additional work is needed to ensure timely and systematic cross-sectoral collaboration for chemical safety monitoring and response.
- While Taiwan EPA is well-funded at the national level, local jurisdictions indicate that they require additional personnel support to implement necessary chemical safety programs. Additionally, funding for Taiwan EPA at the national level is allocated every several years. A lack of stable, long-term funding hinders long-term planning.

CE.2 Enabling environment is in place for management of Chemical Events — **Score: 5**

Strengths

- Taiwan maintains the capability to conduct thorough risk assessment for chemical incidents, including environmental contamination modelling, to support decisions regarding appropriate interventions and cleanup.
- Taiwan has established response plans for 19 different types of disasters, including chemical accidents, and each response specifically addresses health concerns for that disaster.
- Taiwan EPA requires toxic chemical factories to conduct regular exercises for chemical incident response.

Areas which need to be strengthened

- As discussed above, there is no single national coordinating body for chemical safety; however, Taiwan conducts regular cross-Ministry meetings to address chemical safety, including participants from Taiwan FDA, MOHW, and the CoA.
- Due to the unique political status of Taiwan, it is unable to formally participate in INTOX; however, there may be access to informal international chemical safety networks via the staff at the National Poison Center.

Best Practices, Challenges, Gaps, and Recommendations

- Taiwan should formalize cross-ministry collaboration with respect to chemical hazards monitoring, surveillance, and response. There is currently no single entity in charge, and formally designating a lead agency would help ensure timely and systematic collaboration for chemical events and surveillance.
- Taiwan should establish a mechanism to ensure long-term funding for Taiwan EPA to facilitate long-term planning and as well as forward-looking engagement at the local level.

Relevant Documentation

- Labor Safety and Health Research Annual Report (2013)
- Management Regulations for the Import and Export of Industrial Waste (2013)
- Criteria Governing Methods of and Facilities for Storage, Clearance, and Disposal of Industrial Waste (2006)
- The Equipment and Operation Report for Waste Treatment Facility Located in Receiving Country form

Radiation Emergencies

Target

States Parties should have surveillance and response capacity for radio-nuclear hazards/events/emergencies. It requires effective communication and collaboration among the sectors responsible for radio-nuclear management.

Taiwan Level of Capabilities

Taiwan operates 3 nuclear reactor power plant facilities. Under the Nuclear Emergency Response Act, nuclear reactor facilities are required to periodically submit analysis and planning with respect to risks and protective measures within the Emergency Planning Zone (EPZ) surrounding the facility. Assessments, including evaluating emergency response procedures, were conducted in 2011 for all 3 Taiwan nuclear power plants. Baseline public health assessments have been conducted with respect to radiation safety. Taiwan has had no major radiation emergencies in the past 5 years. Due to Taiwan's unique political status, it cannot be a formal member state in the International Atomic Energy Agency (IAEA); however, Taiwan has implemented all applicable nuclear power regulatory standards and submits to IAEA nuclear safeguards inspections in accordance with a trilateral agreement with the United States and IAEA. Despite not being a formal member of the Organisation for Economic Co-Operation and Development or the Nuclear Energy Agency, Taiwan's Atomic Energy Council (AEC) regularly participates in the International Nuclear Emergency Exercises alongside member countries. Additionally, Taiwan remains committed to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) even though it is no longer a formal signatory. Taiwan and China have a cooperative agreement that requires that each notify the other of nuclear events.

Taiwan's Radiological Disaster Prevention and Protection Plan and the Nuclear Emergency Response Basic Plan largely govern the monitoring of radiological and nuclear hazards and guide the response to associated incidents. The AEC is primarily responsible for monitoring and response activities, including laboratory analysis.

RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies — Score: 3

Strengths

- The Radiological Disaster Prevention and Protection Plan and the Nuclear Emergency Response Basic Plan delineate prevention, preparedness, and response responsibilities and activities for radiological and nuclear hazards. These plans are reviewed and updated regularly.
- AEC is primarily responsible for monitoring radiological and nuclear hazards and directing emergency response for radiological and nuclear incidents, including monitoring consumer products and laboratory analysis.
- Current personnel resources are sufficient to meet operational requirements. The budget for radiological and nuclear programs comes from the central government budget; however, it is unclear whether financial resources are sufficient.
- The Radiological Disaster Prevention and Protection Plan designates reference healthcare facilities for radiation emergencies.
- Health authorities in Taiwan are responsible for determining the protocols/guidelines for treating patients in response to a radio-nuclear event, and a tiered system of hospitals is designated to triage and care for patients.

