

# **JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES**

of  
**THE KINGDOM OF BAHRAIN**

Mission report:  
**4–8 September 2016**



**World Health  
Organization**



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# Abbreviations

<b>AFP</b>	Acute flaccid paralysis
<b>AMR</b>	Antimicrobial resistance
<b>AMRA</b>	Agricultural and Marine Resources Affairs Agency
<b>AMS</b>	Antimicrobial stewardship
<b>BDF</b>	Bahrain Defence Force
<b>CVL</b>	Central Veterinary Laboratory
<b>EOC</b>	Emergency operation centre
<b>EPI</b>	Expanded Programme on Immunization
<b>EQA</b>	External quality assurance
<b>FAO</b>	Food and Agriculture Organization
<b>FETP(V)</b>	Field Epidemiology Training Programme (for Veterinarians)
<b>GCC</b>	Gulf Cooperation Council
<b>HCAI</b>	Health care-associated infection
<b>IAEA</b>	International Atomic Energy Agency
<b>IHR</b>	International Health Regulations (2005)
<b>IPC</b>	infection prevention and control
<b>JEE</b>	Joint External Evaluation
<b>KHUH</b>	King Hamad University Hospital
<b>MCM</b>	Medical countermeasures
<b>MDRO</b>	Multidrug resistance organism
<b>MMR</b>	Measles, mumps and rubella
<b>MOA</b>	Ministry of Agriculture
<b>MOH</b>	Ministry of Health
<b>NCDM</b>	National Committee for Disaster Management
<b>NFP</b>	National Focal Point
<b>NHRA</b>	National Health Regulatory Agency
<b>NIP</b>	National Immunization Programme
<b>OIE</b>	World Organisation for Animal Health
<b>PCR</b>	Polymerase chain reaction
<b>PoE</b>	Point(s) of entry
<b>SARI</b>	Severe acute respiratory infection
<b>SCE</b>	Supreme Council for Environment
<b>SMC</b>	Salmaniya Medical Complex
<b>SOP</b>	Standard operating procedure
<b>WHO</b>	World Health Organization

# Introduction

This joint assessment of the Kingdom of Bahrain, carried out on 4-8 September 2016 by national and external experts, was conducted using the World Health Organization (WHO) International Health Regulations (2005) (IHR) Joint External Evaluation (JEE) tool. The JEE allows countries to identify the most urgent needs related to 19 technical areas within their health security system; to prioritize opportunities to enhance preparedness, detection and response capacity, including setting national priorities; and to allocate resources based on the findings.

Bahrain has demonstrated strong commitment to global health security and the national core capacities required by IHR. It is the sixth country in the WHO Eastern Mediterranean Region and the 13th globally to volunteer and complete the JEE process. This evaluation was carried out jointly by Bahraini experts and a multisectoral, international team comprising individuals from peer countries based on their technical expertise, and advisors representing international organizations including WHO and the Food and Agriculture Organization (FAO).

The evaluation included interactive technical presentations covering self-assessment results, joint multisectoral discussions and site visits to key ministries, health-care facilities and points of entry. A comprehensive description of the evaluation methodology is provided in the appendices. This report presents the recommendations for priority actions jointly developed by the external team and their Bahraini peers. Technical Area scores and their justifications and supporting information are provided under each of the 19 Technical Area sections of this report.

## Bahrain health-care system and IHR capacities

Bahrain has a comprehensive health system providing free services to its citizens and heavily subsidized services to non-Bahraini residents which constitute 52% of the total population. Since 2012, the Supreme Council for Health has been responsible for developing an overall national health strategy, following up on its implementation and setting health-care policies. The Ministry of Health (MOH) is responsible for planning, policy-making and provision and regulation of health services. The National Health Regulatory Authority is responsible for licensing and regulation of health-care professionals, health-care facilities and drugs.

In total, 28 primary health-care centres provide free health services including family medicine and health education as well as maternal and child health services, immunization, laboratory, radiology and dental services to the whole population. The Salmiya Medical Complex is the main secondary and tertiary health care facility. King Hamad University hospital and Bahrain Defense Force Royal Medical Services also provide secondary and tertiary care. The private sector has a limited role as a health service provider but is anticipated to grow in the future. MOH circulars specify the Public Health Laboratory as the National Reference Laboratory. Bahrain has a National Electronic Health Information System that connects all patient data on the public sector, and is used for surveillance purposes.

Bahrain has developed its response to public health emergencies through different contingency plans for specific epidemic and pandemic hazards. Some of the plans have been tested in real-life situations such as for Ebola preparedness and during the response to H5N1 avian influenza, as well as for the Middle East Respiratory Syndrome Coronavirus (MERS-CoV). The National Committee for Disaster Management, established by the Cabinet and endorsed by an Amiri Decree, has the mandate of coordinating the response to a wide spectrum of disasters and emergencies including public health events. The Committee is headed by the undersecretary of the Ministry of Interior, while the undersecretary of the MOH is the deputy head. A national plan for emergency preparedness and response, including nuclear and chemical events, is in place and updated following hazard mapping exercises.

The IHR National Focal Point is the MOH Directorate of Public Health. A national high-level IHR multisectoral and multidisciplinary committee was established by ministerial decree in 2010. In addition, an IHR technical committee has representatives from different departments of the MOH. Coordination and communication between the public health sector, animal sector and points of entry have been tested through real-life events. The national focal points of FAO, OIE and the International Atomic Energy Agency (IAEA) are functional and report notifiable events.

## Major cross-cutting themes

During the review of the 19 Technical Areas, three recurring cross-cutting themes emerged, which are considered overarching issues for consideration of the Government: 1) Existing contingency plans and IHR capacities should be frequently tested through simulation and other exercises to ensure that coordination of rapid response, information management and full multisectoral engagement are in place; 2) The private and defense sectors should be sufficiently engaged and represented within national IHR capacity; and 3) IHR-related human resources capacity in different sectors of administration should be strengthened.

- **Testing contingency plans and IHR capacities.** Bahrain has extensive capacity to prevent, detect and respond to health threats in many IHR technical areas. However, real-life events are rare and capacities should be tested and maintained through regular simulation and other exercises. This is particularly important for events that require rapid response and multisectoral coordination.
- **Private and defense sector participation in IHR implementation.** The growing number of private sector service providers should, together with the Defense sector, be fully integrated into national IHR capacity. This includes sufficient legal and contractual frameworks, joint planning, frequent exercises and coordinated response to any health threat.
- **Limited IHR-related human resource capacity.** Bahrain has high quality health-care facilities and skilled technical experts. However, from the risk management point of view, human resources in technical areas such as veterinary health, and chemical and radiation safety, should be strengthened. The existing Human resources strategy is adequate but needs to be fully implemented to sustain all IHR capacities.

In conclusion, the External Evaluation Team acknowledges the high level of capacity of Bahrain in most technical areas of the IHR. Bahrain's commitment to conduct annual self-evaluations using the JEE tool with an external JEE every 3–5 years, could further facilitate the implementation of national planning to prevent, detect and rapidly respond to public health threats whether occurring naturally, or due to deliberate or accidental events.

Further, the External Evaluation Team recognizes that Bahrain can play a leading role in supporting other countries in the region to build their health security capacity, especially in the areas of electronic health information systems used for surveillance and rapid multisectoral information sharing, immunization programmes, as well as preparedness and emergency operations planning. Through active participation in the JEE process, Bahrain is also providing a valuable example of best practices in improving health security for other countries in the Eastern Mediterranean Region. The priority actions identified through the JEE process, once implemented, support other international processes such as the Sendai Framework for Disaster Risk Reduction, WHO's emergency response reform and restructuring of the IHR monitoring process, the OIE Performance of Veterinary Services, and international evaluations of the Ebola response.

The External Assessment Team wishes to extend its warmest regards to the Bahraini national health authorities for the support and openness in the conduct of the mission, which have truly reflected the independent and objective spirit outlined in the WHO Eastern Mediterranean Regional Committee Resolution EM/RC62/R.y.

## Executive summary

An assessment of the capacity of the Kingdom of Bahrain to fulfil the requirements of the World Health Organization International Health Regulations (2005) was carried out by national and external experts on 4–8 September 2016. The assessment – including self-assessment results, multisectoral discussions and site visits – used the WHO Joint External Evaluation tool, which allows countries to identify the most urgent needs related to 19 technical areas; to prioritize opportunities; and to allocate resources based on the findings.

Bahrain, the 13th volunteer country globally to complete the JEE process, demonstrated strong commitment to global health security and the national core capacities required by the IHR.

IHR requirements are fully covered by the IHR National Focal Point (MOH Directorate of Public Health), a national high-level IHR multisectoral and multidisciplinary committee, and an IHR technical committee. Coordination and communication between the public health sector, animal sector and points of entry have been tested through real-life events. National focal points of the Food and Agriculture Organization, World Organisation for Animal Health and the International Atomic Energy Agency are functional and report notifiable events.

Bahrain's health system provides free services to its citizens and is heavily subsidized for non-Bahraini residents, who constitute 52% of the total population. In total, 28 primary health-care centres provide a wide range of free health services to the whole population. The private sector currently provides limited health services but its role is expected to grow in the future.

The Public Health Laboratory acts as the national reference laboratory, and the National Electronic Health Information System, which connects all patient data in the public sector, is used for surveillance purposes.

Bahrain can respond to public health emergencies through its contingency plans for epidemic and pandemic hazards. These have been tested in real-life incidents such as Ebola, H5N1 avian influenza, and Middle East Respiratory Syndrome Coronavirus. The National Committee for Disaster Management coordinates the country's response to a wide spectrum of disasters and emergencies. In addition, a national plan for emergency preparedness and response, including nuclear and chemical events, is updated following hazard mapping exercises.

During the review of the 19 technical areas, three recurring cross-cutting themes emerged: the need for contingency plans and IHR capacities to be tested through simulation; the engagement of the private and defence sectors as part of the national IHR capacity; and the importance of IHR-related human resource capacity in different sectors of administration.

In conclusion, Bahrain has a high level of capacity in most of the 19 technical areas of the IHR. Its commitment to using the JEE tool could facilitate planning to prevent, detect and rapidly respond to public health threats of natural, deliberate or accidental origin in other countries in the Region. Bahrain is also a valuable example of best practices in improving health security.

The External Assessment Team extends its warmest regards to the Bahraini national health authorities for the support and openness in the conduct of the mission.



## Bahrain scores

Capacities	Indicators	Score
<b>National legislation, policy and financing</b>	P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR	2
	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)	3
<b>IHR coordination, communication and advocacy</b>	P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR	5
<b>Antimicrobial resistance (AMR)</b>	P.3.1 Antimicrobial resistance detection	3
	P.3.2 Surveillance of infections caused by AMR pathogens	3
	P.3.3 Health care associated-infection (HCAI) prevention and control programmes	5
	P.3.4 Antimicrobial stewardship activities	2
<b>Zoonotic diseases</b>	P.4.1 Surveillance systems are in place for priority zoonotic diseases/pathogens	3
	P.4.2 Veterinary or Animal Health Workforce	3
	P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional	4
<b>Food safety</b>	P.5.1 Mechanisms are established and functioning for detecting and responding to food-borne disease and food contamination	4
<b>Biosafety and biosecurity</b>	P.6.1 Whole-of-Government biosafety and biosecurity system is in place for human, animal, and agriculture facilities	4
	P.6.2 Biosafety and biosecurity training and practices	4
<b>Immunization</b>	P.7.1 Vaccine coverage (measles) as part of national programme	5
	P.7.2 National vaccine access and delivery	5
<b>National laboratory system</b>	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	4
	D.1.4 Laboratory Quality System	4
<b>Real-time surveillance</b>	D.2.1 Indicator- and event-based surveillance systems	3
	D.2.2 Inter-operable, interconnected, electronic real-time reporting system	3
	D.2.3 Analysis of surveillance data	5
	D.2.4 Syndromic surveillance systems	5
<b>Reporting</b>	D.3.1 System for efficient reporting to WHO, FAO and OIE	5
	D.3.2 Reporting network and protocols in country	4
<b>Workforce development</b>	D.4.1 Human resources are available to implement IHR core capacity requirements	5
	D.4.2 Field Epidemiology Training Programme or other applied epidemiology training programme is in place	5
	D.4.3 Workforce strategy	3

<b>Preparedness</b>	R.1.1 Multi-hazard National Public Health Emergency Preparedness and Response Plan is developed and implemented R.1.2 Priority public health risks and resources are mapped and utilized	<b>5</b> <b>5</b>
<b>Emergency response operations</b>	R.2.1 Capacity to activate emergency operations	<b>5</b>
	R.2.2 Emergency Operations Centre operating procedures and plans available	<b>5</b>
	R.2.3 Emergency Operations Programme	<b>5</b>
	R.2.4 Case management procedures are implemented for IHR-relevant hazards	<b>4</b>
<b>Linking public health and security authorities</b>	R.3.1 Public health and security authorities (e.g. law enforcement, border control, customs) are linked during a suspect or confirmed biological event	<b>4</b>
<b>Medical countermeasures and personnel deployment</b>	R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency	<b>5</b>
	R.4.2 System is in place for sending and receiving health personnel during a public health emergency	<b>5</b>
<b>Risk communication</b>	R.5.1 Risk communication systems (plans, mechanisms, etc.)	<b>4</b>
	R.5.2 Internal and partner communication and coordination	<b>4</b>
	R.5.3 Public communication	<b>4</b>
	R.5.4 Communication engagement with affected communities	<b>4</b>
	R.5.5 Dynamic listening and rumour management	<b>3</b>
<b>Points of entry (PoE)</b>	PoE.1 Routine capacities are established at PoE	<b>3</b>
	PoE.2 Effective public health response at PoE	<b>2</b>
<b>Chemical events</b>	CE.1 Mechanisms are established and functioning for detecting and responding to chemical events or emergencies	<b>4</b>
	CE.2 Enabling environment is in place for management of chemical events	<b>3</b>
<b>Radiation emergencies</b>	RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies	<b>3</b>
	RE.2 Enabling environment is in place for management of radiation emergencies	<b>3</b>

#### \*Note on scoring of technical areas of the JEE tool

The JEE process is a peer-to-peer review. As such, it is a collaborative effort between host country experts and External Evaluation Team members. In completing the self-evaluation, the first step in the JEE process, and as part of preparing for an external evaluation, host countries are asked to provide information on their capabilities based on the indicators and technical questions included in the JEE tool.

The host country may suggest a score at this time or during the on-site consultation with the external team. The entire external evaluation, in particular the discussions around the score, the strengths, the areas that need strengthening, and the priority actions should be collaborative, with external evaluation team members and host country experts seeking agreement.

Should there be significant and/or irreconcilable disagreement between the external team members and the host country experts or among the external or the host country experts, the External Evaluation Team Lead will decide on the score and this will be noted in the final report, along with the justification for each party's position.

# PREVENT

## National legislation, policy and financing

### Introduction

The International Health Regulations 2005 (IHR) provide obligations and rights for States Parties. In some States Parties, implementation of the IHR (2005) may require new or modified legislation or simply the use of existing legislative instruments. Even if new or revised legislation may not be specifically required, States may still choose to revise some regulations or other instruments in order to facilitate IHR implementation in a more effective manner. Implementing legislation could serve to institutionalize and strengthen the role of IHR (2005) and operations within the State Party. It can also facilitate coordination among the different entities involved in their implementation. See detailed guidance on IHR (2005) implementation in national legislation at [http://www.who.int/ihr/legal\\_issues/legislation/en/index.html](http://www.who.int/ihr/legal_issues/legislation/en/index.html).

### 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.*

### Bahrain level of capabilities

As is the case in most countries, Bahrain needs to improve the national legal landscape to be sufficiently comprehensive to fulfil IHR. Deficiencies in laws can be and should be addressed by one or more legal instrument. The best practice to ensure a comprehensive legal framework would be to conduct a legal and regulatory assessment on all issues involving the IHR to identify areas for improvement. Bahrain is committed to fully implementing the IHR and has taken important steps in this direction.

