JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES

of the

SULTANATE OF OMAN

Mission report:
2-7 April 2017

World Health Organization

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Contents

ACKNOWLEDGEMENTS

Abbreviations

AMR	antimicrobial resistance
ASP	antibiotic stewardship programme
BSL	biosafety level
CBRN(e)	chemical, biological, radiological, nuclear (and explosive)
CCHF	Crimean–Congo haemorrhagic fever
CPHL	Central Public Health Laboratories
EOC	Emergency Operations Centre
EPI	Expanded Programme on Immunization
EQA(S)	External Quality Assurance (Scheme)
FAO	Food and Agriculture Organization of the United Nations
FETP	Field Epidemiology Training Programme
GCC	Gulf Cooperation Council
HCAI	health care-associated infection
IHR	International Health Regulations (2005)
IPC	infection prevention and control
JEE	Joint External Evaluation
MCM	medical countermeasures
MDR	multidrug-resistant
MECA	Ministry of Environment and Climate Affairs
MERS-CoV	Middle East respiratory syndrome coronavirus
MoAF	Ministry of Agriculture and Fisheries
MoH	Ministry of Health
NCCD	National Civil Committee of Defence
NFP	national focal point
NLMC	National Laboratory Medicine Committee
OIE	World Organisation for Animal Health
PHEIC	public health emergency of international concern
PoE	point(s) of entry
PVS	performance of veterinary services
SOP	standard operating procedure
WHO	World Health Organization

Executive summary

The following themes emerged as priorities for action for the Sultanate of Oman (Oman) to achieve a level of capability to maintain health security at full compliance with the International Health Regulations (IHR) (2005).

Major findings

Oman received very high scores in almost every area of the IHR Joint External Evaluation (JEE), clearly reflecting the good organization and substantial capacity of the country. For some technical areas, the initial scores proposed by the host country were actually lower than those that the external team eventually determined.

Oman received the highest marks for both the legislation and the coordination of IHR activities. A new Public Health Law is being published. In concert with all sectors involved, the Law was developed through a two-year comprehensive review of all existing legislation to ensure that coordination and communication for the early detection and response to all IHR-relevant hazards (including non-health) are addressed. All clauses of the new Public Health Law are already in place; the achievement has been to combine them into one streamlined legislation. The new Public Health Law designates the Ministry of Health (MoH) as the paramount authority for public health surveillance.

For activities related to controlling antimicrobial resistance (AMR), the scores are lower, which is common in new areas of work. A National Action Plan on AMR has been drafted, formulating the key activities and strategy, and involving both the human, and animal–agricultural sectors. The next step is to convert this into an operational plan. Several committees in MoH work on AMR control under the Directorate General for Disease Surveillance and Control. There is a National Antimicrobial Subcommittee, a Central Department of Infection Prevention and Control, a Department for Rational Drug Use, and the national focal point for Global Antimicrobial Resistance Surveillance System. However, a multisectoral National AMR Committee integrating the animal and agricultural sector as well as the private sector has not yet been established.

In the areas of laboratories, surveillance and reporting, there is strong capacity although cross-sector cooperation needs some enhancement for a few technical details. In terms of biorisk management in the laboratory sector, some work remains to achieve full capacity. This is a finding among most countries that have performed a JEE.

The capacity to address zoonotic diseases and food safety is at a very high level in Oman. Further work will achieve a full "One Health" approach to working together in the human health and veterinary sectors. In particular, antibiotic use stewardship in animal production and closer cooperation between veterinary and human laboratories are needed.

The immunization programme has sustained its immunization coverage at over 95% since 1995. The programme relies on administrative data (birth cohort) to measure coverage. A series of household surveys also ascertained over 95% coverage: the Oman Child Health Survey 1992; Oman Family Health Survey 1998; The Global Health Survey 2000; World Health Survey Oman 2008. However, there is some concern that since immunization is not mandatory for foreign-born children, this might constitute a challenge to the system; the country has experienced recent outbreaks of measles.

In the area of workforce development, a clear strategy for sustaining a competent public health workforce is lacking. During the mission, the JEE team was informed that Oman had developed a comprehensive health workforce strategy, although it does not address the public health sector. This was pointed out as key to maintaining a well-trained and well-prepared workforce in the areas of health security and emergencies.

The public health workforce strategy should be supported with a well-defined career development structure to address the lack of incentives to maintain the current public health workforce and the seemingly high turnover of staff in the sector.

Oman is very good at preparedness, emergency response operations and cooperation between the health and security authorities. Members of the JEE Team who observed from the Emergency Operations Centre the large emergency exercise that took place during the mission, were very impressed both by the scale of the exercise and the many sectors involved. Some potential for improvement exists in making sure that IHR-related public health risks are adequately incorporated in preparedness planning.

Capacity at border crossings that have been designated as points of entry under the IHR is generally good, although plans and standard operating procedures are needed for the newer ones. Oman has also clearly demonstrated its capacity to support other countries by deploying personnel and medical resources internationally.

While the technical areas of chemical events and radiation emergencies received generally good marks, there are some gaps that need to be filled for full capacity in these areas.

Introduction

The Sultanate of Oman is located in the south-eastern corner of the Arabian Peninsula, with the Kingdom of Saudi Arabia, United Arab Emirates and Republic of Yemen at its borders (Fig. 1). Its coastline extends 3165 km from the Strait of Hormuz in the north to the borders of Yemen. Due to the long coastline, fisheries and sea trade are an important part of Oman's history.

A large majority of the population (71.5%) live in urban areas, and nearly half the population live in two regions, Muscat and Al-Batinah. The high concentration of the population in urban centres and in these two regions gives them easier access to services. Regions may vary in traditional customs and practices, influencing health and requiring adapted interventions. Hence, the Ministry of Health (MoH) has developed regional health plans in addition to the national strategic plans.

The Omani population is young, with half of the population under the age of 20 years and only 3.7% aged 60 years and over. This highlights the great demand on services dedicated to young people. At the same time, the elderly population is expected to increase in the coming years, which will require a longer-term vision and adapted strategies for this age group.

The population of the country has increased by 60.1% over the past 24 years, reaching 4.16 million (2.35 million nationals and 1.81 million expatriates) in 2015. It is projected to increase by an additional 48.6% by 2050 (55.7% nationals and 34.2% expatriates). An estimated 18.2% of the population is aged between 15 and 24 years (2012) (13.2% nationals and 5.0% expatriates) and life expectancy at birth is 76.6 years (2014). The literacy rate in 2010 for adults was 85.9%.

Oman, under the leadership of His Majesty Sultan Qaboos bin Said, enjoys a stable political, economic and social system with good relationships with neighbouring

countries. The sound health policies and strategies based on the primary health care approach have resulted in rapid and significant positive changes in health and mortality patterns over the past four decades.

Mortality and morbidity data show clear signs of the onset of a health transition in Oman, similar to what has been observed in developed countries. Recently, the A(H1N1) influenza pandemic challenged the health-care system, particularly at the secondary and tertiary levels, once again placing emergency preparedness and response, safety of health-care facilities and workers, and epidemic control, high on the health agenda.

The burden of disease attributable to communicable diseases is 17.1%, noncommunicable diseases 67.7% and injuries 15.2% (2012). The share of out-of-pocket expenditure is 11.6% (2013) and the health workforce density is 21.7 physicians and 47.1 nurses per 10 000 population (2014).[1]

The Government of Oman and the World Health Organization (WHO) are working together to effectively improve the public health situation in the country with special emphasis on the following five key regional priorities.[2]

- Health security and prevention and control of communicable diseases;

- Noncommunicable diseases, mental health, violence and injuries, and nutrition;

- Promoting health through the life-course;

- Health systems strengthening; and

- Preparedness, surveillance and response.

Sustained investment in economic development and high political commitment to health have resulted in near universal access to health care in Oman. An established, evidence-based, five-year planning process, commitment to building human resource capacity, and a strong health information system, are some of the key strengths of the health system.

However, the demographic and epidemiological transition, with noncommunicable diseases and injuries now among the leading causes of hospital mortality and morbidity, along with demand for better quality care, are challenging the current primary health care-based system. In addition, the private sector is witnessing rapid and unregulated growth. The Health Vision 2050 launched in 2014 responds to these challenges and is being operationalized in the ninth five-year health development plan (2016–2020).

Over 80% of the sultanate's total health expenditure is borne by MoH, and the budgetary allocation for the sector stands at Omani rial 1.3 billion (approx. US$ 3.8 billion). The Government sector under the MoH comprises 205 primary health centres and 49 hospitals with a total of 4998 beds. The decentralized health services in the country are provided in the 11 governorates through the office of the Director General of Health Services. A regional surveillance section under the Director of Disease Surveillance and Control in the governorates was created in 2017. At the peripheral level, health centres, extended health centres, and wilayat (local hospitals) provide elements of primary health care. The Regional Referral Hospital offers secondary and partial tertiary health-care services in the governorates, including the 61 provinces. The information from the periphery flows to the centre through regional headquarters.

In addition, there are five sister organizations (non-MoH governmental hospitals) operated by the Ministry of Defence, the Royal Oman Police, Petroleum Development Oman and Sultan Qaboos University. These have 888 beds and 54 primary health care centres with 255 beds.

In the private sector there are 15 hospitals, 448 general clinics, 288 specialized clinics and polyclinics, 233 dental clinics and 49 Chinese and Indian clinics.

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1   Oman health profile 2015. Cairo: WHO Regional Office for the Eastern Mediterranean; 2015 (WHO-EM/HST/227/E).
2   Country Cooperation Strategy for WHO and Oman 2010–2015. Cairo: WHO Regional Office for the Eastern Mediterranean; 2010 (WHO-EM/ARD/036/E).

Sultanate of Oman scores

Capacities	Indicators	Score
National legislation, policy and financing	P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of International Health Regulations (IHR) (2005)	5
	P.1.2 The state can demonstrate that it has adjusted and aligned its domestic legislation, policies and administrative arrangements to enable compliance with IHR (2005)	5
IHR coordination, communication and advocacy	P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR	5
Antimicrobial resistance	P.3.1 Antimicrobial resistance detection	4
	P.3.2 Surveillance of infections caused by resistant pathogens	3
	P.3.3 Health care-associated infection prevention and control programmes	3
	P.3.4 Antimicrobial stewardship activities	2
Zoonotic diseases	P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens	5
	P.4.2 Veterinary or animal health workforce	4
	P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional	5
Food safety	P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination	5
Biosafety and biosecurity	P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities	2
	P.6.2 Biosafety and biosecurity training and practices	3
Immunization	P.7.1 Vaccine coverage (measles) as part of national programme	5
	P.7.2 National vaccine access and delivery	5
National laboratory system	D.1.1 Laboratory testing for detection of priority diseases	5
	D.1.2 Specimen referral and transport system	5
	D.1.3 Effective modern point-of-care and laboratory-based diagnostics	4
	D.1.4 Laboratory quality system	2
Real-time surveillance	D.2.1 Indicator- and event-based surveillance systems	4
	D.2.2 Interoperable, interconnected, electronic real-time reporting system	3
	D.2.3 Analysis of surveillance data	4
	D.2.4 Syndromic surveillance systems	5
Reporting	D.3.1 System for efficient reporting to WHO, FAO, and OIE	5
	D.3.2 Reporting network and protocols in country	5
Workforce development	D.4.1 Human resources are available to implement IHR core capacity requirements	3
	D.4.2 Field epidemiology training programme or other applied epidemiology training programme in place	2
	D.4.3 Workforce strategy	2

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

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

PREVENT

National legislation, policy and financing

Introduction

The International Health Regulations (IHR) (2005) provides obligations and rights for States Parties. In some States Parties, implementation of the IHR may require new or modified legislation. Even if new or revised legislation may not be required, States may still choose to revise some regulations or other instruments in order to facilitate IHR implementation and maintenance in a more effective manner. Implementing legislation could serve to institutionalize and strengthen the role of IHR and operations within the State Party. It can also facilitate coordination among the different entities involved in their implementation.[3] In addition, policies that identify national structures and responsibilities as well as the allocation of adequate financial resources are also important.