Areas which need to be strengthened

- Taiwan has fairly robust radiation monitoring and surveillance mechanisms in place under the AEC, and MOHW has implemented formal response plans for patient care; however, it is unclear how much systematic and regular communication and coordination between radiological/nuclear and public health authorities occurs to support surveillance and case management activities or reporting of significant events that may result in a Public Health Emergency of International Concern (PHEIC).

RE.2 Enabling environment is in place for management of Radiation Emergencies — **Score: 5**

Strengths

- The Radiological Disaster Prevention and Protection Plan guides response activities for radiation events. This plan is reviewed and updated regularly.
- AEC is primarily responsible for coordinating radiation event response, and a number of other agencies have specific responsibilities relevant to their areas of expertise—including MOHW, MOND, MOI, and Ministry of Education.
- The Radiological Disaster Prevention and Protection Plan addresses a range of response functions for radiation events—including response roles and responsibilities, communication, patient decontamination and treatment, medical equipment and countermeasures, environmental decontamination, and response funding.
- Taiwan conducts regular exercises, and an assessment process is in place to evaluate performance and response protocols.
- While Taiwan is not a signatory to a number of international conventions due to its unique political status, it adheres to regulations governing the management and transportation of radioactive materials/waste.

Areas which need to be strengthened

- Current radiation safety protocols do not address hazardous sites or poison control.

Recommendations for Priority Actions

- Formal communication and information mechanisms between radiological/nuclear and public health authorities would improve health monitoring, risk assessment, event detection, and incident response (particularly case management).
- Interdisciplinary approaches and multi-sectoral collaboration could facilitate addressing hazardous sites and poison centers—potentially with Taiwan EPA and MOHW, respectively—to comprehensively address radiological and nuclear hazards. Taiwan should develop and formalize these interagency collaborations in established regulations and protocols.

Relevant Documentation

- Nuclear Emergency Response Act (2003)
- Report on the Analysis and Plan Review of Civil Protection Measures in the Emergency Response Plan for Nuclear Power Plants 1, 2, and 3; Taiwan Power Company (2013)
- Occupation Radiation Exposure in Taiwan, Republic of China, 2015 (2016)
- Improvement on Radiation Safety Control Techniques (2013)
- Ionizing Radiation Protection Act
- National Radiation Worker Dose Database
- Disaster Prevention and Protection Act (2016)
- Radiological Disaster Prevention and Protection Plan (2013)
- Atomic Energy Council website

- Operational Procedure of Nuclear Accident Emergency Response Northern Radiation Monitoring Center
- Operational Procedure of Nuclear Accident Response Southern Radiation Detection Center
- Radiation Bomb Accident Emergency Response Procedure
- Radiation Detection Center Overseas Nuclear Disaster Treatment Operational Procedure (2016)
- National Environmental Radiation Monitoring website
- Atomic Energy Council real-time nuclear power plant radiation monitoring website
- Nuclear Disaster Response Mechanism & Nuclear Plant 4 Escape Circle Personnel Evacuation, Nuclear Disaster Radiation Injury Medical Treatment, Environmental and Food Security Report
- MOHW First-Aid Responsible Hospital List (2016)
- Relevant Right and Liability List of Governments at All Levels in Radiation Hazard Prevention and Relief
- Nuclear Emergency Response Basic Plan
- IHR-Appointed Port Core Competence Construction Project- Second Phase Plan (2014)
- Nuclear safety exercise list website
- National Report – in accordance with the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (2014)
- Summary of the Fourth International Nuclear Emergency Exercise (INEX-4) and Topical Session (2014)

APPENDIX 1: International Health Regulations

Background

In 2005, the Fifty-eighth World Health Assembly (WHA) adopted the International Health Regulations (2005) [IHR (2005)] which subsequently entered into force on 15 June 2007. The purpose and scope of the IHR (2005) are “to prevent, protect against, control and provide a public health response to the international spread of disease in ways that are commensurate with and restricted to public health risks, and which avoid unnecessary interference with international traffic and trade.” States Parties are required by the IHR (2005) to State Party obligations to develop certain minimum core public health capacities.