### Recommendations for priority actions

- Establish an intersectoral working group, facilitated by WHO, composed of legal advisors and public health officials from all sectors involved in IHR implementation, to conduct an assessment of all existing national legislation,<sup>1</sup> regulations and other instruments covering all related issues and IHR functions.
- Adopt any revised and/or new legislation, including the currently pending draft Public Health Act.

### Indicators and scores

#### P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR

**Score 2: Limited capacity.** An assessment of relevant legislation, regulations, administrative requirements and other government instruments has been carried out in most areas of the IHR.

<sup>1</sup> The term "legislation" is used generally in this document to refer to the broad range of legal, administrative or other governmental instruments which may be available for Bahrain to implement the IHR (2005). Such instruments are not being limited to those adopted by the Parliament and may include administrative measures such as regulations, circulars, orders, and other documents under the legal system in Bahrain such as Royal and Amiri Decrees.

### **Strengths/best practices**

- Bahrain is committed to implementing the IHR; in addition to this JEE, a legislative assessment has been carried out covering most areas related to the IHR.
- The National IHR Committee, composed of representatives from all relevant sectors, supports Bahrain's efforts to implement the IHR and review relevant laws.
- A substantial legal framework exists for most packages.
- The right to health is specified in the Constitution of Bahrain.
- Bahrain has a Legal Affairs Office within the MOH and legal advisors in most relevant ministries.

### **Areas that need strengthening/challenges**

- A legislative and regulatory assessment needs to be undertaken with comprehensive participation of all relevant sectors related to IHR. The efforts already being made by the National IHR Committee to gather all relevant laws will be very useful in this regard.
- Regular evaluation of available legislation, regulations and policies to facilitate full IHR implementation should be continued.

## **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)**

**Score 2: Limited capacity.** The legislative and regulatory assessment carried out identified needs for adjustment. The establishment of an intersectoral working group to assess the existing national legal framework covering all subject areas and IHR functions and the effective implementation of the recommendations would enable Bahrain to reach higher levels for this indicator.

### **Strengths/best practices**

- IHR is entrusted to the MOH, and the Directorate of Public Health has been designated the National Focal Point (NFP) for the Kingdom.
- Progress has been made to develop and approve draft bills, for example on Public Health and Environmental regulation.

### **Areas that need strengthening/challenges**

- Pending and new legislation should be finalized and implemented as needed.

### **Relevant documentation**

- International Health Regulations (2005), World Health Organization, 3rd edition.
- Joint External Evaluation Tool, International Health Regulations (2005), 2016.
- Public Health Law No. 3 of 1975.
- New Public Health Law (currently being reviewed in Parliament).
- Constitution of the Kingdom of Bahrain, 2002.
- Letter of designation of the NFP dated 1 October 2013.

# IHR coordination, communication and advocacy

## Introduction

The effective implementation of the IHR requires multisectoral/multidisciplinary approaches through national partnerships for efficient and alert response systems. Coordination of nationwide resources, including the designation of a national IHR focal point, which is a national centre for IHR communications, is a key requisite for IHR implementation.

### Target

*The effective implementation of the IHR (2005) requires multisectoral/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 centre 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, continuously update and annually confirm them.*

## Bahrain level of capabilities

The IHR NFP is the Directorate of Public Health, which is part of the MOH. The IHR NFP has nominated individuals to carry out the responsibilities of IHR functions, with the Director of Public Health having the lead responsibility of NFP. The contact information of the IHR NFP representatives have been provided to WHO and are continuously updated and annually confirmed. Somebody is available 24/7 on IHR duty.

A national high-level IHR multisectoral and multidisciplinary committee was established by ministerial decree in 2010. Members of the Committee represent public health, communicable diseases, zoonotic diseases, food safety, environmental health, public health laboratory, radiation safety, points of entry (PoE), government and private clinics and hospitals, civil aviation, Ministry of Interior, media and law. In addition, an IHR technical committee includes representatives from the different departments of the MOH. Regular liaison of the IHR NFP with the National Committee for Disaster Management (NCDM) is ensured, as the Undersecretary of Health is a member of this Committee.

Communication and coordination between the different stakeholders and the IHR NFP take place regularly through well-described procedures. Coordination and communication between the public health sector, the animal sector and PoE have been tested through real-life events and have been enhanced. The effectiveness of the IHR NFP functions is regularly discussed by stakeholders, but no formal evaluation has been carried out.

A well-developed, dedicated IHR website within the MOH serves for communication and advocacy. Regular IHR-related news is disseminated to all stakeholders, who also receive an annual update on the status of IHR implementation.

## Recommendations for priority actions

- Ensure sustainability of the IHR and NFP functions through continuous high-level political and administrative support from all stakeholder sectors.
- Evaluate the efficiency of the IHR NFP in collaboration with the MOH, WHO and national stakeholders.
- Ensure 24/7 IHR duty implementation.

## Indicators and scores

### P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR

**Score 5: Sustainable capacity.** The necessary legal changes have been made, and the IHR NFP and a multisectoral committee have been established by ministerial decrees. Multisectoral coordination and communication mechanisms have been tested through real-life events, and the lessons learnt incorporated into multisectoral and multidisciplinary coordination and communication mechanisms. Updates on the status of IHR implementation are shared regularly with the different stakeholders.

#### *Strengths/best practices*

- The IHR NFP has been designated and its functions and roles and responsibilities are clearly defined. A national high-level, multisectoral, multidisciplinary IHR committee has been nominated.
- The IHR NFP and the high-level IHR committee liaise regularly with the NCDM.
- Coordination and communication with other stakeholders is well developed and tested through real-life events.

#### *Areas that need strengthening/challenges*

- The efficiency of the functions of the IHR NFP needs to be evaluated.

#### *Relevant documentation*

- Ministerial Decree establishing the IHR NFP.
- Ministerial Decree establishing the multisectoral, multidisciplinary IHR committee.
- Ministry of Health website services on IHR.

# Antimicrobial resistance

## Introduction

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

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

### Target

*Support work 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.*

## Bahrain level of capabilities

In 2014, a ministerial decree created a national AMR working group to develop a general strategy and milestones for a national AMR programme. A document was developed outlining achievements and future directions of AMR activities in Bahrain.

Capacity for detection and surveillance of infections caused by AMR covers about 80% of the population seen by the Salmaiya Medical Complex (SMC) hospital microbiology laboratory, which receives isolates from six MOH public hospitals and 28 primary health centres. In addition, the Bahrain Defence Force (BDF) and King Hamad University Hospital (KHUH) have advanced laboratories for AMR characterization. Data on human AMR are available at SMC and the military hospitals, although these are not shared or reported to a centralized database.

Infection prevention and control (IPC) programmes are widely implemented and advanced in the public, military and private hospitals and the primary health care centres using Gulf Cooperation Council (GCC) guidelines, standards, manuals and protocols. A strong auditing component of IPC programmes is managed by the National Health Regulatory Agency (NHRA). The concept of a "One Health" approach for AMR needs to be enhanced to ensure containment of AMR in the future. There is capacity in the animal health laboratory to detect AMR, but active surveillance is limited. AMR capacity and surveillance at SMC, BDF, and KHUH will facilitate sentinel surveillance sites for AMR reporting at national and international level. Antimicrobial stewardship programmes have recently been initiated in several hospitals in response to high AMR, particularly in the public and military sectors.

## Recommendations for priority actions

- Develop a national plan incorporating AMR detection, reporting, surveillance and antimicrobial stewardship programmes through engagement of stakeholders representing human health, animal, food, agriculture and environment sectors.

- Formalize an organizational structure to manage and coordinate AMR activities.
- Assign a national AMR reference laboratory for Bahrain.
- Enhance AMR active surveillance capacity and prevention by implementing effective stewardship programmes in both the human and animal health sectors.
- Strengthen interagency collaboration to enhance national AMR reporting between the human health and animal sectors.

## Indicators and scores

### P.3.1 Antimicrobial resistance detection

**Score 3: Developed capacity.** No national plan for detection and reporting of priority AMR pathogens has been developed and no formal or official circular has been issued to describe the organizational structure of national AMR coordination. However, a document was submitted to the Supreme Council of Health in 2015 outlining achievements and future activities for human AMR plans with limited involvement of the animal sector.

For the human sector, although no national AMR laboratory has been assigned, capacities for AMR detection are available at SMC, BDF, and KHUH, where their laboratories can identify all pathogens and do advanced molecular characterization. Hospital laboratories are in the process of international accreditation and receive proficiency testing through international organizations. The microbiology hospital laboratory at SMC has access to AMR data from Salmaniya hospital, 5 peripheral public hospitals and 28 primary health care centres. Each hospital shares its AMR data internally to be utilized by physicians and IPC hospital teams.

There is capacity in the animal health laboratory for testing AMR, although reporting of animal AMR data is done through veterinary services and only shared with public health upon request.

### Strengths/best practices

- Hospital laboratories at SMC, BDF, and KHUH use Clinical and Laboratory Standards Institute (CLSI) guidelines and are in the process of international accreditation.
- The SMC microbiology laboratory also tests clinical isolates sent through 5 peripheral hospitals and 28 primary health centres.
- The capacity for AMR detection available at several laboratories could serve as a national AMR reference laboratory if some functions were added, allowing them to act at national level.
- Capacity is available at the central veterinary laboratory to conduct the AMR testing for all relevant animal pathogens.

### Areas that need strengthening/challenges

- A national AMR plan needs to be developed in collaboration with stakeholders of the human (public/private/military) and animal sectors for approval by the Supreme Council of Health. The plan should be aligned with the WHO Global Action Plan for AMR.
- A clear organizational structure should be established listing those responsible for coordination of national AMR activities, either an AMR committee or other.
- A national AMR reference laboratory should be assigned, the scope of which should then be updated and implemented.
- A mechanism for national reporting of AMR data should be established for both the human and animal sectors to ensure appropriate containment of AMR in the future.

- AMR microbiology laboratory standards should be extended to include private hospitals through the NHRA.

### P.3.2 Surveillance of infections caused by AMR pathogens

**Score 3: Developed capacity.** Although no national plan for surveillance of infections caused by AMR pathogens has yet been developed for the human sector, the SMC, BDF and KHUH have been conducting multidrug resistance organism (MDRO) surveillance for over five years. These hospitals do not function as assigned sentinel sites and do not report AMR surveillance data to either the IPC department or to public health. For the animal sector, passive surveillance for AMR priority pathogens exists, although no data has recently been reported to public health. The “One Health” approach needs strengthening to reflect the AMR profile of the country.

#### *Strengths/best practices*

- A MDRO surveillance strategy is implemented at SMC, BDF and KHUH using the GCC strategy for surveillance and containment of MDRO.
- Surveillance systems implemented at SMC, BDF and KHUH have been capturing AMR data through active health care-associated infection (HCAI) surveillance and community-acquired infection surveillance for over five years.
- Ongoing active AMR surveillance is implemented in the animal sector and testing occurs according to clinical needs in the 28 poultry farms and 200 dairy herds.

#### *Areas that need strengthening/challenges*

- A national plan for surveillance of infections caused by AMR pathogens needs to be developed in collaboration with stakeholders and approved by the Supreme Council of Health.
- Interagency collaboration should be strengthened to collect One Health AMR data from animals, food and humans.
- Surveillance sites need to be designated for reporting human and animal AMR data.
- The capacities of microbiology laboratories in the private sector need to be enhanced to characterize AMR.

### P.3.3 Health care-associated infection prevention and control programmes

**Score 5: Sustainable capacity.** Even though no national plan for HCAI programmes is yet available, IPC programmes are well advanced within all hospitals in Bahrain (SMC, BDF, KHUH and primary health care). They all utilize the GCC IPC guidelines, manuals and protocols. National IPC coordination needs to be enhanced in the future through a detailed national IPC implementation plan captured in the national AMR plan.

#### *Strengths/best practices*

- GCC IPC resources , including IPC guidelines, surveillance manuals and IPC protocols are available and used by hospitals in Bahrain.
- A strong, longstanding IPC programme exists in public, private and military hospitals in addition to primary health care centres.
- A powerful, independent authority audits implementation of IPC programme elements and standards according to GCC guidelines and standards.

### **Areas that need strengthening/challenges**

- National coordination of IPC programmes should be strengthened and national collaboration promoted for prevention of HCAI.
- Auditing of IPC standards in public/private/military hospitals should be enforced through the NHRA.

### **P.3.4 Antimicrobial stewardship (AMS) activities**

**Score 2: Limited capacity.** No national plans for AMS programmes have been developed at either central or facility levels. Limited AMS activities have been initiated recently at SMC, BDF and KHUH without central coordination with the MOH. No designated centres are implementing comprehensive stewardship activities, and no AMS programmes exist in private hospitals or primary health care centres. Limited data are available on antimicrobial use at community and health facility levels. AMR stewardship programmes in the animal sector are not yet conducted.

### **Strengths/best practices**

- A circular prohibiting antibiotic dispensing without prescription through pharmacies was issued in 2013.
- Good quality antimicrobials are available and no illegal antibiotics are imported into the country.
- Hospitals have various elements of AMS programmes since 2012, e.g. they have created AMS teams and committees, antimicrobial use guidelines, and staff training.
- Antibiotics are not used for growth promotion in the animal sector and are only dispensed through the prescription of vets.
- There is strong NHRA control.

### **Relevant documentation**

- IPC policies and procedures of GCC.
- HCAI surveillance guidelines of Bahrain Defence Force Royal Medical Services.
- Annual report of hospital-acquired infections in BDF.
- MDRO surveillance report of BDF, 2014.
- Antibiogram of SMC and BDF for 2015.
- Quality indicator forms.

# Zoonotic diseases

## Introduction

Zoonotic diseases are communicable diseases and microbes spreading between animals and humans. These diseases are caused by bacteria, viruses, parasites, and fungi that are carried by animals and insect or inanimate vectors may be needed to transfer the microbe. Approximately 75% of recently emerging infectious diseases affecting humans are of animal origin; approximately 60% of all human pathogens are zoonotic.

### Target

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

## Bahrain level of capabilities

The Agricultural and Marine Resources Affairs (AMRA) Agency sits within the Ministry of Work, Municipalities, and Urban Plan. Within AMRA there are three directorates: the Veterinary Directorate, the Marine Directorate and the Plant Directorate. The Chief Veterinary Officer heads the Veterinary Directorate, which includes the Central Veterinary Laboratory (CVL), and departments for quarantine, clinical medicine, pharmacy, and poultry affairs, and a poultry laboratory. There are currently 40 licensed veterinarians working in the Veterinary Directorate. The new food safety unit is shared by the Veterinary and Plant directorates. At the borders there are inspectors for imported food and animals.

The Ministry of Work, Municipalities, and Urban Plan manages the licensure and accreditation of animal health facilities, laboratories, veterinary pharmacies, etc. (as the NHRA does for the human health sector).

Domestic animal production is very limited in Bahrain, mostly comprising sheep, goats, poultry, some cattle, and camels. Commercial aquaculture farming, in addition to sea fishing, exists. In Bahrain, the responsibility for zoonotic disease prevention, detection, and response, including for diagnostic laboratories, is at the central level for both the animal and public health sectors. Capacity is not needed at subnational levels due to the small size of the country and the limited animal production sector. There is no generic national strategy for zoonoses or "One Health" in Bahrain.

Priority zoonotic diseases have been identified by the public health sector (e.g. avian influenza, brucellosis, leishmaniasis, MERS-CoV, Q fever, rabies, and tuberculosis), and the animal health sector (e.g. brucellosis, glanders, MERS-CoV, rabies, tuberculosis, and foodborne zoonoses). There is already substantial overlap between these two sectors. However, no discussion or development of an official jointly-agreed list of priority zoonoses has taken place, that would help the ministries integrate their work.