Target

States Parties should have an adequate legal framework to support and enable the implementation of all 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 legislation, regulations or other instruments in order to facilitate their implementation and maintenance in a more efficient, effective or beneficial manner. State Parties should ensure the provision of adequate funding for IHR implementation, through the national budget or another mechanism.

Oman level of capabilities

The term "legislation" refers to the broad range of legal, administrative or other governmental instruments available for the Sultanate to implement the IHR. Such instruments include regulations, orders, acts, laws, policies, decrees, issued circulars, correspondence, and guidelines. This legislation addresses all technical areas in support of the implementation of the IHR.

A new Public Health Law, developed over two years in coordination with all sectors, is the fruit of a comprehensive review of all existing legislation to ensure that coordination and communication for the early detection and response to all IHR-relevant hazards (including non-health) are addressed. In reality, all existing legislation remain; the achievement of the new Public Health Law is to present a single, combined and streamlined Act. The new law designates the MoH as the paramount authority for public health surveillance. Information sharing will be further streamlined and supported. The Food Safety Law and regulations have also been updated recently to adopt the Gulf Cooperation Council (GCC) Advisory Law and its pending endorsement. The new law will regulate the national food production process from "farm to fork". There are also quality control measures for fishery products. Both the public health law and food safety law are pending under the Ministry of Justice for harmonizing cross-sectoral legal terminology.

The MoH has the authority to issue any mandate pertaining to infectious diseases, and can liaise with other sectors to issue joint decrees if needed. The structure is flexible to allow a response to current public health realities. For example, while the MoH has a set of priority diseases, it can update the list to include emerging diseases of potential international concern, as was the case for A(H1N1) influenza virus, Ebola

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3   See detailed guidance on IHR (2005) implementation in national legislation at www.who.int/ihr/legal_issues/legislation/en/index.html

virus, and the issuance of "Home Quarantine" to counter the spread of Middle East Respiratory Syndrome coronavirus (MERS-CoV). Lessons learnt from these experiences will enable the MoH to effectively face any future event deemed a public health emergency of international concern (PHEIC).

The MoH can call upon the support and resources from other sectors during a response to public health events. Funds were provided for the A(H1N1) influenza pandemic, MERS-CoV, and Ebola virus outbreaks and, although there is no reserve fund, they are flexible in times of emergency.

A unique standing IHR unit under the Directorate General for Disease Surveillance and Control within the MoH has recently been established through Ministerial Decree; this designation provides a dedicated team and sustained functionality for IHR work in Oman. A budget line is available for all emergencies within the government national budget, annually updated.

Oman is strongly committed to implement fully the IHR. Revision of legislation occurs periodically, and many acts/regulations, rules and regulations have been modified as a continuous improvement until larger legislation can be passed. Extensive legislative reviews took place in 2011 with WHO, and compliance with international standards and previous public health laws is always ensured during the development of new legislation.

Recommendations for priority actions

- Expedite the Royal Decree for implementation of the new Public Health Law.

Indicators and scores

P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of International Health Regulations (IHR) (2005) – Score 5

Strengths/best practices

- Oman is committed to implementing the IHR; in addition to the JEE, several IHR assessment missions have taken place in the country that included an assessment of national legislation.
- A substantial legal framework exists for all technical areas under the IHR and their implementation.
- Mechanisms for updating legislation in the country are systematically reviewed.

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 5

Strengths/best practices

- A well-established legal and regulatory framework supports all sectors relevant to the implementation of the IHR.
- The Public Health Law, while awaiting endorsement, addresses all public health related issues.
- The Sultanate is part of international agreements on public health protection and cross-border collaboration with the rest of the GCC.
- Implementation of legislation is aligned between the different sectors.

Areas that need strengthening/challenges

- Awareness of the IHR and their implementation among the legal advisors of the different sectors in the country.

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 (IHR NFP), which is a national centre for IHR communications, is a key requisite for IHR implementation.

Target

The national IHR focal point to be accessible at all times to communicate with the WHO regional IHR contact points and with all relevant sectors and other stakeholders in the country. States Parties to provide WHO with contact details of their national IHR focal points, as well as continuously update and annually confirm them.

Oman level of capabilities

The IHR NFP has been established under the MoH Director of Disease Surveillance and Control; the IHR NFP has four staff on a permanent full-time basis, including one in charge of Port Health. Coordination mechanisms are established between the IHR NFP, stakeholders and the governorates. The new structure, along with coordination and communication mechanisms, allows improved communication between the various sectors, stakeholders and WHO.

Communication and coordination between stakeholders and relevant sectors, particularly the animal health sector and points of entry, appear to be strong. Standard operating procedures (SOPs) are established and state that acute public health events are to be reported to IHR NFP immediately, at most within 24 hours. These procedures were tested through simulation exercises (Muscat International Airport, polio, etc.) and the lessons learned disseminated to stakeholders in relevant sectors.

Although annual updates on the status of IHR implementation are made available to various stakeholders across all relevant sectors, insufficient awareness about IHR and their implementation was a concern in sectors other than health; this may be due in part to the turnover of staff and insufficient advocacy of and knowledge-building on IHR and their implementation.

Recommendations for priority actions

- Arrange advocacy and planning to recognize IHR as a national responsibility across all sectors.
- Strengthen coordination between relevant ministries on events that may constitute a PHEIC with clear terms of reference and identified roles and responsibilities.
- Organize regular drills or simulation exercises to test coordination and communication mechanisms as well as respective roles and responsibilities in the event of a PHEIC.
- Build and maintain the capacity and knowledge of all actors at national level on IHR implementation, including through pre-service and in-service training programmes.

Indicators and scores

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

Strengths/best practices

- The IHR NFP was established at the national level with a minimum cadre of staff; coordination mechanisms with other sectors allow for 24/7 availability.

- The official Decree for the IHR Committee ensures coordination between the relevant ministries in the case of public health events or risks.

- Information is systematically exchanged between the animal and human health surveillance units, and other relevant sectors through monthly reports and bi-weekly bulletins. Samples were provided to the team.

- Coordination and communication mechanisms have been put in place to ensure reporting on acute public health events at national and governorate (intermediate) levels. These mechanisms are supported by SOPs for Incident Command Chain reporting.

- Drills and simulation exercises are organized to test the preparedness and response of key relevant actors to a potential public health event or risk (Muscat General Hospital, Muscat International Airport).

Areas that need strengthening/challenges

- There is a lack of awareness of the IHR and their implementation among the various stakeholders, including decision-makers in relevant sectors.

- The IHR implementation plan should be incorporated in the regular organization of drills and simulation exercises on a regular basis in order to test the coordination and communication mechanisms across various sectors.

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. Antimicrobial resistance (AMR) is evolving at an alarming rate and is outpacing the development of new countermeasures capable of thwarting infections in humans. This situation threatens patient care, economic growth, public health, agriculture, economic security and national security.

Target

Support work coordinated by the FAO, OIE and WHO for developing 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). This would include: (i) having a national comprehensive plan for each country to combat antimicrobial resistance; (ii) strengthening surveillance and laboratory capacity at the national and international level following agreed international standards developed in the framework of the Global Action Plan; and (iii) 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 with systems to preserve new antibiotics.

Oman level of capabilities

The country is well aware of the AMR threat, and data on the current situation are available. There is an increasing rate of multidrug-resistant (MDR) Gram-negative bacteria such as carbapenem-resistant Enterobacteriaceae, MDR Acinetobacter and Pseudomonas; and methicillin-resistant Staphylococcus aureus is a concern as well. Extended-spectrum ß-lactamases-producing Enterobacteriaceae are very common, causing community-acquired and health-care associated infections (HCAIs); today, patients are only isolated if the pathogen is MDR.

A National Action Plan on AMR has been drafted, formulating the strategy and key activities, and involving both the human and animal–agricultural sector. However, it still needs to be converted into an operational plan.

The Central Department of Infection Control mandates infection prevention and control (IPC) programmes in each health-care facility. The MoH IPC Code of Practice and IPC Standards and Policy are available, and the GCC HCAI Surveillance Plan has been adopted. A system to evaluate the implementation of infection control measures is currently in the pilot stage. Major hospitals have implemented very strong IPC programmes including active screening in high-risk patient groups. Infection control practitioners are usually nurses with a complementary one-year diploma in IPC, working in an IPC department headed by a microbiologist or an infectious disease physician. While many secondary and tertiary centres conduct targeted HCAI surveillance, mainly problem-oriented or in critical departments, systemic HCAI surveillance at the national level has not yet been established. In response to an Ebola outbreak, comprehensive guidelines have been developed for the care of suspected or confirmed cases.

Antibiotic stewardship programmes are not mandatory, and even tertiary hospitals are struggling to rationalize the use of antibiotics due to lack of human resources. Clinical pharmacists are not available in all hospitals, and often the Infection Control Committee combines IPC activities, antibiotic stewardship

programmes and occupational health. National guidelines on appropriate antimicrobial use are available. An audit of appropriate surgical antibiotic prophylaxis has been conducted, but overall adherence to the guidelines is not known. The Department of Rational Drug Use assesses antibiotic use patterns in primary health care centres.

Antimicrobial drugs require a prescription from licensed doctors or veterinarians. There is no regulatory framework for the use of antimicrobials in agriculture.

In the animal sector, activities on AMR are scarce. No national data on antimicrobial consumption in the animal and agricultural sector are available, although antibiotics are widely used, especially in poultry. The National Action Plan on AMR favours prohibition by law of the use of critical important antibiotics (fluoroquinolones, third and fourth generation cephalosporins and macrolides) in animals, as well as a ban on the use of antimicrobials for growth promotion. It supports monitoring for residues of antimicrobials of concern and analysis of the use of last-resort antibiotics for humans (e.g. tigecycline and colistin) in the veterinary sector.