IHR capacity requirements are defined in Article 5 as “the capacity to detect, assess, notify and report events” and in Annex 1A on “Core capacity requirements for surveillance and response” and 1B on “Core capacity requirements for designated airports, ports and ground crossings.” In addition, the core capacity monitoring framework also has a checklist and indicators which should be used for monitoring progress in the development of IHR Core Capacities in States Parties (<http://www.who.int/ihr/publications/checklist/en/>).

As stated in Annex 1A.2, each State Party shall assess the ability of existing national structures and resources to meet the minimum requirements described in Annex 1. As a result of such assessment, States Parties shall develop and implement plans of action to ensure that these core capacities are present and functioning throughout their territories.

In 2012, the World Health Assembly (Resolutions WHA65.23) urged States Parties to take the necessary steps to prepare and carry out appropriate national implementation plans in order to ensure the required strengthening, development and maintenance of the core public health capacities as provided for in the International Health Regulations (2005).

The IHR Review Committee on Second Extensions for Establishing National Public Health Capacities and on IHR Implementation (WHA 68/22 Add.1) suggested that ‘... and with a longer term vision, the Secretariat should develop through regional consultative mechanisms options to move from exclusive self-evaluation to approaches that combine self-evaluation, peer review and voluntary external evaluations involving a combination of domestic and independent experts. These additional approaches should consider, amongst other things, strategic and operational aspects of the IHR, such as the need for high level political commitment, and whole of government / multi-sectoral engagement. Any new monitoring and evaluation scheme should be developed with the active involvement of WHO regional offices and subsequently proposed to all States Parties through the WHO governing bodies’ process.’

The call for the move from ‘exclusive self-evaluation’ to external evaluation comes from the recognition that transparency and mutual accountability in the international community are essential in implementing IHR collectively. A technical consultation meeting on IHR Monitoring and Evaluation Framework post 2015 was organized in Lyon in October 2015 and suggested development of processes and a tool to conduct joint external evaluation.

The JEE Tool is arranged according to following core elements:

- Preventing and reducing the likelihood of outbreaks and other public health hazards and events defined by IHR (2005) is essential.

- Detecting threats early can save lives.
- Rapid, effective response requires multi-sectoral, national and international coordination and communication.

APPENDIX 2: Joint External Assessment

Purpose of the Joint external evaluation

The Joint External Evaluation Tool - International Health Regulations (2005) is intended to assess country capacity to Prevent, Detect, and Rapidly Respond to Public Health Threats independent of whether they are naturally occurring, deliberate, or accidental. The purpose of the external evaluation process is to measure country specific status and progress in achieving the targets. This will require a sustainable and flexible process to allow for additional countries and regular evaluation visits. The first time the external evaluation is conducted it will establish a baseline measurement of the country's capacity and capabilities. Subsequent evaluations are also necessary to identify progress made and ensure any improvements in capacity are sustained.

Joint external evaluations share a number of important features, including: voluntary country participation; a multi-sectoral approach by both the external teams and the host countries; transparency and openness of data and information sharing; and the public release of reports. It also refers to the joint process during an external evaluation (envisioned to take place approximately every 5 years) where a team of national experts first prepares a self-assessment supplied to the external team prior to the on-site visit and the external team uses the same tool for their independent evaluation, working together with the national team in interactive sessions.

The external evaluation allows countries to identify the most urgent needs within their health security system, to prioritize opportunities for enhanced preparedness, response and action, and to engage with current and prospective donors and partners to target resources effectively. Transparency is an important element in order to attract and direct resources to where they are needed most.

Process

The first stage of the evaluation is a country survey completed by the country using self-reported data for the various indicators on the joint external evaluation tool. This information is then given to the joint external evaluation team comprised of national and international subject matter experts. Review of this self-assessment data provides the team members with a baseline understanding of the country's health security capabilities. These subject matter experts then visit the country for facilitated in-depth discussion of the self-reported data as well as structured site visits and meetings organized by the host country. The evaluation team uses findings of various relevant evaluation and assessments like OIE PVS pathway, monitoring and evaluation of disaster risk reduction and others.