There is insufficient technical expertise and diagnostic laboratory capacity for specific zoonotic diseases in the Veterinary Directorate. Some training is available for animal health sector staff, but no access to epidemiology training programmes or a Field Epidemiology Training Programme for Veterinarians (FETPV). In the MOH, capacities for surveillance, epidemiological assessment, and diagnoses for zoonoses are adequate. There is a generic national protocol for handling patients with highly communicable diseases and also disease-specific protocols such as MERS, zoonotic influenza, and Ebola. The ability of the BDF Hospital to contain a potential hospital outbreak of a high-threat pathogen was tested in 2014 when a cardiac patient from the Kingdom of Saudi Arabia tested positive for MERS-CoV infection four days after admission and surgery. There were no subsequent secondary cases in health-care workers or other patients.

Animal health surveillance systems are well established for certain zoonotic diseases, such as brucellosis and tuberculosis, especially for imported animals. Baseline prevalence information on zoonoses could be established via field studies with technical support from World Organisation for Animal Health (OIE) and the Food and Agriculture Organization (FAO). There is surveillance and reporting of human cases of certain zoonoses according to MOH priority lists A and B. In general, public and private hospitals inform the MOH of human disease events that are of public health concern for follow-up in cases such as rabies, tuberculosis, community-acquired infections, and diseases linked to animal health. The CVL has the capacity to test suspect animals for rabies and the MOH sends suspect rabies samples from humans to the regional reference laboratory in Oman. There has only been one suspect human rabies case identified in Bahrain in recent years.

Mandatory zoonotic disease reporting from the public health and animal health sectors is via national sectoral lines to WHO and OIE, respectively. The Ministry of Agriculture (MOA) reports wildlife events to OIE via the "WAHID-wild" system. An OIE Performance of Veterinary Services (PVS) evaluation was completed in 2008, although the report was not available to the JEE team.

Multisectoral coordination mechanisms are important to provide a platform for regular data sharing, risk assessment, science-based decision-making, joint planning such as surveillance and response, and linking technical activities. In Bahrain, national high-level multisectoral coordination mechanisms include the NCDM and the multisectoral, multidisciplinary National IHR Committee. They both meet regularly and have dealt with complicated health concerns such as Red Tide. There has been rapid multisectoral response to potential zoonotic disease events such as potential MERS in imported camels in 2014. In response to an OIE alert reporting cases of MERS-CoV in camels in Saudi Arabia, Bahrain issued a ban on importing live camels. A subsequent shipment of live camels from Saudi Arabia and Qatar was culled and, through multisectoral communication and collaboration, personnel in direct contact with the camels were tested by MOH. In parallel, about 50% of the local camel population were tested against MERS-CoV infection and confirmed negative.

A formal coordination committee was established in 2006 for joint planning and response to avian influenza, and regular informal communication between technical staff in AMRA and MOH enables sharing of routine reports, and other information upon request. Collaboration exists between units responsible for wildlife (which sit in several different ministries and units). However, a formal, interministerial zoonoses committee that meets regularly to ensure communication and collaboration among ministries, while proposed, has not yet been established.

There are no written generic national plans or current disease-specific plans for response to zoonotic diseases. This is important to ensure rapid, coordinated responses to urgent zoonotic disease events within the different ministries.

Nationally, sufficient financial resources exist but external technical support and training would be beneficial. Increased awareness about the importance of zoonoses to public health would benefit both the animal and public health sectors, other stakeholders, and the public. There are disease awareness campaigns for farmers, but these are on an ad hoc basis.

## Recommendations for priority actions

- Establish a formal mechanism among relevant stakeholders for regular communication, collaboration, and science-based decision-making for the prevention, detection and response to zoonotic diseases.
- Develop a list of priority zoonotic diseases jointly agreed on by both the public health and animal sectors.
- Develop and test a joint national plan for response to zoonotic diseases (including information sharing, joint risk assessment and decision-making).

- Increase the human resource and technical capacity in epidemiology and zoonotic diseases in the Veterinary Directorate.
- Increase the capacity at the CVL for specific priority zoonoses.

## Indicators and scores

### P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens

**Score 3: Developed capacity.** There are active, functional surveillance systems in place for 1–4 important zoonoses in both the MOA and MOH, although these systems are not aligned or based on a jointly agreed list of priority zoonoses, and there is no communication between the two ministries.

#### *Strengths/best practices*

- Priority zoonotic diseases have been identified, albeit separately, by the public health and animal health sectors.
- Animal health surveillance systems are well established for certain diseases, especially for imported animals.
- There is surveillance and reporting of human cases of certain zoonoses according to MOH priority lists A and B, and capacities for diagnosis and epidemiological assessment of zoonoses in humans are adequate.

#### *Areas that need strengthening/challenges*

- There is no official list of priority zoonoses agreed for joint cooperation between the MOA and MOH.
- There is insufficient diagnostic laboratory capacity for specific zoonotic diseases in the Veterinary Directorate.

### P.4.2 Veterinary or animal health workforce

**Score 3: Developed capacity.** Animal health workforce capacity – especially zoonoses-specific capacity – exists within the national system but is insufficient in both number and level of technical training.

Note: Due to the small size of the country and the limited animal production sector, the responsibility for zoonoses exists only at the central level and thus there is no subnational level to consider in scoring this indicator.

#### *Strengths/best practices*

- Some training is available for animal health sector staff.

#### *Areas that need strengthening/challenges*

- There is insufficient technical expertise for specific zoonotic diseases in the Veterinary Directorate.
- There is no access to general epidemiology or FETPV programmes for animal health sector staff.

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

**Score 4: Demonstrated capacity.** Information exchange and response to potential zoonotic risks and outbreaks of zoonotic disease have been demonstrated, although no written zoonoses-specific plans or mechanisms exist.

### **Strengths/best practices**

- Cross-sector mechanisms, including at the Prime Minister level, to rapidly respond to high-level emergencies exist and are used regularly for health emergencies. These can be used for multisectoral response to zoonoses as needed, as demonstrated by the mechanisms established in 2006 for zoonotic influenza, and the 2014 potential MERS event in imported camels.
- Ministries and units responsible for wildlife are included in collaboration as needed.

### **Areas that need strengthening/challenges**

- No established, written national plans exist for systematic information exchange and response to zoonoses, which would be required to fully reach the currently assigned score of 4.
- Information sharing and joint risk assessment for science-based decision-making and multisectoral response for zoonoses are not adequate in the existing system.

### **Relevant documentation**

- Management of Hazard Waste on Health Care, Ministerial Decree No(1), 2001.
- Food Import Law No(3), 1985.
- Prohibition of Slaughtering outside the Slaughterhouses, Ministerial Decree No( 3), 1994.
- Plant Quarantine Law No(5), 2003.
- Animal Quarantine Law No (8), 2003.
- Veterinary Proficiency Practice, GCC Law No(17), 2014.
- Fishing Management and Protection of the Marine Resources Law No(20), 2002.
- Pesticide Residues, GCC Law No(37), 2005.Release Control for Imported and Transient Live Animal Consignments in Bahrain, Ministerial Decree No(42), 2012.
- Veterinary Health Requirements for the Livestock Slaughter houses, Bahrain, Ministerial Degree No(127), 2011.

# Food safety

## Introduction

Food and waterborne diseases are a serious public health issue and a leading cause of illness and death worldwide. WHO estimates of the Global burden of foodborne diseases indicates that each year 33 million people get sick from a foodborne disease including 420,000 dying. The rapid globalization of food production and trade has increased the potential likelihood of international incidents involving contaminated food traded across borders. Therefore, the identification of the source of an outbreak and its recall from the market is critical for limiting the public health impact of an outbreak or of the distribution of contaminated food. Capacity with regard to the management of food safety events throughout the food chain continuum must be developed. This is particularly critical for the Kingdom of Bahrain that imports significant amounts of food commodities, of both plant and animal origins, to meet the growing demand for food for human consumption.

### Target

*State parties should have control, surveillance and response capacity for food and water borne diseases as an integrated part of their public health surveillance and response system. It requires a multisectoral approach and effective communication and collaboration among the different sectors involved in managing food safety events.*

## Bahrain level of capabilities

The National Health Law of 1975 has been revised and the draft is passing through the different approval procedures. The Law contains provision for food safety, although no details were provided on its scope, content, possible risk-based approach, or any details of the operative paragraphs. The updated Law focuses mainly on consolidating the existing multiple regulatory texts into one document. The regulatory law currently being used is the 1975 Health Law. This is complemented by texts such as GCC standards and regulations, international food standards of the Codex Alimentarius Commission, texts providing the basis for audits, food inspections and their enforcements as well as texts related to risk communication with the public, other stakeholders and between national agencies.

Laboratories for the routine testing of imported foods and animal feeds for maximum residue limits of chemicals (pesticides, veterinary drugs and heavy metals) and maximum levels of toxins are in place and operational. It is not clear whether or not they participate in certification or quality control schemes. There are descriptions for example, of past outbreak investigations (e.g. salmonella outbreak at an exhibition venue) with details indicating the existence of a functioning system to detect and respond to outbreaks of foodborne diseases. However, no details were provided on routine surveillance activities (incidence of different foodborne diseases or prevalence of different pathogens in the food supply). Outbreaks of Salmonellosis and foodborne diseases are detected and reported on a regular basis. There are joint response activities to outbreaks but the details and the mechanisms were not provided.

This food safety evaluation is based primarily on discussions of the JEE team with participants from the host country during meetings.

## Recommendations for priority actions

- Accelerate endorsement of the food safety provisions in the new Public Health Law and related administrative measures.

- Establish an integrated/unified national food safety system/authority including a 3–5-year action plan with allocated resources and defined roles and responsibilities.
- Map current roles and responsibilities for managing food safety, including assessment, inspection, testing, traceability and recall functions.
- Establish an electronic reporting system as part of the current public health system for reporting and managing events.
- Strengthen communication and data sharing between relevant agencies and consider establishing an International Food Safety Authorities Network (INFOSAN) structure at national level.

## Indicators and scores

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

**Score 4: Developed capacity.** A qualified committee takes part in outbreak responses using a case-based, standardized questionnaire (descriptive comments about the syndrome and possible source of the illness). Any emergency case/outbreak response has a circular which involves investigation, a questionnaire, collecting food samples and clinical specimens, and guidelines for focal points and laboratories. Effective formal and informal mechanisms exist for rapid information exchange during suspected foodborne disease outbreak investigations between all stakeholders/relevant sectors, in addition to the centralized complaints desk which is currently being trialled. Cooperation exists between the MOH, MOH and AMRA. There is also a proposal to create a committee that includes all stakeholders related to food safety. A communication mechanism between food safety stakeholders in the country is functioning to a limited extent. Information related to cases is regularly shared, especially during emergencies. Information such as leaflets is also shared on a daily basis through meetings, field visits, social media and educational facilities. Food safety control management systems have been implemented such as good manufacturing practice, good hygiene practice, and hazard analysis and critical control points.

#### Strengths/best practices

- There is prompt response to outbreaks/events. A hotline is in place for complaints related to food from 07:00 to 22:00 daily (even during holidays and weekends) and a team of inspectors is available to respond to outbreaks.
- A standardized questionnaire and guidelines are available.
- Laboratories are able to detect and report foodborne diseases.
- Collaboration exists between the MOH and AMRA for the detection of drug residue and for planning surveillance activities.

#### Areas that need strengthening/challenges

- There is a lack of human and electronic resources.
- Communication mechanisms between food safety stakeholders are limited.
- The current Public Health Law of 1975 is weak.
- A national risk analysis system should be established.

#### Relevant documentation

- WHO: Estimates of the Global Burden of Food Diseases, 2015.
- Wedding outbreak response report.
- Guidelines for response activities during outbreaks.

# Biosafety and biosecurity

## Introduction

Working with pathogens in the laboratory is vital to ensuring that the global community possess a robust set of tools—such as drugs, diagnostics, and vaccines—to counter the ever evolving threat of infectious diseases.

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

### Target

*A whole-of-government 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.*

## Bahrain level of capabilities

Biosafety and biosecurity are related concepts, but not identical. Biosafety refers to the protection of individuals and the environment to the exposure to potentially hazardous biological agents. Biosecurity refers to the protection of microbial agents, toxins or research-related information from loss, theft, diversion or intentional misuse. Therefore, biosafety has procedures and practices in place to prevent exposure and occupationally acquired infections, while biosecurity ensures that biological materials and relevant sensitive information remain secure.

Bahrain currently has no specific biosafety or biosecurity laws. However, for biosafety, the NHRA defines binding national standards for health-care facilities and laboratories as part of licensure requirements. The laboratory standards include structural criteria and requirements for comprehensive standard operating procedures (SOPs) for all kinds of laboratories in the health sector, universal precautions and appropriate packaging of material for transportation, the need for distinct clean and contaminated areas, and some other biosafety measures. On the technical level, laboratories most commonly use international standards for laboratory-specific applications and risk assessment. The premises and technical equipment in the laboratories visited appeared appropriate. Commercial transport agencies with appropriate training are used for sample transportation.

MERS-CoV, Mycobacterium tuberculosis, and poliovirus have been identified nationally as dangerous pathogens for which a comprehensive inventory of the sites where they are kept and can be handled is maintained. Training on handling and controlling such dangerous pathogens in the laboratories involved has been implemented. In the laboratories visited, access to microbiology laboratory premises is generally well controlled. Polymerase chain reaction (PCR)-based tests are increasingly used.

Biosafety training is ongoing: both training the trainers and training for staff has been implemented in the public sector laboratories and has started in private sector hospitals. Biosecurity training, focusing first on the national Public Health Laboratory (PHL), and some other laboratories in the public health sector that handle the dangerous pathogens listed above, has been implemented. There is uncertainty about sustainable academic-level training.

A new law to cover a wide range of issues related to laboratories is being processed in Parliament, and is expected to cover all biorisks, i.e. both biosafety and biosecurity. Regular audit visits to all laboratories, with a focus on accreditation, are being initiated.

CVL has a biosafety officer trained at international courses. The laboratory does not handle samples or implement tests that involve handling live dangerous pathogens. There are no regional or private veterinary laboratories in Bahrain. The team was informed that the biosafety and biosecurity-related issues in the national and agriculture laboratories are on the same level as those in the health-care sector microbiological laboratories.

## Recommendations for priority actions

- Enact comprehensive national biorisk legislation covering both biosafety and biosecurity in laboratories across government sectors.
- Develop a national plan for the implementation of the biorisk legislation.
- Expand and publish an inventory of the agents/pathogens of concern, conduct risk assessments and implement mitigation plans in the facilities housing those agents.
- Ensure sufficient human resources by appointing biosafety and biosecurity officers in all microbiology laboratories.
- Strengthen training in both biosafety and biosecurity for all laboratories across government sectors.

## Indicators and scores

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

#### Score 4: Demonstrated capacity.

##### **Strengths/best practices**

- The MOH is fully committed to creating a high-level biosafety and biosecurity (biorisk) environment in all laboratories.
- A strong biosafety and biosecurity programme was observed in the PHL, which includes the food safety and water laboratory, and other visited laboratories were actively developing such programmes.
- Three dangerous pathogens have been identified and their inventory is in place.
- Tools and resources such as PCR to support diagnostics that preclude culturing dangerous pathogens are in place in the PHL and the major public sector clinical laboratory, SMC. The NHRA has a mechanism to audit laboratories in the health-care system as part of their accreditation, which can be used to supervise biosafety and biosecurity programmes in the public and private sector laboratories.

##### **Areas that need strengthening/challenges**

- National biosafety and biosecurity legislation should be developed and implemented.
- Monitoring of biosafety and biosecurity as part of the laboratory licensure system should be fully established.

- The list of agents/pathogens of concern should be enhanced based on internationally available risk lists, and an inventory made of the expanded list; risk assessments should be performed and mitigation plans implemented in the facilities housing those agents.
- A strong biosafety and biosecurity programme should also be implemented in laboratories other than those under the MOH.