Recommendations for priority actions

- Establish a national AMR committee composed of key stakeholders (human, veterinary, food and agriculture) from both the public and private sectors;

- Develop and implement a national AMR operational plan in line with the WHO Global Action Plan, incorporating an evaluation and monitoring system;

- Invite technical missions from the FAO and OIE to support the establishment of AMR surveillance in the animal and agriculture sector;

- Implement inspection procedures to ensure rational and prudent use of antimicrobials in animals.

Indicators and scores

P.3.1 Antimicrobial resistance detection – Score 4

Strengths/best practices
- A National Action Plan on AMR has been drafted, formulating the strategy and key activities and involving both the human and animal–agricultural sector.

- A National Antimicrobial Subcommittee has been established.

- A National Antimicrobial Susceptibility Testing Guideline has been developed.

- Human and veterinary laboratories have the capacity to identify and carry out susceptibility testing for all priority AMR pathogens listed by WHO.

- The National Public Health Laboratory is the human AMR reference lab. Oman has a central diagnostic veterinary laboratory as well as a research lab, available for joint MoH and Ministry of Agriculture and Fisheries, (MoAF) research on AMR.

Areas that need strengthening/challenges
- Several committees in the MoH work on AMR control under the Directorate General of Disease Surveillance and Control, but a National AMR Committee integrating the animal and agricultural sector as well as the private sector has yet to be established.

P.3.2 Surveillance of infections caused by resistant pathogens – Score 3

Strengths/best practices

- A strategic plan on AMR surveillance has been developed in alignment with the requirements of the WHO Global Antimicrobial Resistance Surveillance System.

- AMR surveillance data are uploaded to the WHO system contributing to the global mapping of AMR.

- The first phase of implementation of AMR surveillance (human sector) has started in six sentinel sites.

Areas that need strengthening/challenges

- There is presently no systematic AMR surveillance in animal populations and agricultural sectors.

P.3.3 Health care-associated infection prevention and control programmes – Score 3

Strengths/best practices

- The Central Department of Infection Control mandates IPC programmes in each health-care facility.

- The MoH IPC Code of Practice and IPC Standards and Policy are available; the GCC HCAI Surveillance Plan has been adopted.

- Currently a system to evaluate the implementation of infection control measures is in the pilot stage.

- Major hospitals have implemented strong IPC programmes including active screening in high-risk patient groups.

- In response to the 2014 Ebola outbreak, comprehensive guidelines have been developed for the care of suspected or confirmed cases of Ebola Virus Disease.

Areas that need strengthening/challenges

- Systematic HCAI surveillance at the national level has not yet been established.

P.3.4 Antimicrobial stewardship activities – Score 2

Strengths/best practices

- National guidelines on appropriate antimicrobial use are available, although adherence is not known.

- Antimicrobial drugs must be prescribed by licensed doctors or veterinarians.

- The Department of Rational Drug Use assesses antibiotic use patterns in primary health care centres.

- Legislation and regulations on antimicrobial consumption in the animal and agricultural sector are included in the Public Health Law and National Action Plan on AMR.

Areas that need strengthening/challenges

- Antibiotic stewardship programmes have not been set up in all health-care facilities due to a lack of human resources; at least one clinical pharmacist, infectious disease physician and microbiologist should be able to dedicate time to this activity.

- There are no national data on antimicrobial consumption in the animal and agriculture sector. Efforts to rationalize the use of antimicrobials in this sector should be reinforced.

- There is no regulatory framework for the use of antimicrobials in agriculture.

Zoonotic diseases

Introduction

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

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

Oman level of capabilities

Stakeholders for zoonoses include: MoH, MoAF, Municipalities (Regional Municipalities and Water Resources), Diwan of Royal Court (Wildlife) and Ministry of Environment and Climate Affairs (MECA). The intersectoral National Zoonotic Committee has been active since the 1990s, especially on brucellosis, Crimean–Congo haemorrhagic fever (CCHF), and rabies. Members of the Committee are the MoH, MoAF, MECA, Municipalities, Royal Oman Police, and Sultan Qaboos University College of Agriculture and Animal Science.

Oman has identified the following priority zoonoses for surveillance: avian influenza, brucellosis, CCHF, MERS-CoV, rabies, Rift Valley fever and West Nile virus. National surveillance plans for these priority diseases are available but in generic form in several different documents, except for MERS-CoV and avian influenza.

According to FAO estimates of 2014, Oman has 0.25 million camels, 0.37 million cattle, 0.56 million sheep, 2.1 million goats, and 4.6 million chickens. The country, however, remains a net importer of animals and animal products to meet the growing demand for animal protein. According to OIE, up to 90% of slaughtered animals in Oman are imported.

The Public Veterinary Service is organized under the Directorate of Animal Health in the MoAF except for the inspection of slaughterhouses, carried out by veterinarians under the Municipalities. For technical efficiency, quality assurance, surveillance of zoonoses and foodborne pathogens, and coordination, the veterinary service in the Municipalities should be overseen by the competent veterinary authority in Oman.

A command-and-control set-up is in place with the support of local competent authorities in order to detect outbreaks rapidly for appropriate prevention and response for zoonotic events. The coordination mechanisms between human and animal health authorities are established. Oman has successfully dealt with MERS-CoV, CCHF and brucellosis outbreaks, and manages to control outbreaks to a large extent using a One-Health approach for detecting, preventing and responding. Sharing of information among different sectors, however, is not automatic and is based on good will since there are no written SOPs or a national plan. Human health and veterinary sectors do not have a common reporting system.

Oman has a well-organized national veterinary authority under the MoAF, and a very good network of veterinary laboratories. The main ones are: 1) the Central Veterinary Diagnostic Laboratory located in Muscat providing diagnostic services, including sample analysis for granting permits to import and export animal source foods and animals; 2) the Veterinary Research Centre, located near Muscat, which is dedicated to research on animal diseases and zoonoses; and 3) two regional veterinary laboratories.

Recommendations for priority actions

- Harmonize the response plan for priority zoonoses with clear SOPs for human and veterinary health sectors;

- Establish a One-Health platform and formalize the approach to zoonoses, food safety and antimicrobial resistance between the human and animal health sectors. In particular, coordination, cooperation and communication should be strengthened among key identified stakeholders in animal production, animal health and public health sectors.

Indicators and scores

P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens – Score 5

Strengths/best practices

- The Intersectoral National Zoonotic Committee is established by Ministerial decree and joint investigations have taken place on zoonotic events such as brucellosis, CCHF, and MERS-CoV.

- A command-and-control mechanism is in place to launch a rapid response team from the animal and human health sectors when a zoonotic event strikes, allowing immediate coordinated detection, prevention and response with the support of competent local authorities.

- Identified major stakeholders and zoonoses are covered in the Legal Framework of Oman.

- Zoonotic surveillance systems are largely in place for the priority zoonoses identified: avian influenza, brucellosis, CCHF, MERS-CoV, rabies, Rift Valley fever and West Nile virus.

- Risk mapping is carried out for priority zoonoses.

- Close collaboration and understanding between animal and human health sectors include: direct communication, coordination and exchange of information and periodic meetings of the multisectoral Zoonotic Committee, in addition to mandatory reporting of zoonotic events.

- Well-established laboratories (Central Public Health Laboratories, Central Veterinary Diagnostic Laboratories, Veterinary Research Centre and two regional veterinary laboratories) provide the necessary research and diagnostic services for zoonoses, and food safety threats.

- Procedures or mechanisms exist for zoonotic disease reporting to FAO, OIE and WHO.

- Real zoonotic events have been tackled, e.g. brucellosis, CCHF, and MERS-CoV; post-exposure prophylaxis including animal bite surveillance against rabies by MoH; and sero-surveys, risk mapping, de-ticking (insecticide spray), and farm quarantine against CCHF by MoAF.

Areas that need strengthening/challenges

- A mechanism is needed to collect and share data quickly among key stakeholders in electronic form; and a functional link should be established among public health and animal health laboratories for real-time information sharing. The veterinary sector in particular should install an electronic reporting system.

- A real-time surveillance system for zoonotic diseases would allow for effective and timely response in the animal–human–wildlife ecosystems interface.

- A compensation scheme should be set up for brucellosis when test-and-slaughter is chosen to eradicate the disease following animal vaccination (in endemic zones).

- The skilled workforce in key sectors should be reinforced for surveillance of, and response to zoonoses.

P.4.2 Veterinary or animal health workforce – Score 4

Strengths/best practices

- The animal health workforce is sufficient within the national public health system and in more than half of subnational levels (governorates), in 70 veterinary clinics.

- Training for para-veterinarians is available in addition to ad hoc training for veterinary professionals.

- Scholarships are available for veterinarians to study in other countries; agreements also exist with countries such as Saudi Arabia.

- The National Zoonotic Committee enables a joint coordinated response to zoonotic events.

Areas that need strengthening/challenges

- Continuity is a challenge given that most veterinarians are foreign nationals.

- Continuing education for veterinarians should be ensured, in particular the lack of joint courses (for staff from relevant sectors) on epidemiology, disease control, surveillance and One-Health.

- On-the-job training of field veterinarians should be established on detection (surveillance/diagnosis), prevention and control of zoonoses and food safety pathogens.

P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional – Score 5

Strengths/best practices

- Capacity exists for a timely and coordinated response to more than 80% of zoonotic events of potential national and international concern.

- Timely exchange of information takes place for all priority zoonoses among surveillance units of the MoH and MoAF.

- A coordination mechanism is in place at national and local levels through a network of focal points.

Areas that need strengthening/challenges

- Contingency plans for priority zoonoses in both sectors should be strengthened.

- The One-Health platform and its operations needs to be institutionalized.

- A training plan is lacking for veterinary staff at different levels.

- Written SOPs for joint response to zoonoses events should be drawn up.

- Compensation is needed for owners when test-and-slaughter of brucellosis-positive animals is practised.

- A National Brucellosis Elimination Programme involving different stakeholders should be created, based on successes in the Dhofar Region.

- Regional zoonotic committees, similar to the National Committee, should be considered, or a restructured regional response team, for greater multisectoral coordination using the One-Health approach.

- Multisectoral human resource capacity-building is needed.

Food safety

Introduction

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

Target

State Parties to have surveillance and response capacity for risk or events related to food- and waterborne diseases, with effective communication and collaboration among the sectors responsible for food safety and safe water and sanitation.

Oman level of capabilities

The national food safety system in Oman is based on a multisectoral collaboration and ensures: 1) food safety and quality during food chain steps (the farm-to-fork continuum); 2) the safety of consumers from chemical, biological, poisons, and food- and waterborne diseases; 3) rapid response to food safety emergencies and outbreaks of foodborne diseases; and 4) movement of local and imported commercial foodstuffs under food safety principles.

Oman has a well-established system for detecting, preventing and controlling foodborne disease outbreaks and emergencies, including medical response to exposed individuals. Food safety is a shared responsibility among the MoH, MoAF and Ministry of Municipality. Coordination among these stakeholders is through focal points. While roles for each authority are identified, overlaps of responsibilities were noted, and coordination and communication mechanisms need strengthening.