After conducting the evaluation visit, the evaluation team drafts a report to identify status levels for each indicator, as well as an analysis of the country's capabilities, gaps, opportunities, and challenges. This information is then shared with the host country and, with permission of the host country, various other stakeholders in order to facilitate international support of country implementation efforts, share best practices and lessons learned, promote international accountability, engage stakeholders, and inform and guide IHR implementation both in the host country and internationally.¹

Format

Every indicator in the evaluation tool has attributes that reflect various levels of capacity with scores of 1-5 (one indicates that implementation has not occurred; five indicates that implementation has occurred, is


¹In the WHO African Region, the IHR implementation is within the context of Integrated Disease Surveillance and Response (IDSR) Strategy and in Asia Pacific (SEAR and WPR), the IHR implementation is in the context of Asia Pacific Strategy for Emerging Infectious Diseases.


tested/reviewed/exercised and that the country has a high level of capability for the indicator). For each indicator, a country will receive a single score based on their current capacity. The Technical Area Questions will help the evaluators determine the appropriate score. Most of the measures are descriptive and qualitative. Countries will be asked to provide documentation for some of these items in addition to the responses. The documentation and responses will be reviewed by the evaluators, and will then be discussed during the external assessment. Final report will include scores as well as report narrative identifying existing capacities, gaps, and challenges. The results of the JEE are to guide IHR implementation in the country.


The tool was developed to provide an external mechanism to evaluate a country's IHR capacity for ensuring health security. This tool draws on the original IHR core capacities and incorporates valuable content and lessons learned from tested external assessment tools and processes of several other multilateral and multi-sectoral initiatives that have supported the building of capacity to prevent, detect, and respond to infectious disease threats.


Color Scoring System


While overlaps exist among the capacity sections of the tool, each is considered separately in the evaluation exercise. The implementation status of each core capacity is delineated by a level of advancement or scoring, which reflects the capacity to be institutionalized and sustainable. The following describes the level of advancement or scoring with color coding.

No Capacity – 1: Attributes of a capacity are not in place. Color Code: **Red** - 

Limited Capacity – 2: Attributes of a capacity are in development stage (some are achieved and some are undergoing; however, the implementation has started). Color Code: **Yellow** - 

Developed Capacity – 3: Attributes of a capacity are in place; however, there is the issue of sustainability and measured by lack of inclusion in the operational plan in National Health Sector Planning (NHSP) and/or secure funding. Color Code: **Yellow** - 

Demonstrated Capacity – 4: Attributes are in place, sustainable for a few more years and can be measured by the inclusion of attributes or IHR (2005) core capacities in the national health sector plan. Color Code: **Green** - 

Sustainable Capacity – 5: Attributes are functional, sustainable and the country is supporting other countries in its implementation. This is the highest level of the achievement of implementation of IHR (2005) core capacities. Color Code: **Green** - 

1. Without achievement of all attributes, at one level a country does not progress or advance to subsequent levels. For example, in order to reach the Demonstrated Capacity level, a country has to meet all the attributes for the Limited Capacity and Developed Capacity levels. Additionally, a country that does not meet the criteria for the Demonstrated Capacity level will be scored at the Developed Capacity Level or lower, even if they meet the criteria for the Sustainable Capacity level.
2. All the positive responses should be documentable.

APPENDIX 3: Taiwan Assessment Background

Mission Place and Time

Taipei, Taiwan; 21 June to 1 July, 2016

Mission Team Members [External Assessment Team]

Eric Toner	Senior Associate, UPMC Center for Health Security (Team Lead)
Jennifer Nuzzo	Senior Associate, UPMC Center for Health Security
Ali S. Khan	Dean of the College of Public Health, University of Nebraska Medical Center
Anita Cicero	Deputy Director, UPMC Center for Health Security
Crystal Boddie	Senior Associate, UPMC Center for Health Security
Matthew P. Shearer	Analyst, UPMC Center for Health Security

Host Country Lead Agency

Taiwan Centers for Disease Control, Ministry of Health and Welfare

Participating Agencies / Institutions

Office of Homeland Security, Executive Yuan
Office of Disaster Management, Executive Yuan
Development of Medical Affairs, Ministry of Health and Welfare
Office of International Cooperation, Ministry of Health and Welfare
Food and Drug Administration, Ministry of Health and Welfare
National Health Research Institutes
Taichung Hospital, Ministry of Health and Welfare
Health Bureau of Taichung City Government
Bureau of Animal and Plant Health Inspection and Quarantine, Council of Agriculture
Animal Health Research Institute, Council of Agriculture
Ministry of Foreign Affairs
Environmental Protection Administration
Industrial Technology Research Institute
Atomic Energy Council
National Police Agency, Ministry of the Interior
National Fire Agency, Ministry of the Interior
Bureau of Mines, Ministry of Economic Affairs
National Science and Technology Center for Disaster Reduction