## P.6.2 Biosafety and biosecurity training and practices

### Score 4: Demonstrated capacity.

#### *Strengths/best practices*

- Biosafety training is offered for laboratory staff.
- The country has a training programme in place at facilities housing or working with dangerous pathogens, identified currently as M. tuberculosis, MERS-CoV and poliovirus.
- Staff are trained in public laboratories on the transport of infectious substances according to international regulations.
- Bahrain has good cooperation with WHO on support for training in biosafety and emerging infections.

#### *Areas that need strengthening/challenges*

- Biosafety and biosecurity officers should be appointed in all microbiology laboratories.
- A sustained academic training programme should be developed on biosafety and biosecurity for facilities and staff who work with dangerous pathogens and toxins.
- Appropriate training should be ensured in the private sector.

#### *Relevant documentation*

- National Health Authority: Licensing and Regulation Standards for Hospitals.
- Biosafety manuals of the laboratories visited.

# Immunization

## Introduction

Immunization is one of the most successful global health interventions and one of the most cost-effective ways to save lives and prevent disease. Immunizations are estimated to prevent more than two million deaths a year globally.

### **Target**

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

### Bahrain level of capabilities

The Bahrain National Immunization Program (NIP) is one of the most comprehensive immunization programmes globally, with several new life-saving vaccines recently introduced. The NIP now covers the following target diseases: hepatitis A and B, diphtheria, tetanus, pertussis, *Haemophilus influenza type b*, polio, pneumococcal infections in children and adults, rotavirus, measles, mumps, rubella, varicella, and seasonal influenza. The programme also covers additional vaccines given to many risk groups and travellers. Routine childhood vaccines are administered free of charge to both Bahraini citizens and non-Bahraini residents at primary health care level. The comprehensive National Vaccination Plan 2016–2020 is fully aligned with the WHO Global Vaccine Action Plan.

The measles, mumps and rubella (MMR) combination vaccine has been in use in Bahrain since 1985 with extensive catch-up and other supplementary measles and rubella immunization campaigns carried out to ensure the population is well protected. The majority of the population under the age of 35 years has received two doses of MMR, while older adults have pre-existing immunity. Rubella immunity is routinely checked as part of the antenatal screening services. Bahrain achieved the target of measles elimination in 2015 with only imported cases occurring in recent years.

The NIP childhood vaccines are compulsory by law, with immunization status check-ups scheduled upon school entry, during school years, as well as part of the premarital counselling, and occupational and immigration processes. Through linkage of the birth and population registries, primary health-care centres have reliable data on their service area denominator population. Those living in the area who miss scheduled doses of vaccines are actively traced and followed up by the health centre staff. Vaccination coverage for MMR and other childhood vaccines has exceeded 95% for several years. Vaccination data are part of electronic health information collected and analysed at the primary health-care centres, and monitored and analysed by the MOH EPI team.

Immunization activities are mainly carried out at the 28 primary health-care clinics, while private sector clinics carry out less than 10% of vaccine administration. Vaccine delivery and cold chain are monitored extensively. The procurement and distribution of vaccines are centralized and managed by the MOH for both public and private sectors. The MOH is also in charge of supervision, monitoring and training activities as well as outbreak investigation of vaccine preventable diseases. These activities are done in coordination with the NHRA.

## Recommendations for priority actions

- Maintain the current high vaccination coverage, low incidence of vaccine preventable diseases and high public trust in the NIP.
- Continue with the electronic data transfer and interlinked registries to ensure real-time follow-up analyses of vaccination coverage, vaccine safety and delivery systems.
- Maintain high quality data analysis and research activities on the impact of public health value of new vaccines introduced or considered for introduction to the NIP.

## Indicators and scores

### P.7.1 Vaccine coverage (measles) as part of national programme

**Score 5: Sustainable capacity.** Based on electronic health information and vaccination survey data, the coverage of two doses of measles-containing vaccine has been above 95% for several years. Measles and rubella immunization campaigns and catch-up vaccination have provided additional coverage for the population up to 35 years old (birth cohorts from 1980–1998).

#### *Strengths/best practices*

- The NIP is extensive, scientifically sound and well-funded.
- The Government is committed to introduce new vaccines such as rotavirus, pneumococcal conjugate vaccine and varicella to prevent significant mortality and disease burden.
- High immunization coverage has been sustained in all population groups.
- An active National Immunization Technical Advisory Group (NITAG) exists, as well as excellent technical expertise on vaccinology.

#### *Areas that need strengthening/challenges*

- International mobility and migration from countries with significant measles incidence increase the risk of imported and secondary cases among close contacts. Maintaining high population level protection against vaccine preventable diseases with epidemic potential remains a public health priority.
- A centralized electronic vaccination registry is currently being developed but is not yet operational.
- The increasing role of the private sector and semi-governmental clinics may reduce national level coordination.

### P.7.2 National vaccine access and delivery

**Score 5: Sustainable capacity.** Bahrain has a centralized vaccine procurement and delivery system that reaches all public primary health-care clinics and private sector clinics. Vaccine demand and forecasting as well as the emergency stock are managed by the MOH. The whole cold-chain management is tested and monitored regularly by the MOH EPI team.

#### *Strengths/best practices*

- The infrastructure and cold chain are robust, including continuous supervision, monitoring and evaluation by the MOH EPI team.
- A well functioning central procurement system with a six-month emergency stock of vaccines has prevented stockout situations. Active collaboration exists within GCC countries to assure vaccine in the case of stockouts.
- Active follow-up and outreach activities ensure all children receive full EPI coverage.

### ***Areas that need strengthening/challenges***

- The increasing population and number of health facilities administering vaccines require continuous investment in training activities and quality control.

### ***Relevant documentation***

- Bahrain Child Law 2012.
- National EPI Plan 2016–2020.
- National guidelines for different vaccines and vaccination target groups.
- Ministerial circular on vaccine quality guidelines, 2007.
- Review of Measles Elimination Programme in 2015, WHO/CDC, 2015.
- WHO vaccine preventable disease monitoring system. 2015 global summary: Bahrain.
- National surveillance reports on vaccine preventable diseases.

# DETECT

## National laboratory system

### Introduction

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

#### **Target**

*Real-time bio surveillance with a national laboratory system and effective modern point-of-care and laboratory-based diagnostics.*

### Bahrain level of capabilities

Bahrain's laboratory system in the publicly funded health-care sector consists of a central Public Health Laboratory under the MOH, clinical microbiology laboratories in Salmaniya Medical Complex under MOH, and King Hamad University Hospital, and Bahrain Defence Force Hospital; the last two are administered by BDF, but also receives civilian patients. Some 15 private laboratories under MOH carry out microbiology testing. Approximately 15% of the population use private health care. Health care, including microbiological tests and treatment of infectious diseases in the public sector, is free for Bahraini citizens at all health-care levels. Primary health care is also free for non-Bahraini residents. For secondary/tertiary care, the costs for non-Bahraini residents are partially reimbursed. The SMC laboratory undertakes a large majority of all diagnostic clinical microbiological testing for health-care facilities under MOH.

The Public Health Law states, "The ministerial laboratories are considered accredited reference laboratories for all parties/sectors and its functions regulated by ministerial decree," MOH circulars specify PHL as the national reference laboratory for a number of diseases including *Bacillus anthracis*, influenza (National Influenza Centre), M. tuberculosis, MERS-CoV, poliovirus, and Zika virus. No national reference laboratory has been nominated for antimicrobial susceptibility testing, nor for some diseases covered in the national vaccination programme.

The central Food and Water Safety laboratory of the MOH functions in the same premises as PHL, and is responsible for all microbiological testing of processed food, and bottled, mains and treated sewage water. As the sole laboratory in its field, it serves as the national reference laboratory.

The Veterinary Laboratory Section under the MOA, consisting of CVL and the Veterinary Clinical Laboratory, has the only veterinary laboratory in the country. The CVL tests animals and raw meat and the Veterinary Clinical Laboratory tests for animal disease cases. The laboratories carry out a range of important tests for IHR, including influenza and MERS-CoV, and have clearly-defined referral agreements with relevant regional reference laboratories when testing is not available locally. They have good collaboration with the Royal Court Veterinary Laboratory. As the only laboratory in its field, the CVL acts as the national reference laboratory.

A specimen referral system exists in the health-care sector through circulars by MOH for a number of microbes. The logistics of specimen referral both nationally and to international regional reference laboratories are well organized, with staff accredited for this purpose. International standards are followed in packaging.

The national laboratory system in health care, animal care, as well as food and water safety in Bahrain has the ability to conduct most of the 10 core tests identified by IHR, and can transport specimens safely and quickly from all intermediate levels/districts to the national laboratory facilities for advanced diagnostics. Bahrain has agreements with regional laboratory networks to ensure testing for diseases for which facilities are not available in the country. Based on statistics of isolate numbers referred from different laboratories to PHL, not all health-care organizations may be comprehensively referring the samples or strains as prescribed by MOH circulars.

In the health-care sector, laboratory tests based on nucleic acid amplification (NAT) are available for several microbes. Additionally, pulsed gel electrophoresis (PFGE) is carried out in PHL, and whole genome sequencing is being introduced. The 2015 Guideline for Communicable Disease Surveillance and Control includes case definitions for surveillance: several do not include confirmation by molecular test methodologies, even if these are present in Bahrain.

Bahrain is introducing a national e-Health electronic archive across the health-care sector, including in laboratories. This contributes to efficient availability of microbiological information for surveillance and control of communicable diseases.

Several hospitals are accredited according to international standards, and many others, as well as PHL, are in the accreditation process. The NHRA actively promotes further accreditations. CVL is not accredited. A number of key laboratories in the health sector, including PHL, participate regularly in international external quality assurance (EQA) schemes. PHL has started implementing a limited EQA programme. There is no explicit provision for a national body or mechanism to access EQA results systematically, to monitor the performance of all laboratories, and to react in the case of failed results to facilitate corrective measures.

The PHL and the Food and Water Safety Laboratory liaise frequently with the disease control section under MOH. Information is shared between government sectors by email but there are seldom joint sessions at the technical level between the government sectors.

## Recommendations for priority actions

- Enact a law on microbiological laboratories covering all government sectors.
- Develop a clear regulatory framework for national microbiological reference laboratories and strengthen the process for comprehensive accreditation of all microbiological laboratories.
- Develop clear regulatory obligations for all microbiology laboratories to participate regularly in national or international EQA programmes as part of the licensing and auditing process.
- Ensure that there are sufficient training resources for the appropriate use of microbiology laboratory tests and for implementation of national standard laboratory test algorithms in all government sectors.

## Indicators and scores

### D.1.1 Laboratory testing for detection of priority diseases

#### Score 5: Sustainable capacity.

##### **Strengths/best practices**

- The laboratory system in place is capable of detecting most of the 10 core tests identified by IHR, and agreements are in place for the remaining tests to be carried out in regional reference laboratories.

- Many laboratories participate in international external proficiency testing.

#### ***Areas that need strengthening/challenges***

- The testing capacities in all government sectors to cover the priority diseases under IHR needs to be sustained.
- Sufficient training resources should be assured for the appropriate use of microbiology laboratory tests and implementation of national standard laboratory test algorithms in all government sectors, including laboratories in public and private health care under BDF, MOA and MOH.
- A national system or mechanism for quality assurance for laboratories should be implemented across all government sectors, including public and private laboratories under BDF, MOA and MOH.

#### **D.1.2 Specimen referral and transport system**

##### **Score 5: Sustainable capacity.**

###### ***Strengths/best practices***

- Laboratory sample and specimen referral systems are well established.
- Specimen transportation logistics mechanisms are well developed.
- International transport regulations are being followed and people involved trained.

###### ***Areas that need strengthening/challenges***

- A clear regulatory framework to be developed for national microbiological reference laboratories across all governmental sectors, including public and private health care under BDF, MOA and MOH.
- Based on the clear regulatory framework, national reference laboratory functions should be finalized for essential microbial pathogens across all governmental sectors.
- All health-care laboratories should be monitored, regardless of the ministry in which they are administratively based; and all must comply with the requirement to submit specimens or isolates to all nominated reference laboratories

#### **D.1.3 Effective modern point-of-care and laboratory-based diagnostics**

##### **Score 4: Demonstrated capacity.**

###### ***Strengths/best practices***

- All health-care facilities in the public sector are linked to the next level of health facility.
- Tier- or level-specific diagnostic testing arrangements exist in all governmental sectors.
- Bahrain is proficient in classical diagnostic techniques such as bacteriology and serology, and has introduced PCR-based testing in several laboratories.
- Point-of-care diagnostics are being introduced.

###### ***Areas that need strengthening/challenges***

- All health-care laboratories in the dynamically changing public and private sectors under BDF and MOH should support and comply with the development of clear level-specific testing strategies.

## D.1.4 Laboratory quality system

### Score 4: Demonstrated capacity.

#### *Strengths/best practices*

- A number of health sector laboratories participate in international EQA schemes.
- Several clinical microbiology laboratories are accredited to international standards.
- A system for licensing laboratories in health-care facilities under MOH is in place through the NHRA.

#### *Areas that need strengthening/challenges*

- Legislation on microbiological laboratories should be enacted across all government sectors, including public and private laboratories under MOH, and those under BDF and MOA, aiming to standardize quality requirements.
- Accreditation of laboratories should be ensured following nationally approved standards across all governmental sectors.
- Clear regulatory obligations should be developed for laboratories across all governmental sectors to participate in EQA schemes arranged nationally or internationally according to nationally approved standards, and a central national mechanism established where EQA results are regularly monitored and deficiencies corrected.
- Mechanisms for collaboration between human, veterinary, environmental and research laboratories need to be strengthened.

#### *Relevant documentation*

- Public Health Law.
- National Health Regulatory Agency laboratory standards manual.
- Ministry of Health circulars on referral of samples or isolates of specific pathogens.
- Laboratory-specific certificates on accreditation.

# Real-time surveillance

## Introduction

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

### **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 analyse 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 the IHR and the OIE standards.*

## Bahrain level of capabilities

Bahrain has a strong, functional system of surveillance for priority diseases and syndromes. There is a notifiable list of diseases and six syndromes.<sup>1</sup> Some 114 reporting units exist, of which 30 are major reporting sites comprising large hospitals and health centres. Weekly reporting is done, and monthly and annual summaries of the accumulated data are made. Once a week, a review of data from the prior week is made. Of the nine surveillance system staff, 2–3 are responsible for active surveillance among sites providing timely information. The 30 major sites report at least weekly and many carry out daily electronic reporting which is summarized for public access on the MOH website and through emails. Active surveillance is used by some of the smaller sites, among whom 80% report each week (including report of no cases). Veterinary reporting is carried out through a separate system; the two systems should be further integrated. Laboratory reporting is facilitated by the two systems being housed in the same building, and by electronic reporting.

Indicator-based reporting has been made routine over the last two decades. No structured system exists yet for event-based surveillance, which is carried out on an ad hoc basis in response to media alerts, rumours or identified social media, or through screening of the health map.

Staff from the 114 reporting units are only formally trained via the lectures they received in medical school, and reporting staff change frequently in primary care units. Thus there is a need for continuous orientation on a case-by-case basis. The communicable disease group conducts periodic training through lectures, circulars and by active surveillance staff during their visits to health sites. In-service training depends on activities of the core staff, who themselves are mainly trained on the job. A training and staff development plan should be developed, especially focused on raising key staff to the level of a Masters in Public Health, with specialization in a disease syndrome so that expertise in deeper analysis is developed for key conditions.

There are opportunities to increase electronic reporting and to combine the summary and comparison of data derived through lab, passive and active disease surveillance, and through the veterinary system. A more standardized and system-wide integration of epidemiologic and laboratory data should be encouraged.

<sup>1</sup> Febrile rash (measles and rubella), acute flaccid paralysis (AFP, polio and Guillain-Barré syndrome, GBS), congenital rubella syndrome, food poisoning, severe acute respiratory infection (SARI, influenza, pneumococcal diseases, MERS-CoV, etc.), influenza-like illnesses.