The major stakeholders for food safety include: 1) Ministry of Regional Municipalities and Water Resources; 2) MoH; 3) MoAF; 4) Ministry of Trade and Commerce (standards and metrology); 5) Muscat Municipality; 6) Salalah Municipality; 7) Sohar Municipality; and 8) the Public Authority of Consumer Protection.

Oman has well-established laboratories capable of analysing major foodborne pathogens: 1) the Central Public Health Laboratory (microbial and chemical) under the MoH; 2) Food and Water Control Laboratory (microbial and chemical) and regional subsidiary laboratories (microbial) under the Ministry of Municipalities and Water Resources; 3) Laboratory (microbial) under the Muscat Municipality; 4) Laboratory (microbial and chemical) under the Ministry of Commerce and Industry; and 5) Fishery Quality Control Laboratory (microbial and chemical) under the MoAF). The Central Food Safety Laboratory of the Muscat Municipality is able to analyse food and water samples in the country and serves as a reference centre for GCC countries, including for contaminants and antibiotic residues. The Central Veterinary Diagnostic Laboratory is also well equipped to analyse animal source foods for foodborne pathogens and antibiotic residues. The Central Public Health Laboratories analyse samples for foodborne pathogens from outbreaks, and the Veterinary Research Centre provides the necessary diagnostic services on demand for food safety threats. The laboratories follow international standards of GCC and Codex Alimentarius.

Oman has a risk-based regulatory framework for food safety. However, there is no national coordinating body, such as a Food Safety Centre that coordinates all activities in the country, including harmonization of approaches. Oman has clear guidelines in case of foodborne pathogens and outbreak detection. A foodborne illness investigation and surveillance system is in place. However, the country needs a national food safety strategy.

It was noted that a number of authorities analyse food samples from markets, airports, seaports/harbours, including animal source foods, inspection of abattoirs, and foodborne outbreak samples. While these actors have their own role, clearly mentioned in the Food Safety Law, a National Food Safety Centre could serve as an umbrella and maintain good quality laboratory testing, with sufficient samples to be analysed.

In terms of best practices, Oman has a well-developed Food Safety Law. In a real foodborne outbreak in Saham (2015) due to Salmonella weltevreden, joint surveillance/detection and coordinated response was undertaken by the MoH and the Municipality with clear SOPs and response, which effectively controlled its spread in Oman.

Recommendations for priority actions

- Develop a national food safety strategy.
- Designate a national Food Safety Centre to coordinate all activities according to international standards for food safety.
- Strengthen coordination and communication among food safety stakeholders.
- Undertake drills and simulation exercises with all relevant stakeholders to be prepared for foodborne outbreak events.

Indicators and scores

P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination – Score 5

Strengths/best practices
- A mechanism for rapid information exchange during suspected foodborne disease outbreak investigations between all stakeholders and relevant sectors is in place.
- Food safety laboratories for public health and agriculture sectors are effective and staff are working on risks and interventions.
- The National Food Safety Law was enacted in 2008.
- A National Food Safety Committee exists.
- A national focal point for the WHO International Food Safety Authorities Network (INFOSAN) has been established.
- Oman offers a Food Safety Awareness Course, and is part of the GCC rapid alert system for food.
- Outbreak management courses are available, as well as training workshops on regional communicable diseases.
- Whole genome sequencing capability is available for bacterial isolates using pulsed field gel electrophoresis (PFGE) fingerprinting (connected to PulseNet) supporting GCC countries.
- Well-established laboratories provide the necessary research and diagnostic services for zoonotic and food safety threats.
- A strong legal framework is in place.

Areas that need strengthening/challenges

- A National Food Safety Centre should be established to reorganize and consolidate all activities into a unified structure with a leading central laboratory and decentralized laboratories.

- A clear legal and administrative platform for the Food Safety Centre should define interfaces between all ministries and stakeholders.

- Food testing laboratories should be accredited.

- Collaborative mechanisms and exchange of information among sectors need to be accelerated.

- Laboratories or investigation teams should be linked with hospitals using an electronic reporting system.

- An integrated surveillance system combining inputs from all sectors should be established.

- All pathogen isolates from food and clinical samples should undergo subtyping and epidemiological analysis.

- Awareness and risk communication of food safety issues should receive priority attention.

Biosafety and biosecurity

Introduction

Work with pathogens in the laboratory is vital to ensure that the global community possesses a robust set of tools – such as drugs, diagnostics, and vaccines – to counter the ever-evolving threat of infectious diseases. Research with infectious agents is critical for the development and availability of public health and medical tools that can detect, diagnose, recognize and respond to outbreaks of infectious diseases of both natural and deliberate origin. At the same time, the expansion of infrastructure and resources dedicated to work with infectious agents has raised concerns on proper biosafety and biosecurity to protect researchers and the community. Biosecurity is important to secure infectious agents against those who would deliberately misuse them to harm people, animals, plants or the environment.

Laboratory biosafety describes the containment principles, technologies and practices that are implemented to prevent the unintentional exposure to pathogens and toxins, or their accidental release. Laboratory biosecurity describes the protection, control and accountability for valuable biological materials within laboratories as well as information related to these materials and dual-use research, in order to prevent their unauthorized access, loss, theft, misuse, diversion or intentional release.

Target

A whole-of-government national biosafety and biosecurity system is in place, to ensure 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.

Oman level of capabilities

In general, the laboratory infrastructure of Oman is very good. Laboratory guidelines for specimen collection, handling and transportation are available, as well as all physical containment measures, including personal protective equipment and safety cabinets. Security measures to prevent unauthorized access to laboratories exist in most laboratories (i.e. guards, door locks and video surveillance). The main shortcoming is that Oman does not yet have BSL (biosafety level)-3 laboratories. However, there are official agreements with laboratories outside Oman to test microbes that need BSL-3 level facilities, and molecular techniques are available for the majority of dangerous pathogens.

A national framework documents, reports and investigates biosafety accidents at the facility and national levels. While a national inventory of pathogens has not been done, individual laboratories maintain their own lists of pathogens. A national medical waste management plan exists, managed by a specialized contracted company.

A national programme for training on biosafety, biosecurity and infectious sample transportation is in place. A national biosafety officer at the Central Public Health Laboratory conducts periodic training (including WHO biosafety training and the International Air Transport Association safe transportation of infectious substance) for all MoH and non-MoH laboratories. Trained biosafety officers are available in all health-care facilities at central and regional level with documented training. An academic curriculum has been proposed for biosafety and biosecurity. A draft National Laboratory Safety Manual is pending approval, and MoH and MOAF are adopting WHO and OIE guidelines. Licensing is applicable for private laboratories only.

Recommendations for priority actions

- Improve laboratory containment through BSL 3 facility containment to handle dangerous pathogens.

- Establish a biorisk management policy: develop a national comprehensive biosafety and biosecurity programme for human, animal and agriculture laboratories; and update the national inventory of laboratories and dangerous pathogens.

- Implement biorisk management regulation (pending approval of the Public Health Law).

Indicators and scores

P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal and agriculture facilities – Score 2

Strengths/best practices

- Molecular techniques are available for the majority of dangerous pathogens.

- Personal protective equipment and safety cabinets are available.

- Security measures to prevent unauthorized access to laboratories exist.

Areas that need strengthening/challenges

- There is a lack of BSL-3 facilities.

- A national inventory of pathogens does not exist, although individual laboratories maintain their own lists of pathogens.

- There is no national body or authority for licensing and accreditation of laboratories, and national biosafety and biosecurity legislation has not yet been finalized; licensing is only applicable for private laboratories.

- The national laboratory safety manual is yet to be approved.

P.6.2 Biosafety and biosecurity training and practices – Score 3

Strengths/best practices

- A national biosafety officer at the Central Public Health Laboratory conducts periodic training for all MoH and non-MoH laboratories.

- A national programme for training of biosafety, biosecurity and infectious sample transportation is in place, and an academic curriculum for biosafety and biosecurity has been proposed but does not yet exist.

- Trained biosafety officers are available in all health-care facilities, and several train-the-trainer workshops have been conducted.

Areas that need strengthening/challenges

- There is need for a common national curriculum of biosafety and biosecurity training.

Immunization

Introduction

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

Target

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

Oman level of capabilities

The Expanded Programme on Immunization (EPI) in Oman was established in 1981. The vaccination schedule has evolved based on the epidemiological situation and incidence of vaccine-preventable diseases. With the addition of vaccines for new high-risk groups such as immunocompromised patients and travellers, the name of the programme became the "Immunization Programme". Currently the Programme provides 13 antigens for children under 5 years of age, those of school-age, those in a high-risk population, including the Haj population.

The programme progressed from immunization coverage levels of 10% in 1981 to 95% in 1995, and above 99% since then. The programme uses existing antenatal care registers and birth notifications to develop vaccination registers that allow for active follow up and monitoring of childhood vaccinations. Each health centre monitors the birth cohort of the specified catchment area and actively assures provision of services to targeted children. Immunization services are available in MoH and non-MoH institutions free of charge as well as in private institutions. Private sector facilities are licensed against national standards to provide vaccination services. The private sector covers 10–15% of the total vaccinations provided.

The procurement process is arranged via the supplies and drug department of the MoH, and vaccines are stored centrally prior to distribution to regions. There is a distribution plan according to WHO standards and a notification system (emails and/or telephone calls) has been adopted to organize the process at all levels. An effective vaccine store management system in Oman was certified in 2003, and the country achieved the highest score (99%) in vaccines management assessment conducted by WHO (2016) for all criteria for all levels.

Recommendations for priority actions

- Strengthen monitoring of private sector involvement in immunization programme.
- Expand the adult immunization programme.
- Sustain high immunization coverage.

Indicators and scores

P.7.1 Vaccine coverage (measles) as part of national programme – Score 5

Strengths/best practices

- There are dedicated national and provincial EPI managers, and institutional focal points.

- The EPI programme is an independent unit, functionally linked to Communicable Diseases.

- An active register based defaulter tracing and management system exists.

- Innovative approaches reach/involve communities: health education strategies at community level maintain awareness of the importance of immunization through the life cycle (children and adults); a comprehensive, sustained communication strategy using contemporary technology, information and communication methods can maintain good coverage, correct misinformation and anticipate rumours.

Areas that need strengthening/challenges

- The expanded role of the private sector requires close supervision to assure quality and coverage.

- Foreign-born children, who are not included in EPI, might constitute a challenge to the system.

P.7.2 National vaccine access and delivery – Score 5

Strengths/best practices

- Oman was the first country in the Region to be certified by the WHO-United Nations Children's Fund Effective Vaccine Storage Management initiative in 2003.

- A vaccine management assessment confirmed a well-managed storage and supply system. Internationally, Oman has achieved the highest Effective Vaccine Management score (99%) for all criteria, at all levels, conducted in 2016.

- Functional procurement and vaccine forecasting result in no stock-outs.

Areas that need strengthening/challenges

- Vaccine supply to the private sector should be monitored and regulated.

DETECT

National laboratory system

Introduction

Public health laboratories provide essential services including disease and outbreak detection, emergency response, environmental monitoring, and disease surveillance. State and local public health laboratories can serve as a focal point for a national system through their core functions for human, veterinary and food safety. These include 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 biosurveillance with a national laboratory system and effective modern point-of-care and laboratory-based diagnostics.