Taiwan CDC Assessment Team

Taiwan Centers for Disease Control, MOHW

Steve Hsu-Sung Kuo, 郭旭崧	Director-General (June 2014 – September 2016)
Jih-Haw Chou, 周志浩	Director-General (September 2016 – Present)
Jen-Hsiang Chuang, 莊人祥	Deputy Director-General
Yi-Chun Lo, 羅一鈞	Deputy Director-General
Ying-Hwui Chen, 陳穎慧	Chief Secretary
Yu-Chen Hsu, 許瑜真	International Cooperation Office
Yeuen-Li Yeh, 葉元麗	Division of Planning and Coordination
An-Hua Cheng, 鄭安華	Division of Planning and Coordination
Yung-Ching Lin, 林詠青	Division of Planning and Coordination
Shu-Hua Hsu, 許淑華	Division of Planning and Coordination
Yu-Ling Chang, 張育綾	Division of Planning and Coordination

Yu-Ling Chen, 陳毓翎
Ssu-Yi Huang, 黃思怡
Po-Wen Wang, 王柏文
Chang-Wen Chen, 陳昶玆
Yu-Min Chou, 周玉民
Song-En Huang, 黃頌恩
Wei-Ju Su, 蘇章如
Hsiu-Fang Chang, 張秀芳
Chiung-Fang Lin, 林瓊芳
Ying-Jung Hsieh, 謝瑩蓉
Yi-Hsin Pan, 潘怡心
Ru-Wen Jou, 周如文
Pei-Chun Chuang, 莊珮君
Hsun-Yin Huang, 黃薰瑩
Chang-Hsun Chen, 陳昶勳
Yu-Ju Lin, 林育如
Jen-Hsin Wang, 王任鑫
Mei-Hui Lin, 林美慧
Chia-Chi Chang, 張佳琪
Shin-Yi Lin, 林欣怡
Tzu-Yun Huang, 黃子昀
Sung-Yin Chen, 陳松吟
Ching-Shun Hsiao, 蕭慶瞬
Li-Ju Chen, 陳俐如
Po-Jung Chiang, 江柏榮
Yun-Jui Shih, 施雲瑞
Hai-Yun Ko, 柯海韻
Hui-Yun Kao, 高慧芸
Shu-Hui Tseng, 曾淑慧
Yu-Fen Ke, 柯玉芬
Chen-Yen Hsu, 許甄晏
Li-Jung Chien, 簡麗蓉
Wen-Chao Wu, 吳文超
Shu-Chun Chu, 朱淑君
Wei-Hui Chou, 周偉惠
Yi-Hsin Shen, 沈怡欣
Yu-Hung Shih, 施昱宏
Yi-Jhen Chen, 陳奕禎
Wei-Shi Tsai, 蔡威士
You-Chin Hsieh, 謝侑瑾
Yi-Chun Wu, 吳怡君
Li-Li Ho, 何麗莉
Li-Jue Wu, 吳麗珠
Wang-Ping Lee, 李婉萍
Yu-Hui Tsai, 蔡郁慧
Chiu-Mei Chen, 陳秋美
Shiang-Yun Huang, 黃湘芸
Cheng-Yi Lee, 李政益

Division of Planning and Coordination
Division of Planning and Coordination
Division of Planning and Coordination
Division of Planning and Coordination
Division of Acute Infectious Diseases
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Division of Infection Control and Biosafety
Division of Infection Control and Biosafety
Division of Infection Control and Biosafety
Division of Quarantine
Division of Quarantine
Division of Quarantine
Division of Quarantine
Division of Quarantine
Epidemic Intelligence Center
Epidemic Intelligence Center
Epidemic Intelligence Center