A syndromic surveillance system is in place for specific priority diseases where clinical diagnosis for suspected cases is considered for reporting (e.g. AFP, SARI, cholera – acute diarrhoea with dehydration syndrome).

The system has performed well in recent years. Examples include identification of one true and many false positives in a suspected measles outbreak, and the control of potential panic during a cholera outbreak in the Republic of Iraq thanks to effective communication of negative results from the surveillance system in Bahrain.

## Recommendations for priority actions

- Integrate the health and zoonotic surveillance systems.
- Extend electronic reporting to include more surveillance sites.
- Increase staff as further private health facilities are established in the country.
- Provide advanced training for key staff to develop expertise in syndromes and diseases that demand further in-depth analysis.
- Develop and implement guidance documents including approved guidelines and bulletins.
- Engage in further coordination with GCC countries for specialized training, mentorship, and collaboration in reporting and analysis.

## Indicators and scores

### D.2.1 Indicator- and event-based surveillance systems

**Score 3: Developed capacity.** Bahrain has a functioning indicator-based surveillance system with 60+ reportable diseases and focal persons at reporting sites. Event-based surveillance is relatively new, not fully implemented in the country and will require training of all stakeholders.

#### *Strengths/best practices*

- Indicator- and event-based surveillance system(s) are in place to detect public health threats.
- A standardized form exists for data collection (immediate/as soon as possible/weekly).
- Results of surveillance data are regularly published (weekly/monthly/annually).

#### *Areas that need strengthening/challenges*

- Data validation needs to be done regularly and through a formalized structure.
- Event-based surveillance needs to be fully established and functioning.

### D.2.2 Interoperable, interconnected, electronic real-time reporting system

**Score 3: Developed capacity.** The system appears to be mature and competent.

#### *Strengths/best practices*

- Laboratories and the private sector participate in the surveillance system.
- Many conditions/diseases under the surveillance system are beyond regular indicator- and event-based surveillance systems.
- Data from health facilities are linked with the central surveillance unit at the MOH.

### ***Areas that need strengthening/challenges***

- The current system should continue to increase units using real-time electronic reporting.
- Integration of veterinary, human, laboratory and other related surveillance systems should be increased.
- Higher level training of staff involved with surveillance activities and specialization would facilitate analyses that go beyond summary reports.
- Feedback to the peripheral level may be strengthened.

### **D.2.3 Analysis of surveillance data**

#### **Score 5: Sustainable capacity.**

##### ***Strengths/best practices***

- Weekly, monthly, and annual reporting of surveillance data is carried out.

### ***Areas that need strengthening/challenges***

- Laboratory and veterinary reports need to be integrated into the system.
- Staff need specialized training, and primary care reporting units need further in-service training due to the high turnover of staff.

### **D.2.4 Syndromic surveillance systems**

#### **Score 5: Sustainable capacity.**

##### ***Strengths/best practices***

- Syndromic surveillance is in place for six priority diseases. Certain disease data are linked with laboratory reports when available.
- Certain disease surveillance information is shared with concerned stakeholders.

### ***Areas that need strengthening/challenges***

- No structured system for event-based surveillance exists.
- No regular system exists for sharing surveillance data among all interested parties.
- Well-structured event-based surveillance should be integrated within the existing surveillance system.
- The surveillance of zoonotic diseases should be strengthened in collaboration with the animal welfare department.
- The electronic data management system needs to be updated.

### ***Relevant documentation***

- Amiri decree 1977 for notification of communicable diseases mandating reporting from all health facilities (public and private).
- Data collection and notification forms using fax, email, electronic system, hotline, visits, calls, including zero reporting.
- Reporting manual, circulars.
- TB and AFP posters.
- Weekly, monthly, and annual reports.

# Reporting

## Introduction

Health threats at the human–animal–ecosystem interface have increased over the past decades, as pathogens continue to evolve and adapt to new hosts and environments, imposing a burden on human and animal health systems. Also, threats related to accidental or deliberate release of chemical, radiological and nuclear agents are of increasing concern. Collaborative multidisciplinary reporting on public health events reduces the risk of diseases and their international spread.

### **Target**

*Timely and accurate reporting of public health events according to WHO requirements and consistent coordination with FAO, OIE, IAEA and other relevant international organizations enhances the likelihood of rapid and coordinated response to these public health events, nationally and globally.*

### Bahrain level of capabilities

Multisectoral coordination is in place to respond to potential and real public health emergencies of international concern, including at points of entry. The Public Health Directorate at the MOH – the designated IHR NFP – reports public health events of infectious, zoonotic and foodborne diseases to WHO in a timely manner. The Directorate collects information from both governmental and nongovernmental organizations, and all major partners are fully aware of the information exchange mechanisms in place. The reporting system has demonstrated its capacity and has been tested in practice in recent years. The IHR NFP reporting public health events of potential international concern to WHO. The country has so far experienced infectious and zoonotic events and reporting these events to WHO occurred in a timely manner.

The IHR NFP consults with WHO about the notification and response to public health events as per Article 8 of the IHR. Bahrain has reporting requirements to the Gulf countries either through the IHR NFP of these countries or through the secretariat of the GCC.

Simulation exercises are valuable in maintaining preparedness for reporting events. While good communication exists among those involved in surveillance, it will be important to establish more formal mechanisms using an online portal to facilitate systematic notification and reporting to all national stakeholders.

### Recommendations for priority actions

- Conduct simulation exercises to test the 24-hour notification of potential public health events of international concern in the country to WHO.
- Establish a mechanism (online portal) for the timely notification and information sharing on such events among national stakeholders.

## Indicators and scores

### D.4.1 System for efficient reporting to WHO, FAO and OIE

**Score 5: Sustainable capacity.** The country has excellent demonstrated and sustained reporting capacity.

#### *Strengths/best practices*

- IHR NFP is a staff member of the Public Health Directorate of the MOH, which facilitates sharing and receiving information on public health events occurring in the country.
- IHR NFP has the authority to report public health events of potential international concern to WHO, in consultation with the IHR Higher Committee, which has representatives from food and zoonotic health.
- The NFPs of FAO, OIE and IAEA also have the capacity to report notifiable events to their respective organizations.
- Strong transparency has been demonstrated by the Government in information sharing of public health events occurring in the country and of preparedness measures related to the importation of potential public health events to the country.

#### *Areas that need strengthening/challenges*

- No major challenges were identified.

### D.4.2 Reporting network and protocols in country

**Score 4: Demonstrated capacity.** Multisector coordination is in place to respond to potential and real public health emergencies of international concern, including at points of entry. The Public Health Directorate at the MOH, as the IHR NFP, has the capacity for timely reporting of public health events of infectious, zoonotic and foodborne diseases to WHO. The Directorate collects information from both governmental and nongovernmental organizations. This is examined, along with animal and food health information, by the IHR Higher Committee of the MOH using an IHR decision instrument and following the IHR algorithm. This system has demonstrated its capacity and has been tested during events in recent years such as imported tuberculosis and Coronavirus cases, H1N1, Ebola preparedness, and the possible importation of cholera. No chemical or radiation events have been identified. Mechanisms for information exchange across sectors are well understood by all major partners.

Given that Bahrain is a small country with limited experience of real-time events, simulation exercises are valuable in maintaining preparedness for the timely reporting of events that may occur in the future. While good communication exists among those involved in surveillance, based on long personal relationships that are possible in a country of limited size, more formal mechanisms need to be established using an online portal to facilitate systematic notification and reporting to all national stakeholders.

#### *Strengths/best practices*

- IHR NFP is a member of the MOH Public Health Directorate, which facilitates sharing and receiving information on public health events occurring in the country.
- IHR NFP has the authority to report public health events of potential international concern to WHO, in consultation with the IHR Higher Committee, which has representatives from food and zoonotic health.
- The Government demonstrates strong transparency in sharing information on public health events occurring in, or potentially being imported to, the country.

### ***Areas that need strengthening/challenges***

- While reporting is complete, its timeliness needs improving through active surveillance and electronic reporting.
- Bahrain has never experienced a reportable public health event of chemical or radiation origin; hence the timely reporting of such events to WHO through the IHR NFP has not been tested.

### ***Relevant documentation***

- IHR Law on notification of public health events to WHO.Amiri Decree.
- Terms of reference of IHR NFP.
- Terms of reference of the OIE, FAO and IAEA focal points.
- IHR monthly reporting form.
- Monthly scoring form for timeliness and completeness of IHR events.

# Workforce development

## Introduction

Workforce development is important in order to develop a sustainable public health system over time by developing and maintaining the highly qualified public health workforce with appropriate technical training, scientific skills, and subject-matter expertise.

### Target

*State 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).*

## Bahrain level of capabilities

Bahrain has long invested heavily and intelligently in education as a whole, and in staff development for public health in particular. The entire human resources system is financed by the Government and senior decision-makers fully support human resource capacity strengthening in the country. A public health training plan specifying the number of personnel at various levels and specialities is said to exist.

The system has trained epidemiologists, biostatisticians, information systems specialists, veterinarians, and other public health personnel. An indication of training that has been provided at national level, or available to staff from a partner entity, is apparent in the quality and comprehensiveness of the materials presented and the competence of the presentations made. There is a clear awareness of the need to engage in long-term training planning to assure an adequate pipeline of staff for key functions in the system in the future. While national staff consider the number of trained public health staff to be suboptimal, the country far exceeds the benchmark level of 1:200 000 trained epidemiologist per population. These staff are all at the national level, as is appropriate for a country of Bahrain's size. Some epidemiology staff are outside the MOH, dealing with zoonoses.

FETP training exists in the country with trainees graduated from programmes from countries in the region, Europe, or the United States of America. In recent years, the focus has been on in-service and short-course training; however, higher level courses would be valuable from now on. The stability of staff is an asset, as most have been in their posts for more than a decade, and staff attrition is low.

Bahrain enjoys an enviable number of physicians, nurses and other allied health professionals in the country. Expansion of private health services has not, to date, affected the availability of good quality data on the health system and public health workforce, but is an area of concern.

## Recommendations for priority actions

- Conduct simulation exercises to enhance the capacity of human resources.
- Recruit additional staff based on the human resources strategy.
- Develop a staff development plan and relations with teaching units to train additional staff at advanced FETP level.

## Indicators and scores

### D.4.1 Human resources are available to implement IHR core capacity requirements

**Score 5: Sustainable capacity.** Bahrain has demonstrated its capacity in forming multidisciplinary teams and maintaining stable, capable, and adequate staffing.

#### *Strengths/best practices*

- IHR capacity is available at different levels of the health system.
- Multidisciplinary teams work together, within and outside of the MOH.
- There is continuing strong support for training of staff.

#### *Areas that need strengthening/challenges*

- Partnerships with sectors outside the MOH could be improved.
- Training plans, particularly at advanced FETP level, need to be developed.

### D.4.2 Field Epidemiology Training Programme or other applied epidemiology training programme in place

**Score 5: Sustainable capacity.** While there is currently no FETP available in the country, an adequate number of staff have been trained in other programmes within and outside the Region.

#### *Strengths/best practices*

- Resources are available for learning and development.
- A national culture is supportive of training.
- Masters and PhD programmes in epidemiology/public health are available.
- Staffing levels are stable, and there is frequent use of short courses to raise skill levels.

#### *Areas that need strengthening/challenges*

- While there is frequent reference to the need for additional staff, a clear plan to identify the needs, areas and means is lacking.

### D.4.3 Workforce strategy

**Score 3: Developed capacity.** The JEE team was not able to review a workforce strategy document.

#### *Strengths/best practices*

- There is adequate staffing and plans to expand the public health workforce.
- The workforce turnover is low.

#### *Areas that need strengthening/challenges*

- More opportunities are needed to train staff at Master and PhD levels.
- Increased opportunities should be found to collaborate with other GCC countries to develop a critical mass of trained staff in key areas.

#### *Relevant documentation*

- Workforce strategy.
- Human resources strategy.
- National public health workforce financed within the country.
- NHRA health information for human resource capacities.
- Training programmes available to help expand the pipeline of qualified public health professionals.
- A mechanism (Civil Service Law) to monitor the implementation of the human resources strategy.

# RESPOND

## Preparedness

### Introduction

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. Other components of preparedness include mapping of potential hazards, the identification and maintenances 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

#### **Target**

*Development and maintenance of national, intermediate (district) and local/primary level public health emergency response plans for relevant biological, chemical, radiological and nuclear hazards. This covers mapping of potential hazards, identification and maintenance of available resources, including national stockpiles and the capacity to support operations at the intermediate and local/primary levels during a public health emergency.*

#### Bahrain level of capabilities

Bahrain has developed substantial capacities as required under the IHR for public health preparedness and planning for public health events of potential concern. Although the country has not recently been exposed to many emergencies, it keeps the momentum of having emergency management systems through a series of simulations and drills. Bahrain has also further scaled up its emergency preparedness efforts in the context of Ebola and Zika outbreaks in West Africa and South America. It has clearly and efficiently identified potential hazards and conducted risk assessments using the all-hazard approach for all IHR-related hazards. At the national level, the country has a defined and well functioning multisectoral mechanism that provides guidance to all sectors in planning and capacity development for emergency preparedness. There is also a defined structure in the health sector that is reflected in the national plans for emergency preparedness and response. Simulations and drill exercises have been conducted to test the efficiency of the national plans and for training purposes. SOPs are available to implement the plans along with job action sheets at different levels of the health system.

However, there is still a vacuum in the health sector for a dedicated, designated unit or department to coordinate health sector actions with other sectors; and to follow up and coordinate health sector actions for emergency management.

#### Recommendations for priority actions

- Review existing national and contingency emergency preparedness plans to identify any gaps.
- Develop a communication strategy to inform all stakeholders, including communities, of risks.
- Identify training needs, institutions, and standardization of training needs based on an assessment to harmonize the workforce development process.
- Establish/strengthen a dedicated unit in MOH to improve coordination of emergency preparedness and response in health with all concerned stakeholders, and to enhance multisectoral preparedness.

## Indicators and scores

### R.1.1 Multi-hazard National Public Health Emergency Preparedness and Response Plan is developed and implemented

**Score 5: Sustainable capacity.** The national public health emergency response plan(s) is implemented/tested in actual emergency or simulation exercises and updated as needed.

#### *Strengths/best practices*

- The national multisectoral, public health emergency preparedness plan is developed and implemented.
- Contingency plans for Ebola, MERS-CoV, pandemic and epidemic influenza, polio, and measles have been developed and tested. Another drill specifically for polio was conducted in November 2016.
- Primary and secondary health-care facilities are all part of the national health sector plan for emergency preparedness and response.

#### *Areas that need strengthening/challenges*

- Existing SOPs should be reviewed and updated as required.
- Training should be carried out for those concerned in the multisectoral health workforce.

### R.1.2 Priority public health risks and resources are mapped and utilized

**Score 5: Sustainable capacity.** The national risk profile and resources are assessed regularly to accommodate emerging threats.

#### *Strengths/best practices*

- A proactive public health risk and resources mapping is done for all hazards including IHR-related hazards. The risk and resources maps are updated regularly.

#### *Areas that need strengthening/challenges*

- National resource mapping should be reviewed and updated to include the most recent developments in other sectors.

#### *Relevant documentation*

- Presentation of the current situation by MOH.
- Presentation by Civil Defence.
- National multisectoral plans for emergency preparedness and response.
- National plan for emergency preparedness and response for the health sector.