Oman level of capabilities

The national health laboratory network in Oman is based on three levels. The primary health care laboratories in health centres and polyclinics offer basic and routine laboratory tests. The regional hospitals have more advanced diagnostic testing and regional public health laboratories do expatriate screening, antenatal screening and food poisoning investigations. Reference and confirmatory testing is done at the Central Public Health Laboratories (CPHL), along with most of the nucleic acid-based diagnostics. All these laboratories are linked via the laboratory information system (Al Shifa).

The MoAF has two central well-equipped laboratories (one for diagnostics and one for research), two regional laboratories as well as municipal laboratories. The Ministry of Commerce and Industry has a central laboratory as well as regional laboratories. There are also several private laboratories (Armed Forces Hospital, Sultan Qaboos University, Royal Oman Police, Diwan), and a university laboratory.

The national laboratory system of the health sector is capable of conducting all core tests of the priority diseases: polymerase chain reaction testing for influenza virus; virus culture for poliovirus; serology for HIV; microscopy for Mycobacterium tuberculosis; rapid diagnostic testing for Plasmodium spp.; bacterial culture for Salmonella enteritidis serotype Typhi. In addition, the health sector laboratory system has capability to carry out all important core tests except for Ebola virus. The veterinary sector also has laboratory capacity to carry out important core tests. In general, the laboratory infrastructure is very good. However, Oman does yet not have a BSL-3 laboratory, and the use of point-of-care diagnostics is limited. There are official agreements with laboratories outside Oman for testing not available in country.

A draft of the new Public Health Law and the communicable disease manual are available. There are national diagnostic algorithms for priority laboratory tests and a functional referral system. The National Laboratory Medicine Committee (NLMC) acts as national focal point for all health diagnostic laboratories in Oman. Its mandate is to ensure high quality services in different laboratories. Intersectoral communication between human and veterinary sectors is limited and occurs mainly through the Zoonotic Committee and verbal reporting between laboratories.

All laboratories have personal protective equipment and safety cabinets. A national biosafety officer at CPHL conducts periodic training for all MoH and non-MoH laboratories (WHO biosafety training and International Air Transport Association safe transportation of infectious substance). A National Laboratory Safety Manual is pending approval. Laboratory guidelines for specimen collection, handling and transportation are also available. Specimen transport is funded from the Government budget.

There is a mandatory licensing system for private laboratories only, although the National Laboratory Medicine Committee has a systematic clinical inspection of all MoH laboratories. While not mandatory, several laboratories have been accredited. The National Laboratory Medicine Committee ensures that all laboratories have internal and external quality assurance schemes (EQAS). CPHL provides these and also monitors quality performance. All national health laboratories and private laboratories are enrolled in EQAS.

Recommendations for priority actions

- Establish a national regulatory body for laboratory inspection, certification and accreditation.
- Establish a national laboratory quality assurance system.
- Ensure full participation of the veterinary sector in the national laboratory committee.
- Develop a veterinary laboratory strategy for control of prioritized zoonoses, food safety and antimicrobial resistance.

Indicators and scores

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

Strengths/best practices

- National SOPs for transport, handling, and testing are available.
- Good laboratory infrastructure exists, including reference laboratories.
- One electronic laboratory information system is connected to all health-care facilities.
- The National Laboratory Medicine Committee covers MoH laboratories.
- Training programmes are available in quality and safety.
- EQAS is in place in the majority of laboratories.
- Some laboratories are internationally accredited.

Areas that need strengthening/challenges

- There is a need for better integration of the human and veterinary sectors to ensure efficient and timely information exchange. This can be achieved several ways, such as full participation of the veterinary sector in the NLMC work.
- There is also a need to develop a veterinary laboratories strategy for control of prioritized zoonoses, food safety and antimicrobial resistance.
- A BSL-3 level laboratory should be established.

D.1.2 Specimen referral and transport system – Score 5

Strengths/best practices

- There is a system to transport specimens to (central) national laboratories from all primary and intermediate level laboratories within the country.
- Laboratory guidelines for specimen collection, handling and transportation exist. Specimen transport is funded from the government budget.

- Official agreements with laboratories outside Oman cover testing that is not available in the country.

Areas that need strengthening/challenges

- It is not completely sure whether the transport system is fully operational, also in the veterinary sector.

D.1.3 Effective modern point-of-care and laboratory-based diagnostics – Score 4

Strengths/best practices

- There is a national system of sample referral and confirmatory diagnostics culminating in performance of modern molecular or serological techniques at national and/or regional laboratories.

Areas that need strengthening/challenges

- The use of point-of-care diagnostics is limited.

D.1.4 Laboratory quality system – Score 2

Strengths/best practices

- NLMC ensures that all laboratories have internal and external quality control programmes.

- CPHL provides EQAS and also monitors quality performance.

- All national health laboratories and private laboratories are enrolled in EQAS.

- Training programmes are available in quality and safety.

Areas that need strengthening/challenges

- The main limitation is that mandatory licensing exists only for private laboratories.

- Full participation of veterinary laboratories in EQAS should be ensured.

- National quality standards have been developed but there is no system for verifying their implementation.

DETECT

Real-time surveillance

Introduction

The purpose of real-time surveillance is to advance the safety, security and resilience of the nation by leading an integrated biosurveillance 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 subnational, national and international levels of authority regarding surveillance of such events; and improved country and regional capacity to analyse and link data from and between strengthened, real-time surveillance systems, incorporating interoperable, interconnected electronic reporting systems. Epidemiologic, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; and advancement in fulfilling the core capacity requirements for surveillance in accordance with IHR and OIE standards.

Oman level of capabilities

The formal communicable disease surveillance and control programme was launched in March 1991. The Law of Prevention and Control of Communicable Diseases was issued by Royal Decree No. 73/92, which regulates the surveillance and control of communicable diseases and specifies the role of the concerned health organizations in implementing measures and procedures required to protect the community from communicable diseases. Reporting on notifiable diseases as defined by this Royal Decree is received from MoH, non-MoH and private facilities. The e-notification system covers 60% of MoH facilities, while reporting is manual from non-MoH facilities and private institutions. Plans are in place to expand e-notification to cover these facilities.

The communicable disease manual provides case definitions and standards for prevention and control of notifiable diseases. Frequent updates on the notification list and SOPs are developed and communicated to cater for emerging diseases and threats.

Collected data are analysed regionally and centrally for early detection of possible outbreaks. The human and animal health sectors share data according to SOPs that define focal points and roles and responsibilities.

Recommendations for priority actions

- Sustain and expand the e-surveillance system for diseases including real-time notification, web-based data sharing systems and protocols.

- Strengthen intersectoral communications to support and enable real-time data sharing, especially among human and veterinary health sectors.

- Ensure sustainability of the disease surveillance system and its quality improvement.

- Strengthen a systematic documented process for periodic analytical reports, risk assessment and forecasting.

Indicators and scores

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

Strengths/best practices

- A system is in place for timely detection of events that constitute a public health risk; the system provides standardized data to WHO.

- Indicator- and event-based surveillance exists in the Sultanate at all levels.

- The indicator-based system was formally launched in 1991 with the establishment of the communicable disease programme.

- Data flows from peripheral (health institution level) to governorate levels, then to national headquarters.

- Data validation and analysis are conducted at governorate and national levels.

Areas that need strengthening/challenges

- The frequent change in workers in health-care institutions is a challenge to surveillance reporting.

- There is a lack of local training facilities for field level public health staff.

D.2.2 Interoperable, interconnected, electronic real-time reporting system – Score 3

Strengths/best practices

- Oman has in place an interoperable, interconnected, electronic reporting system for public health.

- The e-notification system is linked to medical records.

- A web-based system enables future scope of linkages with all non-MoH sectors.

- SOPs ensure baseline quality in surveillance process.

- Feedback systems are operational.

Areas that need strengthening/challenges

- Intersectoral real-time communication and sharing of data between human and animal health sectors are limited.

- The veterinary surveillance system is less developed and not yet able to share data in real time.

D.2.3 Analysis of surveillance data – Score 4

Strengths/best practices

- Systematic weekly, monthly and annual reporting is in place.

- Functions are attributed to experts for analysing, assessing and reporting.

- A dedicated, qualified team in each province and centrally carries out data analysis and risk assessment against SOPs.

- Data are shared with other stakeholders through a regular Communicable Diseases bulletin.

Areas that need strengthening/challenges

- Challenges exist in sustaining trained human resources, especially analytical capacity.

- A local training facility for field-level public health staff is lacking.

D.2.4 Syndromic surveillance systems – Score 5

Strengths/best practices

- All MoH, non-MoH and private establishments participate in the surveillance system, which monitors acute flaccid paralysis, fever and rash illnesses, congenital rubella syndrome, acute haemorrhagic fever syndrome, coronavirus respiratory syndromes, and food poisoning.

- Data and specific outbreak reports are shared for public health decision-makers and other stakeholders.

- Oman has demonstrated sustained efforts to help other GCC countries to develop their surveillance systems.

Areas that need strengthening/challenges

- None were identified for this subindicator.

Reporting

Introduction

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

Target

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

Oman level of capabilities

Oman has a designated IHR NFP located within the office of the Director General for Disease Surveillance and Control under the MoH, which is fully operational. In addition, the country has designated focal points for FAO, OIE, WHO International Food Safety Authorities Network, and the International Atomic Energy Agency. The functional National Zoonotic Committee established in the 1990s includes representation from the ministries of Health, Agriculture and Fisheries, Environment and Climate Affairs, and the Diwan of Royal Court, which covers wildlife. In addition, an IHR multisectoral committee, established by ministerial decree, serves as another platform for information exchange.

There is a network of IHR responsible contact points within each ministry, and the decision-making instrument provided in Annex 2 is used to assess public health events. Despite efficient communication in practice, the reporting channels have not been institutionalized among different stakeholders by official SOPs. However, within the new Public Health Law, international reporting requirements under IHR are addressed for all sectors and effectively channelled through the MoH.

Oman has demonstrated experience in identifying and reporting on potential PHEICs through an actual event concerning MERS-CoV cases in the human population, as well as surveys in camel populations. Communications with WHO are regular and timely regarding both verification and consultation functions under the IHR.

In relation to multilateral regional and international or bilateral neighbouring country reporting requirements, Oman is party to the GCC Early Warning System.

Recommendations for priority actions

- Conduct systematic simulation/table-top exercises to ensure the reporting function among different national IHR stakeholders for any potential PHEIC.

Indicators and scores

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

Strengths/best practices

- The IHR NFP is defined and operational, and has used IHR channels both regionally and globally for information exchange and notification regarding suspected events. Regular and timely communication exists for verification requests, and the NFP takes advantage of the consultation mechanism with WHO.

- Focal points for FAO, OIE and International Atomic Energy Agency are also available with established terms of reference and well-practised communication.

- Active and regular communication among national sectors exists under the IHR committee.

- Participation in joint training activities includes the WHO workshop on CCHF, and a National Outbreak Management workshop.