Shu-Wan Jian, 簡淑婉
Shu-Ying Li, 李淑英
Hwa-Jen Teng, 鄧華真
Gwo-Chang Sheu, 許國昌
Ming-Tsan Liu, 劉銘燦
Wen-Yueh Cheng, 鄭雯月
Ji-Rong Yang, 楊季融
Cheng-Fen Yang, 楊正芬
Chien-Shun Chiou, 邱乾順
Jyh-Yuan Yang, 楊志元
Juo-Yu Hsieh, 謝若郁
Hsin-Jung Lu, 盧欣嶸
Huei-Wen Liao, 廖慧雯
Hsieh-He Hsien, 謝和憲
Li-Wen Kuo, 郭禮文
Yu-Wen Yang, 楊玉玫
Mei-Chen Peng, 彭美珍
Han-Ning Wei, 魏涵寧
Hsin-Lun Lee, 李欣倫
Tsuey-Fong Lee, 李翠鳳
Yi-Feng Su, 蘇怡鳳
Cheng-Hao Wu, 吳承浩
Min-Cheng Lin, 林明誠
Pei-Fang Lai, 賴珮芳
Shun-Wen Tsai, 蔡舜文

Epidemic Intelligence Center
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
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Center for Diagnostics and Vaccine Development
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Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Center for Diagnostics and Vaccine Development
Public Relations Office
Public Relations Office
Public Relations Office
Office of Preventive Medicine
Emergency Operations Center
Emergency Operations Center
Emergency Operations Center
Central Regional Center
Central Regional Center
Central Regional Center

Executive Yuan

Chien-Nan Chen, 陳建男
Office of Disaster Management

Ministry of Health and Welfare

Tsung-Hsi Wang, 王宗曦
Dong-Fu Shang, 商東福
Tsun-Ying Huang, 黃純英
Yu-Jing Liu, 劉玉菁
Wei-Siang Jhao, 趙偉翔
Yi-Kuo Hsieh, 謝奕國
Wen-Chu Yen, 嚴文姝
Pei-Yu Chuang, 莊佩瑜
Ya-Ting (Fia) Chen, 陳雅婷
Secretary General
Development of Social Insurance
Development of Medical Affairs
Development of Medical Affairs
Development of Medical Affairs
Development of Medical Affairs
Office of International Cooperation
Office of International Cooperation
Office of International Cooperation

Food and Drug Administration, MOHW

Lan-Chi Lin, 林蘭砮
Yen-Jung Chueh, 闕言容
Yu-Chun Huang, 黃郁璿
Tzu-Ling Chen, 陳姿伶
Yan-Ying Lin, 林炎英
Hsin-Pin Wang, 王信斌
Hsiao-Wen Kuo, 郭曉文
Food Safety Division
Food Safety Division
Food Safety Division
Central Center for Regional Administration
Central Center for Regional Administration
Central Center for Regional Administration
Central Center for Regional Administration

Bureau of Animal and Plant Health Inspection and Quarantine, CoA

Chun-Ping Cheng, 鄭純彬
Chief Secretary

Yao-Ching Hsieh, 謝耀清	Animal Quarantine Division
Huang-Lin Kao, 高黃霖	Animal Quarantine Division
Yi-Hung Lin, 林邑鴻	Animal Quarantine Division
Yueh-Ping Lin, 林月屏	Animal Quarantine Division
Yan-Ting Chan, 詹雁婷	Animal Quarantine Division
Peu-Chun Tsai, 蔡佩君	Animal Quarantine Division
Cheng-Ta Tsai, 蔡正達	Animal Health Inspection Division
Shih-Chiang Kuo, 郭仕強	Animal Health Inspection Division

Animal Health Research Institute, CoA

Wen-Jane Tu, 杜文珍	Director General
Tsung-Wen Hsu, 許聰文	Deputy Director General
Chien-Yuan Huang, 黃建元	Chief Secretary
Chen-Shen Huang, 黃春申	Biology Division
Nan-Ling Kuan, 官南綾	Biology Division
Ming-Chu Cheng, 鄭明珠	Epidemiology Division
Yu-Ju Lin, 林育如	Epidemiology Division
Yu-Pin Liu, 劉玉彬	Epidemiology Division

Ministry of Foreign Affairs

Kung-Hao Chang, 張公豪	Department of International Organizations
---------------------	---

Environmental Protection Administration

Tzi-Chin Chang, 張子敬	Deputy Minister
Shaw-Ying Yuan, 袁紹英	Department of Environmental Sanitation and Toxic Substance Management
Shu-Lin Chen, 陳淑玲	Department of Environmental Sanitation and Toxic Substance Management
Wen-Shing Chang, 張文興	Department of Environmental Sanitation and Toxic Substance Management
Chia-Hui Lu, 盧嘉惠	Department of Environmental Sanitation and Toxic Substance Management
Kuan-Lun Chu, 朱冠綸	Department of Environmental Sanitation and Toxic Substance Management