# Emergency response operations

## Introduction

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

### Target

*Countries will have a public health Emergency Operation Centre (EOC) functioning according to minimum common standards; maintaining trained, functioning, multisectoral 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.*

## Bahrain level of capabilities

Bahrain has developed a very well defined emergency response system involving all the tiers of the administrative mechanism. The incident command and control system of health is well connected to a multisectoral structure at the national level. The EOC is located within the MOH premises, is well equipped including a hotline running 24/7 and staffed with back-up support and adequate space. The EOC is designed to be self-sufficient for 72 hours. The triggers for activation of the EOC are defined and linked at different levels. Some staff are trained in advance. While training is ongoing, ‘just in time’ training is underscored as a priority to further strengthen the EOC. A nuclear exposure exercise was conducted in 2015 at the airport and a chemical exposure exercise at a factory where EOC functions were demonstrated to function well. Some tabletop exercises were also conducted to test EOC plans.

## Recommendations for priority actions

- Regularly review and update the emergency response plans including hospitals (public/private) focusing on EOC functions, and ensure their dissemination among all stakeholders, particularly the incident command system.
- Develop/review SOPs to operationalize the plans at all levels.
- Ensure that simulations involving key stakeholders include EOCs.
- Develop case management guidelines related to different hazards.
- Expand risk assessments to include all IHR-related hazards.

## Indicators and scores

### R.2.1 Capacity to activate emergency operations

**Score 5: Sustainable capacity.** In addition to activities for “demonstrated capacity”, exercises are conducted at least twice a year to test EOC activation.

#### Strengths/best practices

- There are clear triggers for the activation of EOC within 24 hours of an incident at full scale. This has been tested through exercise drills.

- Multiple interministerial trainings have been conducted to support the activation process of the EOC.
- A monthly staff recall list is generated within the MOH.

#### ***Areas that need strengthening/challenges***

- Training for all relevant ministries needs to be continued and include EOC members.
- A roster needs to be developed to support and ensure EOC functions 24/7.

### **R.2.2 Emergency operations centre operating procedures and plans**

**Score 5: Sustainable capacity.** In addition to meeting “demonstrated capacity”, response plans are in place and describe scaled levels of response with resource requirements for each level and procedures for acquiring additional resources.

#### ***Strengths/best practices***

- A draft SOP for the EOC, incorporating operational procedures and policies, is in the process for approval. Meanwhile, job action sheets have been generated to facilitate the smooth running of the EOC.

#### ***Areas that need strengthening/challenges***

- SOPs need to be reviewed to ensure the link between hospitals (private/public) and the national incident management system.

### **R.2.3 Emergency operations programme**

**Score 5: Sustainable capacity.** In addition to achieving “demonstrated capacity”, a follow-up evaluation has been conducted and a corrective action plan developed and implemented.

#### ***Strengths/best practices***

- EOC plans/procedures and a communications system have been evaluated through simulation and drills.

#### ***Areas that need strengthening/challenges***

- A lack of training for staff running the EOC has been identified at all levels in an internal capability analysis. This has been put forward to the decision-makers and is currently under consideration.
- The EOC needs to be a part of any simulation for response.

### **R.2.4 Case management procedures are implemented for IHR relevant hazards**

**Score 4: Demonstrated capacity.** Case management, patient referral and transportation, and management and transport of potentially infectious patients are implemented according to guidelines and/or SOPs.

#### ***Strengths/best practices***

- Case management guidelines are available within the disaster plan for most public health emergencies including communicable diseases.

#### ***Areas that need strengthening/challenges***

- Case management guidelines for IHR-related hazards not yet covered by the disaster plan, including chemical and radiological events, need to be developed and implemented.

### ***Relevant documentation***

- Presentation from MOH.
- Visit to National Health Regulatory Authority.
- National emergency response plan (to be reviewed).

# Linking public health and security authorities

## Introduction

Public health emergencies pose special challenges for law enforcement, whether the threat is manmade (e.g. anthrax terrorist attacks) or naturally occurring (e.g. flu pandemics). In a public health emergency, law enforcement will need to quickly coordinate its response with public health and medical officials in order to minimize loss of life, or injury, and for optimal public safety and security.

### Target

*In the event of a biological, chemical or radiation event of suspected or confirmed deliberate origin, a country will be able to conduct a rapid, multisectoral 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.*

## Bahrain level of capabilities

The NCDM, established by the Cabinet and endorsed by Amiri Decree, has the mandate of coordinating the response to a wide spectrum of disasters and emergencies including public health events.

The Committee is headed by the Undersecretary of Interior and has members (undersecretaries) from all sectors including security, police, army, etc. The deputy head of the NCDM is the Undersecretary of Health. The Committee's terms of reference are clearly defined. The Committee meets regularly and on an ad hoc basis to share information and make decisions related to events occurring in the country, including public health events. The concerned sectors take the lead in the response to events in coordination with the other sectors.

A mapping of hazards is conducted regularly and potential risks, including disease outbreaks and the most likely sources of these events, are identified. A national plan for emergency preparedness and response is in place and usually updated based on recent hazard mapping. The roles and responsibilities for each sector are identified in this plan and SOPs are accessible to all sectors. Drill exercises are conducted on an annual basis and the plan is reviewed accordingly. Sectoral plans also exist including public health preparedness and response plans but not as an integral part of the national plan.

Additional coordination exists with the other Gulf countries for emergency preparedness and response. Mapping of hazards is also done at regional level and a regional plan is in place and regularly updated.

The governmental structure of Bahrain permits public and animal health systems at all levels to request the support and engagement of law enforcement agencies for assistance with managing a health event or hazard. Bahrain has faced infectious disease outbreaks such as H1N1 influenza, and MERS-CoV, as well as preparedness for Ebola, which have necessitated a multisectoral response involving both national and international stakeholders. The engagement of the law enforcement authorities has significantly supported the public health sector to put in place the necessary public health measures.

SOPs to accelerate the coordination needed for a prompt and appropriate response are in place. These are developed within the framework of the national contingency plan and clearly define the authorities, roles and responsibilities of health and law enforcement that are specific to the type of health event and hazard. Specific events might include disease outbreaks, events at PoE, quarantine issues, food contamination, chemical and radiation hazards, and intentional use of biological agents. These all require information sharing, joint investigations and risk assessments, coordinated controlled activities and law enforcement. As the private sector is not integrated within this coordinated system, information sharing related to public health events detected by this sector might be delayed in reaching the relevant stakeholders.

## Recommendations for priority actions

- Improve timely information sharing related to detection of public health events, investigations and response.
- Review and update existing SOPs for joint investigations and response to public health events, particularly for the private sector.
- Ensure access to all existing plans by relevant stakeholders of public health and security.

## Indicators and scores

### 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: Demonstrated capacity.** The NCDM led by the Ministry of Interior coordinates the response to major events including public health events. There is good coordination and information sharing among members of the Committee on updates and decision-making processes. The Committee meets regularly and on a when-needed basis. Protocols exist between public health and security authorities and have been formally used for information sharing, investigation and response; however, the private sector does not follow these procedures, which may delay sharing of information related to public health events.

#### *Strengths/best practices*

- The NCDM has high-level representation from all sectors, defined terms of reference, and can act with full authority. The committee meets regularly and on an ad hoc basis.
- There is strong coordination and collaboration with the media.
- The public health sector has clear protocols that engage the security forces to assist in the case of a disaster or major hazardous event.
- SOPs exist to guide the actions of different stakeholders in a highly coordinated multisectoral response to public health and other emergencies.

#### *Areas that need strengthening/challenges*

- While a mechanism exists for information sharing between the public health and security sectors related to events of potential concern, there is no defined mechanism for information sharing between the private sector and the security sectors, which many delay investigation and response operations.
- Joint training between different sectors including law enforcement and security needs to be enhanced.

#### *Relevant documentation*

- Terms of reference and structure of the National Committee for Disaster Management.
- Preparedness and response.
- Enforcement.
- Relevant protocols and standards operating procedures for Information sharing investigation and response to specific hazards.

# Medical countermeasures and personnel deployment

## Introduction

Medical countermeasures (MCM) are vital to national security and protect nations from potentially catastrophic infectious disease threats. Investments in MCM create opportunities to improve overall public health. In addition, it is important to have trained personnel who can be deployed in case of a public health emergency for response.

### **Target**

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

## Bahrain level of capabilities

The country has plans and procedures for receiving and sending medical countermeasures and deploying personnel in certain hazards (for example, nuclear exposure). However, these plans and procedures are within the limit of GCC countries. This has been practised well every year including the support of the Hajj mission whereby MCM are sent with the pilgrims. Bahrain's military sector also has strong international agreements, policies and procedures for MCM in addition to mutual aid. During peace time, joint exercises are conducted among GCC countries where training procedures have been developed. Joint exercises are also conducted by the military forces and MOH as part of these exercises. The last such exercise was conducted five years ago in Bahrain was called "eagle resolve".

The MOH maintains medical stockpiles, although deficiencies in the logistics system are currently being assessed with the aim of strengthening the system. Since the country has limited production of medical equipment, it has vendor agreements in place to maintain supplies during a surge, which were used and tested during an avian influenza outbreak to stockpile and distribute medicine through the existing plan.

The MOH firmly believes that the collaboration and building of further links with the NHRA to explore further opportunities in widening the scope of plans and policies will enhance the process of receiving and sending MCM and personnel deployment. Discussion has been initiated between NHRA and MOH to ensure safety and the financial aspect of personnel deployment through optimum licensing. The strategic decision to request health personnel from other countries during the emergency is linked to the incident command mechanism of the country.

## Recommendations for priority actions

- Review existing plans and procedures to widen the scope to include countries outside GCC.
- Strengthen cooperation and collaboration with NHRA to further improve the system of personnel deployment (sending and receiving) within the country and externally.
- Review and update the vendors list according to IHR-related hazards to ensure timely and optimum support.

## Indicators and scores

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

**Score 5: Sustainable capacity.** Bahrain participates in a regional/international partnership or has a formal agreement with another country or international organization that outlines criteria and procedures for sending and receiving MCM and has participated in an exercise or response within the past year to practise deployment or receipt of MCM.

#### *Strengths/best practices*

- Bahrain has demonstrated and tested experience in deployment of MCM based on Hajj.

#### *Areas that need strengthening/challenges*

- The existing plan should be reviewed to explore widening its scope.

### R.4.2 System is in place for sending and receiving health personnel during a public health emergency

**Score 5: Sustainable capacity.** Bahrain participates in a regional/international partnership or has a formal agreement with another country or international organization that outlines criteria and procedures for sending and receiving health personnel and has participated in an exercise or response within the past year to practise deployment or receipt of health personnel.

#### *Strengths/best practices*

- Bahrain has good functional plans and procedures to send and receive medical personnel within the GCC network.
- The decision for the international call for medical personnel is linked to the incident management system of the country.

#### *Areas that need strengthening/challenges*

- Collaboration and coordination with NHRA should be strengthened to ensure the standards and policies of receiving and sending medical personnel.
- The scope of the existing plan should be expanded beyond the GCC country network.

#### *Relevant documentation*

- Presentation of MOH.
- Medical countermeasures and health personnel deployment procedures.
- The vendor list verbally explained and the plans shared during presentations.

# Risk communication

## Introduction

Risk communications should be a multilevel and multifaceted process which aims at helping stakeholders define risks, identify hazards, assess vulnerabilities and promote community resilience, thereby promoting the capacity to cope with an unfolding public health emergency. An essential part of risk communication is the dissemination of information to the public about health risks and events, such as outbreaks of diseases. For any communication about risk caused by a specific event to be effective, the social, religious, cultural, political and economic aspects associated with the event should be taken into account, as well as the voice of the affected population. Communications of this kind promote the establishment of appropriate prevention and control action through community-based interventions at individual, family and community levels. Disseminating the information through the appropriate channels is essential. Communication partners and stakeholders in the country need to be identified, and functional coordination and communication mechanisms should be established. In addition, the timely release of information and transparency in decision-making are essential for building trust between authorities, populations and partners. Emergency communications plans need to be tested and updated as needed.

### Target

*States Parties should have risk communication capacity which is 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.*

### Bahrain level of capabilities

Bahrain has a well developed approach to risk communication, including coordination between different sectors, community and media engagement, and capacity-building through regular training of communication staff. MOH communication staff also participate in WHO-led regional trainings and networks to share best practices.

Bahrain's risk communication structure benefits from informal processes and agreements, through which resources between different ministries are coordinated, using both top- and bottom-down approaches depending on the nature of the emergency or disease outbreak. This risk communication system is tested through regular, high-level, multisector and national disaster response exercises.

The MOH recognizes that documenting and formalizing the risk communications structure and its links to other sectors and the national disaster management committee will help strengthen the overall system, beyond the informal processes that drive its current success.

In 2015, the MOH assigned a Risk Communications Officer within its Public Health Directorate to work with, and have direct access to public relations, health promotion and IHR focal points. While the country has a coordinated risk communication management system for public health that cuts across other sectors and is integrated into the national disaster plans, the risk communication processes and SOPs have yet to be documented in a formal, unified strategy.

Bahrain has documented good practices for partner, media and community engagement, and well-mapped health promotion stakeholders and activities targeting both migrant and Bahraini populations. Information,

education and communication (IEC) materials on vaccination, noncommunicable and infectious diseases are provided in different languages, particularly for South Asian migrants.

Community engagement and social mobilization mechanisms at the local level have strong links to different partners (religious leaders, civil society, Bahrain Red Crescent Society). However, Bahrain needs more robust community participation in emergency planning and decision-making processes. While traditional and social media sites are monitored and analysed daily by MOH, an established system for dynamic listening and rumour management through blogs and web forums needs to be developed.

To sustain current public health communication successes, Bahrain's MOH must now document a multisectoral risk communication strategy with accompanying SOPS to support and build upon the existing, well-developed communications structures. Focus must also shift from reactive communication and planning to proactive testing and analysis of communication efforts and incorporating lessons learnt into standardized and evidence-based processes. This will bolster the nation's communication response in the event of a serious emergency or disease outbreak and move Bahrain towards a global best practice for risk communications.

## Recommendations for priority actions

- Document and endorse a national risk communication strategy.
- Document and test existing SOPs to support and build upon the current risk communication structure.
- Standardize formal assessments to evaluate and apply lessons learnt from risk communication and community engagement activities.
- Train community engagement and social mobilization teams to expand community participation and planning in the risk communication process at the local level.
- Develop a formal system for dynamic listening and rumour management.

## Indicators and scores

### R.5.1 Risk communication systems (plans, mechanisms, etc.)

**Score 4: Demonstrated capacity.** A national, multihazard, multisectoral emergency plan and a national disaster plan document processes and procedures for risk communication, media and community engagement with different stakeholders. Regular drills are conducted to test the plans. Communication processes are reviewed periodically to strengthen responses. Communication staff are trained and can be deployed or repurposed during an emergency. The country has yet to finalize the risk communication strategy.

#### *Strengths/best practices*

- A draft health sector risk communications strategy is being developed and has gone through several drafts. However, no date is confirmed for endorsement by MOH.
- A Directorate, within the NCDM, led by the Undersecretary of the MOH, is being formalized to coordinate all public health and risk communication processes, linking them to other sectors during a disaster or an emergency.
- Communication capacity exists within other ministries. During a public health emergency, cross-sector collaboration occurs under the guidance of MOH Public Health Directorate and communications staff are repurposed as surge capacity, if needed.
- An emergency budget (5%) is set aside in each ministry, which includes financial resources for risk communications.

### **Areas that need strengthening/challenges**

- Public health risk communications processes and procedures exist but need to be documented and tested regularly.

#### **R.5.2 Internal and partner communication and coordination**

**Score 4: Demonstrated capacity.** There are formal government arrangements to coordinate communication within MOH, between key stakeholders (the NCDM and other line ministries), international stakeholders (WHO Regional Office for the Eastern Mediterranean and GCC regional networks) and civil society (Red Crescent Society, religious leaders, community health centres, schools, etc.).

### **Strengths/best practices**

- During an emergency event, joint communication plans are developed in coordination with the relevant government sectors.
- Government directives document the functional structures of health promotion, and national disaster committees work across different sectors depending on the nature of the emergency.
- The success of Bahrain's internal and partner communications coordination is in part due to dynamic relationships and well-established informal processes, endorsements and agreements within government sectors. This is a strength as long as these informal processes are reinforced and augmented by documented procedures that are tested, reviewed and systematized.