- There is a mechanism for alerting the health sector through a regular emergency response system: ability has been demonstrated to identify a potential PHEIC and file a report within 24 hours based on a real event, and a multisectoral process is in place for assessing potential events.

- The multisectoral National Zoonotic Committee is well established and active, for example for arranging the joint risk assessment for Rift Valley fever.

Areas that need strengthening/challenges

- There is no formal roster of duty officers, but as senior officers are required to be reachable 24/7 their contact information is disseminated.

- Institutionalizing reporting pathways and mechanisms among sectors should be addressed and operationalized with SOPs under the new Public Health Law.

D.3.2 Reporting network and protocols in country – Score 5

Strengths/best practices

- Multisectoral coordination is in place to respond to potential and real PHEICs, including at PoE, and information exchange occurs regularly among the network of sectors at the national level.

- A protocol is in place for approving and reporting on a potential PHEIC to WHO.

- Direct communication and linkages exist between the MoH with PoE.

- Oman has demonstrated timely reporting of potential PHEIC to WHO and OIE based on a zoonosis.

Areas that need strengthening/challenges

- Institutionalizing reporting pathways and mechanisms among sectors should be addressed and operationalized with SOPs under the new Public Health Law to maintain and further improve capacity.

- Oman has not experienced a reportable public health event of chemical or radiation origin; hence timely reporting of such events to WHO through the IHR NFP has not been tested.

Workforce development

Introduction

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

Target

State Parties to 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). Workforce to include physicians, veterinarians, biostatisticians, laboratory scientists, farming/ livestock professionals, with an optimal target of one trained field epidemiologist (or equivalent) per 200 000 population, who can systematically cooperate to meet relevant IHR and Performance of Veterinary Services core competencies.

Oman level of capabilities

There is a strong commitment to ensure that the country meets its health-related targets with the required number of skilled public health workers. Public health capacities, including clinicians, veterinarians, social scientists and others exist at all levels of the country (national, governorate and local levels). However, epidemiologists are only available at the national and intermediate level.

The country has a multidisciplinary rapid response team at national and at each governorate level.

Oman does not have a Field Epidemiology Training Programme. While in the past, selected nationals were sent abroad through scholarships for field epidemiology training; the programme was interrupted two years ago due to the current financial crisis affecting the country. The Omani team confirmed that coordination and communication mechanisms such as regular meetings, phone calls and WhatsApp groups facilitated the exchange of information between epidemiologists at the national and intermediate levels. SoPs were not provided.

Oman had developed a comprehensive health workforce strategy although the country does not have a workforce strategy addressing the public health sector. This was pointed out as key to maintaining a well-trained and well-prepared workforce in the areas of health security and emergencies. The public health workforce strategy should be supported by a well-defined career development structure addressing the lack of incentives to maintain the current workforce and the seemingly high turnover of staff in the sector.

Recommendations for priority actions

- Develop and implement a comprehensive public health workforce strategy with special emphasis on the design of career paths for public health professionals.

- Address, through this strategy, common issues related to workforce development including: attracting competent nationals to the field of public health, providing for sustainable education through pre- and in-service training, maintaining and motivating the workforce, and establishing a talent-development initiative and policies for retention.

- Take into account areas where multisectoral collaboration with other sectors is essential, including One Health and PoE.

DETECT

- Adopt a two-pronged strategy to sustain and maintain the needs of the existing public health workforce:
  - In the short term, Oman should formalize agreements with other countries to ensure the regular training of nationals in critical public health areas, including in FETP;
  - In the long term, establish a public health institution that will provide for a sustainable approach to public health workforce development.

Indicators and scores

D.4.1 Human resources are available to implement IHR core capacity requirements – Score 3

Strengths/best practices

- Oman has a multidisciplinary human resource capacity (public and animal health, PoE) available at the national and governorate (intermediate) levels.
- A health workforce strategy applies to clinical areas and domains.
- In-service training is organized on a variety of technical topics and diseases.

Areas that need strengthening/challenges

- Qualified public health workers tend to gravitate towards administrative tasks.
- The availability of epidemiologists should be ensured at the local level.

D.4.2 Field epidemiology training programme or other applied epidemiology training programme in place – Score 2

No FETP or applied epidemiology training programme is established in Oman. Staff used to participate in programmes hosted in other countries; however this practice was discontinued in the last two years, partly due to financial constraints.

Strengths/best practices

- Selected individuals have participated in an FETP through GCC agreements.

Areas that need strengthening/challenges

- Incentives are limited for Omani public health workers to undertake an FETP.

D.4.3 Workforce strategy – Score 2

Strengths/best practices

- Oman has a 2050 vision for its health workforce and a health-care workforce strategy, albeit focused on clinical areas.

Areas that need strengthening/challenges

- Provisions should be made to include public health workforce development in the 2050 health workforce vision.
- Oman should partner with public health schools and institutes in the GCC and beyond, with a view to:
  - support the regular training of Omani professionals in a variety of areas, including epidemiology;
  - design, develop and deliver short courses in specialized areas of relevance to the Omani workforce across all sectors with responsibilities in the implementation of the IHR, including all-hazards preparedness and response.
- Plan for the launch of a Public Health Institute (within the Schools of Medicine) at national level.

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.

Oman level of capabilities

Oman has reached a high level of preparedness and has implemented appropriate plans, systems and procedures to maintain a good level of readiness nationwide. In 1988, a National Emergency Committee was established to oversee emergency preparedness and response activities. The MoH, represented by the sector for Medicinal Response and Public Health, acts as sector lead for health within the Committee. A National Strategic Framework for the Management of Emergencies is being implemented to encompass an all-of-government approach to selected emergencies, which currently includes natural hazards, chemical, biological and radionuclear (CBRN) threats, and manmade incidents. A Public Health Emergency Preparedness and Response Plan has been finalized and is expected to be integrated into policy in the near future. The new plan incorporates an all-hazard approach and One Health concepts.

Separately, subnational level plans (at governorate level) have been developed with SOPs to respond to emergencies. Strategic stocks and stockpiles for medicine, food and non-food items exist and are being managed by a number of governmental and non-governmental authorities. An initial situational analysis has been carried out to assess the preparedness and response of health facilities to specific threats (e.g. CBRN) and identify resource gaps.

Recommendations for priority actions

- Finalize and implement the all-hazard Public Health Emergency Preparedness and Response Plan.

- Conduct comprehensive national risk mapping for major public health hazards, including geographical risk areas and available and needed resources.

- Strengthen coordination mechanisms between relevant stakeholders, clarify their roles and responsibilities, and share protocols and scenarios for various types of public health emergencies.

Indicators and scores

R.1.1 Multi-hazard national public health emergency preparedness and response plan is developed and implemented – Score 4

Strengths/best practices

- A strategy is in place to reallocate or mobilize resources from national and intermediate levels to support action at local response level, including capacity to scale up the level of response.

- A National Strategic Framework for the Management of Emergencies is implemented and tested, which allows MoH and relevant health departments to effectively plan, prepare for, and respond to emergencies.

- The draft National Public Health Emergency Preparedness and Response Plan with a multi-hazard approach is available (to be adopted and implemented).

- A plan to deal with zoonotic diseases is implemented and tested.

Areas that need strengthening/challenges

- A written surge capacity plan should be developed to respond to public health emergencies of national and international concern.

- A national strategic plan is needed to mobilize resources to support actions at local level.

R.1.2 Priority public health risks and resources are mapped and utilized – Score 3

Strengths/best practices

- National resources have been mapped for IHR-relevant hazards and priority risks, and a plan to manage, distribute, and regularly review national stockpiles is in place.

- An assessment of preparedness and response of health-care facilities to CBRN risks was done in order to address resource and training gaps.

- Resource mapping for hazardous materials incidents has been completed.

Areas that need strengthening/challenges

- A regular mechanism needs to be established for major priority risks in the country.

- A national risk assessment should be conducted with national mapping of hazards.

- Resource mapping and stockpiling of essential medicines/antidotes and supplies should be established.

- A regular mechanism should allow for budget allocations to the relevant authorities and departments.

Relevant documentation

1. National strategic framework for the management of emergencies.

2. Strategic framework for medical and public health response sector.

3. Emergency plan for zoonotic diseases.

4. Mapping of radioactive sources and major chemical resources.

5. Management of hazardous materials plan (chemical, radioactive and biological).

Emergency response operations

Introduction

A public health emergency operations centre is a central location that coordinates 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 with capacity for: a public health emergency operations centre functioning according to minimum common standards; maintaining trained, functioning, multisectoral rapid response teams; real-time biosurveillance laboratory networks; information systems; and trained emergency operations centre staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency.

Oman level of capabilities

Oman has a well-developed emergency response operation structure and facility at national and subnational level apt for proper activation, coordination and continuity of operations in case of an emergency. Systems and procedures have been developed and key staff trained for their implementation. Adequate resources have been allocated and capability is tested on a regular basis to ensure proper functioning. Regular training opportunities are also offered for staff directly and indirectly involved with the EOC operations.

Recommendations for priority actions

- Finalize and implement all-hazard Public Health Emergency Preparedness and Response Plan.
- Develop specific plans and procedures for main potential risks and hazards, with a focus on incidents and case management guidelines; and early warning systems that define alert levels for main potential risks.
- Ensure sustainability of human resource capacities to manage IHR-related hazards.

Indicators and scores

R.2.1 Capacity to activate emergency operations – Score 5

Strengths/best practices
- The country has a well-established EOC at central and governorates levels.
- Staff are trained in emergency management and PHEIC SOPs and can activate a response within two hours to ensure a coordinated, rapid and effective response.
- Training opportunities for EOC personnel are offered at least twice a year to test EOC activation.

Areas that need strengthening/challenges
- Effective procedures are needed to trigger EOC activation for all types of public health emergencies.

RESPOND

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

Strengths/best practices

- EOC plans are in place for epidemiology, medical expertise, public communications and partner liaison, concept of operations, and data collection and reporting.

- EOC response plans, available and implemented at national and governorate levels, detail the key structural and operational procedures required to manage emergencies at respective levels.

- Incident Command is in place for effective decision-making and proper communication during an event.

Areas that need strengthening/challenges

- Plans for the management of CBRN events need to be finalized.

- EOC functions to ensure rapid response to public health emergencies need to be reinforced.

R.2.3 Emergency operations programme – Score 5

Strengths/best practices

- Multiple functional exercises are conducted to test systems and operational capabilities.

- The EOC has been triggered and activated several times in the past two years.

- Trained personnel are capable of activating the system independently, and training opportunities for disaster management have been offered.

Areas that need strengthening/challenges

- Resource allocation should be ensured for training activities.

R.2.4 Case management procedures are implemented for IHR-relevant hazards – Score 4

Strengths/best practices

- Case management, patient referral and transportation, and management and transport of potentially infectious patients are implemented according to guidelines and/or SOPs.

- Appropriate staff and resources (defined by the country) are in place to manage IHR-related emergencies.

- Communicable disease management manual includes several case management guidelines.