Atomic Energy Council

Tze-Chieh Horng, 洪子傑	Nuclear Security Section
Heng-Jui Hsu, 許恒瑞	Nuclear Security Section
Yuan Ko, 戈元	Nuclear Security Section

Bureau of Mines, MOEA

Shiao-Shunn Chiu, 邱孝順	Division of Technical Assistance
-----------------------	----------------------------------

Industrial Technology Research Institute

Yu-Ren Lin, 林祐任	Green Energy and Environment Research Laboratories
Shin-Yu Chen, 陳新友	Green Energy and Environment Research Laboratories

Health Bureau of Taichung City Government

Yuan-Nian Hsu, 徐永年	Directory-General
Shiow-Shiun Horng, 洪秀勳	Senior Executive Officer
Wan-Jhen Lin, 林宛蓁	Disease Control Section
Chiung-Wen Hsu, 許瓊文	Disease Control Section
Yi-Fu Chang, 張藝馥	Disease Control Section
Min-Chuan Lin, 林敏娟	Disease Control Section
Hsiu-Yueh Chen, 陳秀月	West Central District Public Health Center
Li Chiang, 蔣莉	West Central District Public Health Center
Chun-Mei Huang, 黃春美	West Central District Public Health Center

Bai-Jou Ko, 柯百柔

West Central District Public Health Center

Taichung Hospital, MOHW

Meng-Chih Lee, 李孟智

Superintendent

Tsung-Chia Chen, 陳宗家

Division of Infectious Diseases

Pi-Shan Hsu, 許碧珊

Department of Family Medicine

Min-Kung Chen, 陳敏恭

Infection Control Office

Yu-Hung Hsieh, 謝玉虹

Infection Control Office

I-Wen Wang, 王怡文

Infection Control Office

Preparation and Implementation of the Mission

Prior to the assessment visit in late June 2016, an introductory visit to Taiwan was made in March 2016 by the External Assessment Team. The External Assessment Team met with the host country team members over 4 days and reviewed in detail the self-assessment tool. Assessment mission agenda and logistics were developed through frequent emails.

Acknowledgements

The team from the UMPC Center for Health Security would like to deeply thank all those who participated in this assessment, especially the Taiwan CDC GHSA Task Force, without whose support and guidance the external evaluation would not have been possible.

APPENDIX 4: Acronym List

AEC	Atomic Energy Council
BAPHIQ	Bureau of Animal and Plant Health, Inspection, and Quarantine
CECC	Central Epidemic Command Center
CEOC	Central Emergency Operations Center
CoA	Council of Agriculture, Executive Yuan
EOC	Emergency Operations Center
GOARN	Global Outbreak Alert and Response Network
INFOSAN	International Food Safety Authorities Network
MCM	Medical countermeasure
MOEA	Ministry of Economic Affairs
MOFA	Ministry of Foreign Affairs
MOHW	Ministry of Health and Welfare
MOI	Ministry of the Interior
MOND	Ministry of National Defense
NFP	National Focal Point
NHCC	National Health Command Center
NNDSS	National Notifiable Diseases Surveillance System
PMDS	Product Management Distribution System
SOP	Standard Operating Procedure
TCDC	Taiwan CDC
TFDA	Taiwan Food and Drug Administration

APPENDIX 5: Corrections

December 29, 2017

Page 21

- *Level of Capabilities*: Updated text to reflect that Taiwan's National Vaccine Fund was established in 2010.
- *P.7.1 Strengths*: Updated text to reflect that National Immunization Information System (NIIS) data is routinely accessed by public health personnel rather than medical professionals.

Page 22

- *P.7.2 Recommendations*: Updated text to reflect that Taiwan's National Vaccine Fund should be expanded rather than established.

Page 29

- *Level of Capabilities*: Updated text to reflect that Taiwan was granted access to the WHO's Event Information Site in 2009.
- *D.3.1 Areas which need to be strengthened*: Updated text to reflect that Taiwan is required to submit event reports to WHO via e-mail in addition to the Event Information Site rather than in lieu of submissions via the Event Information Site.

Page 49

- *R.5.3 Strengths*: Updated text to reflect that Taiwan CDC publishes a minimum of 36 Facebook posts monthly rather than daily.