### **Areas that need strengthening/challenges**

- Simulated emergency exercises should specifically test communication partnerships and the lessons learnt from these used to document and standardize partnership processes during an emergency to enhance proactive and life-saving communication efforts.

#### **R.5.3 Public communication**

**Score 4: Demonstrated capacity.** Communication with the public is managed through coordination between the Public Health, Public and International Relations and Health Promotion Directorates within MOH. The Public and International Relations directorates regularly reach out to diverse media (TV, radio, and social media). During an emergency they are mandated to update public information every 45 minutes. Heath information behaviour-seeking surveys, focus groups and polls are conducted regularly as part of target audience analyses and for message validation.

### **Strengths/best practices**

- Bahrain is a small island state with a population of 1.3 million, making local populations easy to reach through media and community engagement during an emergency.
- MOH communication staff attend a Ministry of Information media meeting every two weeks to update planning and cross-cutting issues.
- An e-hotline system (Tawasul) addresses public concerns and complaints in real time.
- The media have direct and easy access to MOH spokespersons.
- Bahrain participates in GCC communication workshops to review communications efforts to enhance cooperation and message consistency at the regional level.

### **Areas that need strengthening/challenges**

- During an emergency, public communication, advocacy materials and rumour management should be systematically documented and evaluated alongside the emergency response to strengthen the risk communication evidence base. This will enhance overall risk communication which can be used to better inform and improve future emergency responses in Bahrain.

### **R.5.4 Communication engagement with affected communities**

**Score 4: Demonstrated capacity.** A Health Promotion Directorate within MOH is responsible for social mobilization and community engagement. Each health-care centre has a health promotion specialist and committee with volunteers and representatives from civil society, the private sector, schools, governorates and municipalities who meet on a regular basis to assess community needs and enhance their participation, which in turn facilitates outreach to populations at risk in times of emergencies. Active participation from community members in emergency planning and decision-making needs to be enhanced so they can take action and ownership of life-enhancing public health solutions.

### **Strengths/best practices**

- For migrant populations, there is strong coordination between the Ministry of Labour and Social Affairs and MOH to provide health promotion materials and community engagement support in local languages and through health-care centres and religious leaders of these groups.
- Health promotion specialists and volunteers are regularly trained and their skills updated.
- Health promotion has both ongoing routine health care (addressing noncommunicable diseases and lifestyle issues) and emergency plans (disease outbreaks and other risks).

### **Areas that need strengthening/challenges**

- There needs to be more proactive community and volunteer participation in the planning, decision-making and feedback process of an emergency response.
- Training and simulation exercises should be expanded to include both community engagement specialists and community members.

### **R.5.5 Dynamic listening and rumour management**

**Score 3: Developed capacity.** Bahrain has in place a daily social and traditional media monitoring system through which rumours and misinformation are gathered and addressed. However, coordinated decision-making and response actions need to be managed at the source of the rumour with evidence-based information.

### **Strengths/best practices**

- The Public and International Relations Directorate conducts daily screening of newspapers for any health-related news or articles and refers any rumour to concerned sections.
- Rumours/complaints are also received through social media channels and Tawasul (e-hotline).
- Health promotion specialists and committees in health centres provide feedback and areas of concern from local communities.

### **Areas that need strengthening/challenges**

- Dynamic listening can be enhanced using data-mining processes in web forums, blogs and other digital sources, for public health concerns and patterns that are not picked up through regular media monitoring. Systematic monitoring and evaluation of dynamic listening/rumour management methods can identify trends in misinformation and the speed with which rumours are addressed. The evidence gathered from these analyses can be used to fortify rumour management methods, enhance two-way community engagement and provide more targeted health promotion information.

### **Relevant documentation**

- IHR programs 2012–2016 (review of Bahrain's IHR capacities and timeline for implementation).
- Health information-seeking behaviour in Bahrain, 2013. Health Promotion Directorate in collaboration with Zarca Interactive.
- Achievements of the IHR 2010.
- Health Promotion Directorate Annual Statistics for 2015.
- Ministry of Health Disaster Plan 2009.
- Public Health Risk Communication Plan 2016 (draft).
- Bahrain Ebola Communication Plan 2015–2016.
- Press release on Zika virus transmission, August 2009.
- 2011 Simulation Exercise on Polio Outbreak for Communications.
- Communication Plan for Cholera Outbreak 2016.
- 2016 Communications Coordination Structure between Stakeholders during an Emergency.
- 2014 Organigram of Health Promotion Committees.
- IEC poster on cholera.
- Event Reporting and Investigation Algorithm.
- MOH directive outlining the functional role of the Health Promotion Directorate.
- National Risk Register (includes impact assessment of public perception).

# POINTS OF ENTRY AND OTHER IHR-RELATED HAZARDS

## Points of entry

### Introduction

All core capacities and potential hazards management apply to points of entry (PoE) and thus enable the effective application of health measures to prevent international spread of diseases.

#### 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.*

### Bahrain level of capabilities

Bahrain is an island in the Arabian Gulf and shares one land border (sea bridge) with Saudi Arabia. It has three recognized PoE that support international traffic: Bahrain International Airport – a major international airport and the hub airport of Gulf Air; Bin Salman Seaport – currently used by travellers, cargo ships and container vessels; King Fahad Bridge Ground Crossing – the only land entry points to Bahrain at the border with Saudi Arabia. All three PoE (airport, seaport and ground crossing) are used for travellers and cargo.

Bahrain International Airport is operated by Bahrain Airport Company, a government entity, and regulated by Bahrain Civil Aviation Affairs. The airport has 24/7 medical services provided by MOH with trained professional medical personnel for public health hazards response and strong communication and coordination with IHR NFP.

Procedures are in place to transfer ill passengers to private and government hospitals in the city with fully equipped ambulances.

The airport terminal is equipped with thermal cameras for screening of arriving passengers from areas that have suspected cases of communicable diseases.

The airport Rescue and Fire Fighting centre is equipped with modern ambulances and trained staff to address public health emergencies.

The Khalifa Bin Salman port is operated and run by AP Mollar Terminal and regulated by Ports and Maritime Affairs. The medical services are provided by AP Mollar Terminal with 24/7 response and headed by a trained physician who has good skills and knowledge of response to public health threats. A referral system is in place for the safe transfer of ill travellers to appropriate medical facilities.

The Bahrain International Company Aerodrome Emergency Plan and the AP Mollar Terminal Emergency Plan are well developed to respond to medical emergencies but do not include public health hazards.

There are no appropriate medical services at King Fahad Bridge Ground Crossing. In the event of a pandemic or threat to public health, MOH will provide officers and equipment.

There are procedures for regular vector control by specialized contractors, and the cargo terminal has representations from the MOA. MOH carries out inspections of food, plants and animals. Quarantine facilities are not available for animals at PoE.

There was also no evidence of systematic surveillance of vectors and reservoirs at PoE or programmed inspection of conveyances (ships and aircraft).

## Recommendations for priority actions

- Develop a multihazard public health contingency plan for each PoE with the involvement of all stakeholders.
- Improve the animal quarantine capacity at PoE.
- Enhance the use of IHR recommended model of ship sanitation certificates at Khalifa bin Salman port. Ensure rapid access to equipment and trained personnel for the early detection and management of ill passengers.

## Indicators and scores

### **PoE.1 Routine capacities are established at PoE**

**Score 3: Developed capacity.** The first three technical requirements are agreed to have been met. However, the fourth (vector control programmes and surveillance) is not in place at all PoE. Similarly, no inspection programme for vessels for sanitation purposes is in place (both legally and in actuality).

#### ***Strengths/best practices***

- Bahrain has a strong and established medical system that can respond quickly to emergencies and there are clear working practices in place to deal with ill travellers reported at PoE.
- The quarantine facility at the airport for suspected ill/infected travellers is inadequate. However, the construction of an efficient facility should be operational by July 2017.
- Sufficient resources seem to be in place to deal with expected emergencies of the type and level of traffic at the seaport and airport.
- A regular programme for vector control is implemented at the seaport and airport and supervised by the operator and the regulator.
- There is a commitment (and technical capability) for seaports to provide an inspection service for ships and the issuance of ship sanitation certificates, effective by the first quarter of 2017; this will be discussed with the concerned public health officer in MOH.

#### ***Areas that need strengthening/challenges***

- A programme for vector surveillance and control is not in place. The newly published WHO guide on surveillance of vectors at seaports, airports and other PoE can provide further guidance. Quarantine services at PoE need further improvement.
- Vessel inspection at seaports for ship sanitation purposes is lacking. This service is in demand by shipping lines and operators (ship sanitation certificates need to be issued every six months from authorized ports).

- The country needs to have qualified trained personnel to carry out inspections at airports through a regular programme to ensure availability of routine capacity.

## PoE.2 Effective public health response at points of entry

### Score 2: Limited capacity.

#### *Strengths/best practices*

- Strong medical capacity exists at PoE. Medical facilities at the seaport and airport are well developed with diagnostic equipment and trained medical officers.
- Guidelines and procedures for the managements of infectious diseases are in place at the seaport and airport. This includes work flow charts, contact lists and identified PoE and for transportation.
- The airport and seaport have procedures for transfer of ill travellers to appropriate medical facilities.
- The PoE has strong communications and coordination with the MOH, IHR NFP and all stakeholders.

#### *Areas that need strengthening/challenges*

- Existing emergency plans for PoE should be reviewed, and a public health contingency plan developed for preparedness and response to all hazards as an annex to the emergency plans.
- Availability of medical services at the King Fahad Bridge ground crossing should be ensured.
- Trained qualified personnel should be available to evaluate the effectiveness of PoE in responding to public health events of different origins.

#### *Relevant documentation*

- Bahrain International Airport Emergency Plan.
- Civil Aviation Emergency Plan.
- APM Terminal Port Emergency Plan.
- Health Services Referral Protocol (seaport).
- Infection Control Protocol (seaport).
- Infectious Disease Procedures (seaport).
- Bahrain International Airport for Handling and Management of Infectious Diseases.
- SOPs for Sick Passengers on Board.
- SOPs for Affected Arriving Passengers.

# Chemical events

## Introduction

Prevention of uncontrolled hazardous chemical events posing a significant threat to public health, service sectors and infrastructure requires timely mobilization of a coordinated multi-agency response. States Parties are therefore required to have surveillance and response capacity for chemical risk or events through effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation and safe disposal including health protection.

### **Target**

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

## Bahrain level of capabilities

Stakeholders involved in the management of chemicals in Bahrain include the Supreme Council for Environment (SCE), which is responsible for the management of import, export, transportation, storage and use of chemicals. The SCE is also responsible for developing thresholds and standards for chemicals in workplaces and the environment (this is a mandate of the Ministry of Labour). The Environmental Laboratory located within the SCE is responsible for sampling and analysis of marine waters and trade effluents; it is also involved in the analysis of soil samples related to development and land reclamation. SCE maintains ambient air monitoring stations and is in the process of acquiring mobile air quality monitoring equipment, with the potential for analysis of common air pollutants in the event of an emergency.

The MOH is responsible for public health management and therefore needs to work closely with the SCE to achieve an effective and protective response to chemical events. The public health laboratory is situated within the MOH; this laboratory has capability for analysis of foods and water for chemicals, upon request. The MOH is responsible for analysis of drinking water, which is conducted at desalination reservoirs and at the point of consumption in commercial settings, such as hospitality and food outlets. The MOH is also responsible for analysis of recreational pool and spa water.

The Ministry of Interior, through the General Directorate of Civil Defence [Civil Defence] is responsible for deploying first responders to the scene of a chemical event. These responders have access to hand-held chemical detection equipment with reach-back capability. Similar equipment is not maintained by the MOH or the SCE for the purposes of chemical event response. The Ministry of Interior is responsible for customs affairs and works with the SCE in relation to import, export and in-country transit and storage of chemicals. It maintains a poison centre, which can be accessed by MOH upon request. There is no national poison centre available to the MOH or private hospitals.

The Ministry of Works, Municipalities Affairs and Urban Planning is responsible for use of chemicals in relation to agriculture and works with the SCE in relation to the international conventions.

The NCDM manages response to disasters, including public health response to chemical events; a number of relevant ministries form this committee, including MOH, Ministry of Interior and Ministry of Information Affairs.

Bahrain recognizes the importance of nongovernmental organizations in effective chemical management, including industry, academia and professional bodies.

Bahrain has also ratified a number of global conventions relating to chemical management, including the Stockholm Convention, Basel Convention and Rotterdam Convention and is working towards ratification of the Minamata Convention.

The Strategic Approach in International Chemical Management has been implemented by Bahrain; the SCE is leading a project with the United Nations Institute for Training and Research secretariat to further this work.

A National Profile to Assess the National Infrastructure for Chemical Safety was written in 2010 and updated in 2012.

Bahrain has the ability to quickly respond to major chemical events and has some legal tools relating to aspects of chemical management. However, more work is required to strengthen multisectoral work, particularly in relation to regulation, case management (e.g. decontamination), clinical management (e.g. toxicology), surveillance and drinking water safety.

## Recommendations for priority actions

- Update the National Chemical Profile.
- Accredit an environmental sampling and analysis laboratory.
- Prepare a plan for integration of a national poison facility into the MOH to include access to international toxicology databases (e.g. Poisindex) and 24/7 access to advice relating to clinical management.
- Disaster Management Committee to complete and publish a chemical plan and perform multisectoral exercises.
- MOH and NHRA to ensure that medical training for management of chemical cases and events is part of medical registration and develop/source training for first responders to chemical events.

## Indicators and scores

### CE.1 Mechanisms are established and functioning for detecting and responding to chemical events or emergencies

#### Score 4: Demonstrated capacity.

##### **Strengths/best practices**

- The NCDM has developed a national emergency response plan, within which a chemicals plan will cover response to chemical events.
- The National Profile to Assess the National Infrastructure for Chemical Safety should be updated in 2017.
- Good controls are in place for import, export and transportation of chemicals. The OFOQ database is used in relation to export and import of chemicals.
- Emergency services have procedures to alert relevant agencies in the event of a chemical incident, including Civil Defence, the SCE and MOH.
- Resources are available to respond to chemical events at sea and on land in a timely manner. Civil Defence maintains hand-held detection equipment and is responsible for determining protective distances, establishing cordons and (managing) clean up.
- The SCE is in the process of acquiring mobile air quality monitoring equipment (van based), which will be deployable in the event of a chemical event.

- The SCE has capacity for analysis of soil, air and water for chemicals and has agreements in place to provide additional capacity if required.
- The SCE has agreed the use of an additional EOC for oil and non-oil chemical events situated at a nongovernmental oil company site.
- Stockpiles of essential medicines, including antidotes, are maintained in the country as part of the national emergency preparedness and response requirement. Support arrangements are also in place with other GCC countries.

#### ***Areas that need strengthening/challenges***

- The NCDM chemical plan needs to be completed and exercised in conjunction with the SCE and other relevant agencies and nongovernmental organizations.
- A poison centre should be considered within the MOH where medical staff can quickly access toxicological information, including case management advice.
- Dedicated isolation or decontamination facilities should be set up at hospitals.
- First responder training should include response to chemical events.
- Public sector first responders should have detection and monitoring equipment for use in chemical events.
- The MOH has limited capacity for analysis of consumer products for chemical hazards.
- Efforts are needed to crystallize the capabilities of the public, private and military health-care facilities to respond to chemical events and to improve collaboration.

### **CE.2 Enabling environment is in place for management of chemical events**

#### **Score 3: Developed capacity.**

##### ***Strengths/best practices***

- A number of international conventions relating to chemical management have been ratified and work is in progress relating to these.
- GCC unified regulations have been adopted for pesticides, agricultural fertilizers and soil improvement additives; management of hazardous wastes; and management of hazardous chemicals.
- There is a National Profile to Assess the National Infrastructure for Chemical Safety.
- There is a national emergency response plan.
- There are oil and gas response plans.
- Gaps in environmental law have been identified related to chemical management and updates are pending.
- The internationally recognized Globally Harmonized System of Classification and Labelling of Chemicals will shortly be trialled in two industrial sectors.