- A separate management guideline for poisoning and zoonotic diseases is available.

- SOPs for the management and transport of potentially infectious patients at PoEs are in place.

Areas that need strengthening/challenges

- Case management guidelines should be developed for priority risks other than epidemics, in the country.

- Limited capacity exists in health facilities for the case management of specific public health hazards.

Linking public health and security authorities

Introduction

Public health emergencies pose special challenges for law enforcement, whether the threat is man-made (e.g. an anthrax terrorist attack) or naturally occurring (e.g. a flu pandemic). In a public health emergency, law enforcement will need to quickly coordinate its response with public health and medical officials.

Target

In the case of a biological 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, such as to investigate alleged use events.

Oman level of capabilities

The National Civil Committee of Defence (NCCD) is the coordinating entity in the Sultanate of Oman responsible for the management of emergencies and disasters, covering the central, governorate, and local levels. Created in 1988 in response to the national challenges in managing major natural disasters, the Committee's mandate has been expanded and matured over the years to incorporate all relevant national stakeholders.

Headed by the Inspector General of the Royal Oman Police, the NCCD structure is composed of 21 Deputy Ministers across diverse sectors. The group meets ad hoc 1–2 times a year during peacetime, yet once convened via established triggers, the senior group holds frequent meetings and utilizes a defined Incident Command Structure, all of which is outlined in defined terms of reference. The NCCD's activities are divided into eight subdivisions, of which the MoH is part of the Medical Response and Public Health Sector. These eight groups comprise technical expertise across sectors; therefore MoH officials and health expertise are represented within other relevant divisions. In addition, the NCCD structure is flexible in design to further incorporate and prioritize sectors as needed given the specific nature of the emergency.

The Medical Response and Public Health Sector is guided by a National Strategic Framework identifying the roles and responsibilities of sectors; this plan allows for cross-collaboration, information exchange, and resource allocation among the public health and security sectors in Oman. Under this framework, the sector can procure resources from MoH, civil services, Royal Oman Police and Army, such as ambulances or specialized transport for medical evacuation. In addition, drill exercises and trainings are jointly conducted among these sectors.

At the regional level, governorate NCCDs parallel the national structure. The 11 governorate NCCDs can readily receive support from the national level if needed.

Recommendations for priority actions

* Finalize and implement the all-hazard Public Health Emergency Preparedness and Response Plan.

* Provide training for both public health and security personnel, especially at the governorate level.

* Conduct regular simulation exercises/drills to test the plans and ensure compliance with emergency procedures.

RESPOND

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 5

Strengths/best practices

- The NCCD is the nationally mandated structure coordinating the response to major public health events, strong coordination and information sharing occurs at a senior level. In addition, protocols exist between the public health and security sectors and have been formally used.

- The NCCD allows all relevant sectors and stakeholders to work as one entity in the management and response to emergencies.

- The National Strategic Framework is implemented within the Medical and Public Health Response division, thus ensuring collaboration between the public health and security authorities.

- Mechanisms for information exchange exist between stakeholders, including direct means, regular meetings and reporting.

- Communication is well coordinated – there is one spokesperson for each agency and Media is one of the eight subdivisions in the NCCD. The head of the NCCD is the paramount communicator.

- Drills and simulation exercises are conducted to test available plans that are updated accordingly.

- Multisectoral risk assessment is performed in the event of an unknown hazard/health threat, and SOPs exist for joint risk assessment.

Areas that need strengthening/challenges

- While SOPs have been developed to coordinate actions between stakeholders during an emergency event, additional SOPs should clarify the roles and responsibilities of stakeholders to avoid conflict/duplication of activities during a crisis.

- The National Public Health Emergency Preparedness and Response Plan should improve overall coordination.

- Regular training for public health personnel is needed, as currently this is only consistent for personnel within the security sector. Furthermore, joint trainings among both the sectors should be held more regularly.

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.

Oman level of capabilities

The NCCD is the body with primary responsibility for the management of emergencies in the country, through which all stakeholders work together in case of an event constituting an emergency. Other stakeholders include the MoH, the Ministry of Defence Medical Services, the Public Authority for Civil Defence, and the Oman Charitable Organization, which was formed by a Royal Decree in January 1996. One of its objectives is to provide emergency assistance (relief) to those affected inside or outside the country – whether individuals or institutions – from disasters, fires or accidents. Oman is a member of the Global Outbreak Alert and Response Network (GOARN) but has not actively provided experts through this mechanism. The country participates in INSERA – the international agreement for sending search and rescue services.

The country does not have a national written plan for sending or receiving MCM, but functioning elements are in place that outline procedures for sending medical personnel among international partners during public health emergencies. An SOP has been drafted for unified collaborative procedures for certain hazards (e.g. CBRN) within the limit of GCC countries. Oman has demonstrated sending medical personnel and search and rescue teams several times internationally (to the Islamic Republic of Pakistan, Republic of Haiti and Federal Republic of Somalia, and the Federal Democratic Republic of Nepal, respectively). Oman also has experience in deploying MCM during Hajj time, and has sent MCM for malaria to Yemen, and personal protective equipment to affected countries during the 2014–2015 West Africa Ebola epidemic.

In the case that a request for international assistance in the form of receiving MCM or personnel is necessary, consideration must be given to questions of licensing of both medications and personnel. The procedure is that the decisions are taken by the Royal Office based on advice given by the MoH. The team was informed that necessary procedures exist but are not in the public domain. Oman has never activated the system for receiving international assistance, but has received consultants from the WHO Regional Office for the Eastern Mediterranean to assess the situation of measles outbreaks close to the Yemeni border in the past.

Oman has some ability to produce antibiotics and other laboratory supplies nationally. The MoH maintains medical stockpiles, but there are some deficiencies in maintaining antidotes and medical equipment, mainly due to supplier challenges.

RESPOND

Recommendations for priority actions

- Finalize the public health emergency preparedness and response plan with consideration to procedures for MCM.

- Develop protocol/guidance/procedures for active participation in the Global Outbreak Alert and Response Network.

- Ensure dissemination to key officials/stakeholders of protocols concerning personnel deployment to respond to public health events in other countries.

Indicators and scores

R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency –Score 5

Strengths/best practices

- Functional elements exist for sending MCM internationally and within the GCC network.

- Agreement exists for countermeasure procurement within the limit of GCC countries.

- The country has demonstrated the ability to produce some medications and medical supplies.

Areas that need strengthening/challenges

- There is a need to develop SOPs that outline clearly the procurement of MCM.

- No national plan for sending or receiving MCM is in place.

- No frequent collaborative simulation exercises have been conducted on sending and receiving MCM.

R.4.2 System is in place for sending and receiving health personnel during a public health emergency – Score 5

Strengths/best practices

- Medical personnel have been sent to support other countries in multiple instances.

Areas that need strengthening/challenges

- There is a need to develop SOPs that outline clearly and improve sending and receiving personnel abroad.

Risk communication

Introduction

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

Communications of this kind promote appropriate prevention and control action through community-based interventions at individual, family and community levels. Disseminating information through appropriate channels is essential. Communication partners and stakeholders in the country need to be identified, and functional coordination and communication mechanisms established. In addition, the timely release of information and transparency in decision-making are essential for building trust between authorities, populations and partners. Emergency communication plans should be tested and updated as needed.

Target

State Parties to have a risk communication capacity, which includes multilevel and multifaceted 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 make informed decisions to mitigate the effects of a threat or hazard). This capacity consists of a mix of communication and engagement strategies, such as through media and social media, mass awareness campaigns, health promotion, social mobilization, and stakeholder and community engagement.

Oman level of capabilities

Oman has shown a proactive approach and very good capacity in risk communication. The designated area in MoH is Health Education in coordination with Public Relations and Communication. The country has a health emergency operation framework, and risks communication is present; nevertheless risk communication should be included in the all-hazards public health preparedness and response plan as well as in plans at governorate level. Capacity-building for MoH officials and communicators is suggested to reinforce this area.

There is an assigned budget line for communications personnel, materials and activities for emergencies, as well as an allocated annual budget for Health Education and Awareness programmes.

The country has good experience in work with communities and in tracking and responding to rumours. Some further work is needed to conduct knowledge, attitude and practice studies to understand better the needs of different target groups, and to reorient communication to ensure that it is effective and engages the population in the case of a health emergency.

In addition, efforts are needed to assure good coordination of communication and a functioning feedback loop between partners of the National Emergency Management Centre and to develop an algorithm for joint work.

RESPOND

Recommendations for priority actions

- Ensure inclusion of a risk communication component in all preparedness plans at national and governorate levels: National All-hazard Public Health Emergency Preparedness and Response Plan; governorate plans; hospital plans for emergency situations; related non-profit organizations.

- Organize risk communication training for MoH officials and risk communication teams to build capacities at the national level, and to train the trainers that will replicate the knowledge at the governorate level.

- Recruit more staff members in the IHR committee.

- Develop a plan/protocol/policy for communication and crises in all domains with clear roles and responsibilities (response emergency committee).

- Establish a National Intersectoral Risk Communication Committee for Health Emergencies under NCCD to focus, in particular on: ensuring joint exercises and drills, including revised and tested emergency plans and shared evaluation results; exchanging IHR information, communication and coordination requirements; activating the technical team at MoH to implement follow-up of IHR requirements in other sectors; and updating rumour notification certificates.

Indicators and scores

R.5.1 Risk communication systems (plans, mechanisms, etc.) – Score 4

Strengths/best practices

- The MoH understands the importance of the risk communication strategy for adequate response and preparedness.

- The health education and awareness programmes area is well organized and has mechanisms to put in place effective risk communication response when necessary.

- There is dedicated staff and financial resources for this area.

- Risk communication is a part of the health emergency operation framework.

Areas that need strengthening/challenges

- There is no specific risk communication plan or strategy although this is part of the framework for health emergency response; risk communication should be a component in the new National All-Hazards Public Health Plan for Preparedness and Response.

- Although there have been some trainings, mostly on how to work with the media, capacity-building in risk communication would be of great benefit to reinforce the work of the Health Education and Public Information area and to empower staff with knowledge and skills.

R.5.2 Internal and partner communication and coordination – Score 4

Strengths/best practices

- There are shared communication plans, agreements and/or SOPs between response agencies such as public safety, law enforcement, hospitals, emergency response, and/or government agencies such as ministries of defence, agriculture and others.

- There is a function for risk communication in the National Emergency Management Centre (the response plan), which includes all sectors in the Sultanate depending on the crisis.

- The appointed IHR NFP coordinates with other sectors and international organizations.

- Some formal and informal mechanisms enable coordinated communication between stakeholders and partners, as well as the overall health sector.

Areas that need strengthening/challenges

- Flow charts should be updated for information exchange and communication between the stakeholders participating in NCCD, with a list of contact persons from all sectors for better communication and coordination.

- Partner and stakeholder engagement needs to be strengthened, including among health-care workers, civil society organizations, private sector and other non-state actors.

- Risk communication training should be organized for representatives of the other seven areas of the National Emergency Management Centre.

- Media partners should be mapped for adequate communication strategy.