##### ***Areas that need strengthening/challenges***

- More work is required on health and safety management of chemicals, including consolidation of existing plans relating to safe handling, storage and use of chemicals in workplaces.
- The chemical plan of the national emergency response plan has yet to be finalized.
- Medical first responder and doctor registration training needs to include chemical event response or case management.

- There are no standardized or systemic means of epidemiological follow-up relating to chemical exposure.
- More work is required to implement multisectoral response to chemical events.
- Multisectoral efforts should be strengthened and weaknesses identified related to drinking water safety.
- Chemical management needs to be strengthened, including the necessary laboratory infrastructure put in place, and intra- and interministerial cooperation, coordination, and information sharing facilitated. The environmental laboratory at the SCE needs to be externally accredited and quality assured.
- Involvement in international chemical or toxicological networks should be explored and implemented.
- A nationally agreed, readily available chemical database for toxicological assessment and case management should be established.
- There is a need to establish baseline public health assessments or indicators relating to chemical exposure, such as mortality or morbidity.
- It is not clear if the Ministry of Interior compiles and routinely shares surveillance data on major chemical events. The MOH does not compile surveillance data on all chemical events or accessed medical services in relation to chemical events.

#### ***Relevant documentation***

- Presentations by MOH, Civil Defence and the SCE.
- National plan for emergency preparedness and response for the health sector.
- Supreme Council for Environment, Bahrain National Profile to Assess the National Infrastructure for Chemical Safety, 2012.
- Technical Advisory Committee, Water Resources Council, documents relating to the development of the national water strategy and implementation plan for Bahrain.

# Radiation emergencies

## Introduction

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

### Target

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

## Bahrain level of capabilities

The Bahrain National Risk Assessment has two hazard risks for radiological incidents: a foreign nuclear accident affecting Bahrain, and a radioactive substance leak from a nuclear reactor accident. Both these risks need a national plan and regular exercise programme to mitigate the risk. Bahrain has developed and approved a National Radiation Emergency Response Plan, and the Cooperation Council for the Arab States of the Gulf has approved a Regional Radiological and Nuclear Emergency Preparedness and Response Plan.

The Supreme Council of the Environment is the authorized authority to license the storage, transport and discharges of radioactivity across all sectors of work. The radiation group is a small dedicated team with a range of monitoring equipment for environmental investigation, some sample analysis capacity and sample preparation experience. At the time of the JEE, a network of automated gamma monitors was in final testing phase before being deployed across the country in pre-identified and authorized locations. For the purpose of this evaluation, it was considered an existing capability. Radiological analyses and measurement capacity are limited to high resolution gamma spectrometry and to basic alpha/beta counting for air filter samples. A radiochemistry laboratory suite was in the early stages of work and therefore not considered an operational capability as no SOPs or sufficiently trained staff were in place. The team has a response role in the National Radiation Emergency Response Plan and for cargo transport events at the land crossing when automated detectors find an unauthorized transport event.

The MOH Public Health laboratory has one piece of equipment for sample analysis which has been out of order for some time, and the future of the capability is undetermined. No other agency or public body works routinely with samples for the purpose of radiological surveillance or intake assessment.

Two previous IAEA training and development projects provided a good basis for the JEE to detail capabilities. The learning from these courses needs to be built upon in the form of widening participation in training across all sectors, local plans and SOPs. If agreed by the Supreme Council of Health, and a suitable trainer is identified, this could form the basis of accredited training for the health sector.

The licensing regime for medical applications of radiological and nuclear technologies is operational. It is currently run by NHRA in close cooperation with the SCE. This may change when Parliament passes the amended environment law. What is really needed, and should be assigned to a specialized committee, is for the quality assurance regime to be implemented for therapeutic and diagnostic applications of radiation and radioisotopes in the medical sectors. Their expanded use for medical diagnoses and treatment in medical facilities in Bahrain justifies the establishment of such a committee to avoid a new national hazard of international health concern. The committee would need to establish minimum operating standards for

the medical use of radiation and radioactive sources for the protection of staff, patients and the public. The committee would require appropriate competent authorities for the environment; medical exposures; occupational protection; public protection and hospital engineering specialists. These authorities should work together to establish a comprehensive licensing and standards structure with appropriately qualified trained inspectors to ensure this field is appropriately controlled.

## Recommendations for priority actions

- Implement the recommendations from the IAEA project reports from April and November 2015.
- Undertake a capability needs assessment and gap analysis across all sectors (public, private and military) on monitoring equipment and trained staff for the whole range of radiological incident scenarios. An action plan to address these gaps should consider:
  - creating memorandums and protocols for use of existing assets during an incident, making best use of equipment's full capabilities;
  - expanding the number of assets (equipment and trained staff); and/or
  - requesting international assistance from the Cooperation Council for the Arab States of the Gulf or the IAEA Assistance Convention.
- Continue providing training for medical and first responders to a radiological incident; include the handling of contaminated casualties and the symptoms of acute radiation syndrome.
- Conduct regular training and exercise drills to test and improve the written protocols and multisector working relationships and understanding at the operational, tactical and national level.

## Indicators and scores

### **RE.1 Mechanisms are established and functioning for detecting and responding to radiological and nuclear emergencies**

**Score 3: Developed capacity.** Technical guidelines or SOPs are developed, evaluated and updated for the management of radiation emergencies (including risk assessment, reporting, event confirmation and notification, and investigation).

#### ***Strengths/best practices***

- A national risk assessment and risk register are regularly reviewed and a national radiation emergency response plan agreed.
- A national network of automated gamma monitors exists to detect a widely dispersed radioactive plume.
- Gamma monitors operate at the land cargo transport point of entry.
- Bahrain's capacity exceeds RE.1 score of 3 in the following ways:
- A designated hospital receives contaminated and irradiated casualties and has SOPs for the unit exercised.
- A number of national and Gulf regional exercises have been undertaken.

#### ***Areas that need strengthening/challenges***

To fully meet the capacity requirements of RE.1 score 3, the following capacities must be strengthened:

- SOPs for contaminated and irradiated casualties to be developed for all access points of medical care.
- Capacity for environmental investigation and internal and external dose assessment to be established and integrated in technical procedures.

- Arrangements to be made for the detection of radioactive material in metal waste processing facilities.
- To reach an RE.1 score beyond score 3, the following capacities are required:
- A competent authority for assessing dose from intakes of radionuclides and required environmental dispersion modelling to be established for the purposes of public health impact assessment.
- Radiological data exchange standards to be established between competent authorities, responders and human health surveillance units. This should include sample/measurement location, time, duration, reporting units and suitable calibration/reference standards.

## **RE.2 Enabling environment is in place for management of radiation emergencies**

**Score 3: Developed capacity.** A radiation emergency response plan exists (could be part of national emergency response plan) and national policies, strategies or plans for national and international transport of radioactive material, samples and waste management including those from hospitals and medical services are established.

### ***Strengths/best practices***

- The Supreme Council of Environment focal point for radiological and nuclear events from the Ministry of Foreign Affairs has coordination and communication with the MOH and IHR NFP.
- A national risk assessment and risk register is regularly reviewed and a national radiation emergency response plan in operation.
- Transport of radioactive materials requires prior authorization from Supreme Council of the Environment.
- Bahrain capacity exceeds RE.2 score of 3 in the following ways: several national and Gulf regional exercises have been undertaken with all relevant stakeholders required for a public health impact assessment (including food chain, external dose).

### ***Areas that need strengthening/challenges***

- To fully meet the capacity requirements of RE.2 score 3,
- capacity for environmental investigation and internal and external dose assessment should be detailed and integrated in technical procedures.

To develop capacity beyond score 3 the following is required:

- A competent authority for assessing dose from intake of radionuclides and required environmental dispersion modelling to be established/identified for the purposes of public health impact assessment.
- SOPs to be established for environmental monitoring and information sharing in collaborative response estimation and intakes.

### ***Relevant documentation***

- Expert mission for lecturing at the IAEA/NTC Medical Response for Radiological Accidents and review of the capability of a hospital for designation to response to radiation emergencies. IAEA Project C7-BAH-9.004-001; 8-19 November 2015.
- National Training Course on First Response to Radiological Emergencies; IAEA Project BAH9004.02, 5-9 April 2015.
- Regional Radiological and Nuclear Emergency Preparedness and Response Plan, The Cooperation Council for the Arab States of the Gulf (referenced during Joint External Evaluation but not able to be reviewed).
- Kingdom of Bahrain National Radiation Emergency Response Plan (referenced during Joint External Evaluation but not able to be reviewed).

# Annex 1: Joint External Evaluation background

## Mission place and dates

Manama, Bahrain, 4–8 September 2016.

## Mission team members

Taneli Puumalainen, Head of Vaccination Programme, National Institute for Health and Welfare, Department of Health Protection, Helsinki, Finland

Peter Ben Embarek, International Food Safety Authorities Network (INFOSAN) Management, Department of Food Safety, WHO headquarters, Geneva, Switzerland

Dalia Samhouri, Technical Officer, Epidemiology Surveillance and IHR, WHO Regional Office for the Eastern Mediterranean, Cairo, Egypt

Elizabeth Mumford, Technical Officer, Global Preparedness, Surveillance and Response, WHO headquarters, Geneva, Switzerland

Huda Qudsia, Regional Advisor, Health Risk Management, WHO Regional Office for the Eastern Mediterranean, Cairo, Egypt

Richard Garfield (Team Lead), Assessment, Surveillance and Information Management, Emergency Response and Recovery Branch, US Centers for Disease Control and Prevention, Atlanta GA, United States of America

Nacif Rihani, Livestock Development Officer, Sub-Regional Office for the GCC and Yemen, Food and Agriculture Organization, Abu Dhabi, United Arab Emirates

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Petri Ruutu, Emeritus Professor, National Institute for Health and Welfare, Helsinki, Finland

Laura Ngo-Fontaine, Communications and Advocacy Specialist, Geneva, Switzerland

Kleio Stoidou, Public Health Legal Advisor, Athens, Greece

## Objectives

- Assess the implementation of IHR public health capacities for surveillance and response to public health events including at points of entry;
- Review all related documents;
- Develop a report describing the progress and gaps in implementing IHR capacities; and
- Recommend priority actions to update and finalize the national plan to achieve and maintain IHR capacities for global health security.

## Preparation and implementation of the mission

- Prior to the visit, several communications took place with assessment team members and experts in Bahrain to review the agenda, responsibilities, and logistics.
- A national training was conducted on 10–11 August to provide national stakeholders with the information and resources necessary to participate successfully in the JEE process; and to provide guidance on self-reporting requirements and responsibilities.
- Background documents were collected and shared with the JEE team along with the complete JEE tool for review.
- One-day orientation was provided to the JEE external experts on the JEE process and tool, objectives and expected outcomes, and to discuss and finalize the agenda of the mission.
- Meetings with the relevant stakeholders and field visits were conducted to validate the collected information and to reach a consensus on the scores and priority actions.
- A debriefing meeting was held with senior officials (undersecretaries of all ministries) and with national technical teams involved in the evaluation to present the outcomes of the JEE, best practices and priority actions.
- A television interview was conducted with the Lead of the mission. A press release described the participation of Bahrain in the JEE, highlighting the main strengths, gaps and priority actions that need to be in place to support the country meeting the requirements of the 19 technical area.

## Limitations and assumptions

- The assessment was limited to one week, which limited the amount and depth of information that could be managed.
- The results of this assessment will be made publicly available.
- The assessment is not an audit.
- Information provided by Bahrain is not independently verified, but was jointly discussed and an assessment rating mutually agreed by the external assessment team and the Bahrain counterparts.

## Key host country participants and institutions

Affiliation	Name	Title
Ministry of Health	Dr Aysha Bu Aneq	Undersecretary
	Mrs Anisa Al-Howaihi	Director, Public and International Relations
Ministry of Health	Dr Mariam Al-Hajeri	Director
Public Health Directorate	Dr Mona Al-Mousawi	Public Health Consultant for IHR, National IHR Focal Officer
	Dr Adel Salman Al-Sayyad	Chief, Diseases Control Section
	Dr Jaleela S Jawad	Head, Immunization Unit
	Dr Wafa Ebrahim Al-Sharbati	Public Health Consultant
	Ms Fathiya Sateeh	Public Health Specialist, Communicable Diseases Unit
	Dr Abeer Al-Ghwai	Acting Director, Health Promotion Unit
	Mr Abdulaziz Al-khudri	Head, Environmental Health Section
	Mr Mohammed AL-Haddaq	Chief, Food Control Section
	Mrs Zainab Mohammed Al-Haddaq	Food Safety Specialist, Food Control Section
	Mr Faisal Al-Sari	Head, Domestic Food Safety and Licensing Group, Food Control Section
	Mrs Nujood Khalifa Al-Muqahwi	Head, Imported Food Safety Group, Food Control Section
	Mrs Amjad Ghanim Zaed	Chief, Public Health Laboratory
	Mrs Fatima Shehab	Head, Food Microbiology, Public Health Labora- tory
	Mrs Jameela Ghazwan	Head Medical Technologist, Public Health Labo- ratory
Ministry of Health Directorate of Material Management	Hiba Mohamed Abdul Ridha	Senior Chemist, Public Health Laboratory
	Mrs Hashmiya Ebrahim Saeed Alwasti	Senior Medical Technologist, Public Health Labo- ratory
	Mr Jaafar Hassan Matar	Radiation Protection Consultant
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	Mr Khalid Adwan	Acting Head, Central Material Store
Ministry of Health Salmanyia Medical Complex Lab	Dr Nermin Kamal Saeed	Pathology Resident
	Dr Safa Al-Khawaja	Head, Infection Control Section
	Dr Eman Farid	Head, Laboratory Unit
	Mrs Latifa Fardan Al Aradi	Special Nursing Specialist
Ministry of Health	Dr Nasser Mohammed Ali	A/E Resident
Accident and Emergency Department		
Ministry of Health Primary Health Care	Dr Muneera Al-Kooheji	Regional Medical Officer (Region1)
	Dr Edward Henry	Medical Doctor at Airport Clinic
	Dr Naweed Sarwani	Head, Airport Clinic

Ministry of Interior	Mr Ahmed Hussain	Head, Executive Office, National Committee For Disaster Management
Ministry of Interior King Fahad Causeway	Mr Najeeb Alballooshi	Senior Customs Officer, Customs Affairs
	Mr Abdulrahman Al-Kuhaji	Acting Head, Custom Facilities, Customs Affairs
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Bahrain Defence Force Medical Hospital	Dr Nahed Kamal Seddiq	Senior Infectious Disease Resident
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	Mrs Ameena Al-Fahal	Infection Control Officer
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	Mr Jamal Mohammed Al-Hajji	Airport Services Supervisor
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	Dr Um-Kulthoom Al-Asiri	Chief, Veterinary Quarantine
	Dr Abdullah Azraq	Head, Veterinary Lab
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	Mr Samer J Al-Kharouf	Nuclear Radiation Affairs Advisor
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	Mrs Deepa S Pillai	Infection Prevention and Control Nurse
	Mrs Jennie Ann Pastrana	Infection Prevention and Control Nurse
	Mrs Manal Aly Elnawasany	Infection Prevention and Control Nurse
	Dr Aneena Anna Abraham	Quality Data Analyst
	Mr John Pastrana	Health and Safety Officer

SAICM: Strategic Approach to International Chemicals Management.

## Supporting documentation provided by host country

- Self-report on JEE assessment tool, Bahrain.
- Presentation on overview of the health system in Bahrain.
- Technical area presentations on each of the 19 technical areas of the JEE tool.
- Online repository of supporting documents, notifications, data sources, previous assessments and web links for the 19 technical areas of the JEE tool.