R.5.3 Public communication – Score 5

Strengths/best practices

- The Health Education and Awareness programmes develop messages and materials for communication with a wide general public and different target audiences. This relies on the continuous engagement of the public and different media to reach large numbers of persons and communities and to achieve comprehensive geographical coverage, in relevant languages. Different media channels used include social media and new technologies like SMS.

- There is a good relation with mass media (TV, radio, newspapers, etc.).

- MoH has a designated spokesperson.

Areas that need strengthening/challenges

- Periodic knowledge, attitude and practice studies and other rapid assessment methods are suggested to evaluate the effectiveness of messages and investigate any change in behaviour during a health emergency.

- Some public communication products like websites and social media should be constantly evaluated and adapted for more effective communication impact.

R.5.4 Communication engagement with affected communities – Score 4

Strengths/best practices

- There are a number of community engagement activities at different levels, and a fully operational area of health promotion and education in central and governorates, which coordinates the activities of social engagement throughout the country.

- There is an ongoing and functional feedback loop between vulnerable populations and response agencies.

Areas that need strengthening/challenges

- Social mobilization and engagement strategies should be included in all national emergencies response plans.

- There is a need to conduct community assessments, message testing, and testing of emergency plans through stimulation exercise for better orientation of communication and education strategies for health emergencies.

- Guidelines to scale up community engagement during emergencies should be developed and tested.

- Work with local leaders should be fortified, with more defined social mobilization strategies.

R.5.5 Dynamic listening and rumour management – Score 5

Strengths/best practices

- The management of risk communication is effective and the public trusts the MoH advice and recommendations.

- A system tracks and monitors rumours and misinformation from the public from different sources.

- A coordination mechanism exists among all concerned through periodic meetings.

- An MoH hotline for questions and answers (Q&A) for health matters, especially during emergencies.

- Rumours are evaluated weekly with communication and technical experts, based on which it is decided whether and how to respond.

Areas that need strengthening/challenges

- Continuous efforts should focus on information transparency, especially through social media.

- Coordinated responses to rumours and to correct misinformation (when necessary) should be formalized between different partners and stakeholders.

- Periodic meetings and trainings for the media on health-related issues would help to develop an alliance for better public health information dissemination.

- The rumour notification certificate needs to be updated.

OTHER IHR-RELATED HAZARDS AND POINTS OF ENTRY

Points of entry

Introduction

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

Target

States Parties to designate and maintain core capacities at 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.

Oman level of capabilities

Oman is located in south-west Asia on the Arabian Peninsula. It shares borders with the United Arab Emirates, Saudi Arabia, and Yemen. The coast is formed by the Arabian Sea in the south and east, and the Gulf of Oman in the north-east.

Since the recent decentralization of the Omani MoH, the direct management of points of entry (PoEs) has moved from the Department of Communicable Disease Surveillance and Control at central level to the Directorate General of Health Services at the governorate level.

Oman has three designated seaports, one airport and one ground crossing. The Public Authority for Civil Aviation regulates the airports, which are operated and managed by Oman Airport Management Company.

Regarding the ports, the regulation falls under the Oman Logistics Centre board at the Ministry of Transport and Communication while operating and management is performed under concessions or joint ventures between the Government and international private companies. This is exemplified in Sohar Port and Freezone, which is managed by Sohar Industrial Port Company, a joint venture between the Port of Rotterdam and Oman.

The governorate Division of Communicable Diseases, through its public health inspectors, is the competent authority, which is a full member of the facilitation committee as well as of the EOC at points of entry.

Recommendations for priority actions

- Review and update the Public Health Emergency Contingency Plan at PoE to be incorporated within the emergency plans of the designated airport, ground crossing and ports.

- Conduct regular simulation exercises/drills to ensure compliance with emergency procedures as well as coordination with other relevant stakeholders.

- Strengthen the regulatory function of the competent authority in terms of monitoring, supervision and data collection to ensure a safe environment.

- Establish a public health clinic at the new Muscat International Airport, endowed with the necessary capacities to provide health-care services and to carry out epidemiological activities.

Indicators and scores

PoE.1 Routine capacities are established at points of entry – Score 5

Strengths/best practices

- The affiliation of PoE to the governorate level allows optimal allocation of resources.

- PoEs are well connected to the national surveillance system, granting regular transmission of data through pre-designated forms. In particular, the e-notification system transfers data related to PoE from governorate level to the Directorate General for Diseases Surveillance and Control at ministry level.

- The GCC PoE guidelines formalize joint designations of adjacent ground crossings in compliance with IHR.

- Ambulances are provided by the ports and airport operators, and the Emergency Medical Services.

- Access to the system "Bayan" allows the competent authority to be informed about the nature of imported goods, especially food products, in conformity with IHR regulations.

- A procedure grants access for coffins containing human remains after flight arrivals.

- The three designated seaports are authorized to issue the three types of Ship Sanitation Certificates.

Areas that need strengthening/challenges

- The level of collaboration between the competent authority and the medical services run by the ports and airport operators is uneven. While it is excellent at Muscat airport, it is suboptimal at ports and ground crossings.

- Activities related to the monitoring of food safety, potable water, and solid and liquid waste are scattered between the operators of ports and airports on the one hand, and the Ministry of Regional Municipalities, Environment and Water Resources on the other. The assumed regulatory role of the competent authority in terms of implementation of national guidelines, supervision and data collection, needs to be strengthened.

- Regarding vector control, there is a dichotomy between the capacities at the central level (Department of Malaria) and within subcontractor companies and the need to put in place an emergency plan and sustainable routine surveillance with entomological follow-up at PoEs.

- The control of disinsection carried out on board aircraft, and the check of the health component of the Aircraft General Declaration, especially for incoming flights from endemic countries, needs to be enhanced.

PoE.2 Effective public health response at points of entry – Score 5

Strengths/best practices

- The national aviation public health emergency plan has been approved by the national Civil Aviation Authority with the adoption of a multi-hazard rather than a communicable disease approach. This emergency plan is being adapted for implementation in all airports.

- SOPs are available to report acute public health events to the designated governorate focal point.

- Within GCC guidelines, SOPs exist with respect to public health emergencies at PoE.

- Appropriate onsite spaces are available to interview and assess suspected or affected travellers.

- Adequate isolation rooms are available at the designated PoE.

- Standardized referral forms exist in case of referral from the PoE to public health-care facilities.

- Publications have been issued on responsiveness evaluation of the PoE in case of a public health event.

Areas that need strengthening/challenges

- The "Code 11 (Mass Illness Onboard)" section within Muscat Airport Emergency Plan should be reviewed and updated in order to make it compatible with the national aviation public health emergency plan.

- Similar to those developed for airports, public health emergency plans need to be designed and integrated within the port emergency plans.

- Regular exercises (full-scale, partial or tabletop) should be conducted related to public health threats at PoE. Joint exercises between port and airport operators would be beneficial.

- Air traffic controllers should be made aware of the International Civil Aviation Doc 4444 – PANS-ATM (Procedures for Navigation Services – Air Traffic Management) procedure on communication between the controller and the pilot in command in the event of suspected case on board.

- Oman could consider requesting the WHO certification of points of entry.

- There is a shortage of appropriate personal protective equipment and thermal devices.

- Extra training is need on infection control techniques.

OTHER

Chemical events

Introduction

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

Target

State Parties to have surveillance and response capacity for chemical risks or events, with effective communication and collaboration among the sectors responsible for chemical safety, industries, transportation and safe disposal.

Oman level of capabilities

The legislative infrastructure is largely in place for the response to events of chemical origin, while legislation concerning chemical products is being developed. Pesticides and pharmaceuticals have specific regulations. There is adequate legislation for the control of toxic chemical waste, but technical capacity for sound management is weak. Oman has ratified the Basel, Rotterdam and Stockholm conventions, as well as the Paris Convention on chemical weapons, and is progressing towards ratification of the Minamata Convention on Mercury. The Amendment to the Basel Convention has been ratified and incorporated into legislation on toxic waste. The International Labour Office conventions 170 and 174 are not in force. Guides and procedures for sound chemical management have been elaborated and partially implemented. There is good access to international databases (e.g. INTOX, INCHEM, POISINDEX®, TOXBASE, TOXINZTM). Environmental monitoring of air and water is in place, with partial surveillance for other media.

An interministerial committee dealing with polychlorinated biphenyl and other specific chemicals is functioning, with the potential to expand its competence. A national plan to implement the Stockholm Convention on Persistent Organic Pollutants is also being put in place.

Coordination with other IHR sectors is in place, while mechanisms for consultation among stakeholders on chemical events, and communication of chemical risks, need strengthening since there remains a general lack of awareness of these risks and events. There is also poor appreciation of how to respond to a chemical emergency at decision-maker level in the regions. Further training of human resources in risk communication is thus desirable. Good laboratory capacity and SOPs exist for identifying chemical risks at the national level, but remain weak at the peripheral level.

A national centre for toxico- and pharmacovigilance provides an important component for 24/7 identification and surveillance of chemical risks, particularly acute exposure. However, for risks from chronic exposure that could become chemical events, capacity needs strengthening. Chemical risks associated with contaminated food can be identified, although there is a need to strengthen capacity for analysis of clinical toxicological samples.

The health sector cooperates with the emergency services (coordinated through the EOC) for preparedness, response to, and notification of, chemical events in line with the IHR. Each major industrial installation has its chemical emergency preparedness and response plan for the periphery as well as the interior of the installation; however, these plans need regular testing and improvement through simulation exercises.

Recommendations for priority actions

- Establish a legally constituted National Interministerial Commission on Chemical Events, with a budgeted programme of work including, inter alia:

  ○ Systematically collecting and exchanging information on chemical events occurring throughout the country, and on their management, with regular analysis of the information in order to learn from the experience;

  ○ Evaluating the risks involved in chemical events, communicating these risks to relevant decision-makers throughout the country, along with how to identify and minimize these risks, and respond to emergencies;

  ○ Raising awareness among the public concerning chemical risks and events;

  ○ Organizing drills and simulation exercises to test national and regional capacities to identify and respond to chemical events, backed up with training and strengthening of human resources.

- Update, on a regular basis, the National Profile on Chemicals Management.

- Further develop and implement an obligatory System for Classification and Labelling of Chemicals in all sectors.

- Strengthen analytical toxicology laboratory facilities, with the creation of a regional network of accredited laboratories to support diagnosis and management of exposed persons; and monitor biomarkers of chemical events, including the integrated transport of samples.

Indicators and scores

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

Strengths/best practices

- A surveillance system is in place for chemical events, identification and management of intoxications, and laboratory capacity for confirmation.

- Monitoring of chemical exposures is done by other stakeholders: air, water and soil (MECA); food and drinking water (Ministry of Regional Municipalities and Water Resources; fish and sea products (MoAF); other consumer products (Ministry of Commerce and Industry).

- Routine chemical safety assessments carried out by MECA include environmental impact assessments, and quantitative risk assessments for large establishments and projects.

- A draft is available of the all-hazard public health emergency preparedness and response plan, which considers the range of functions required during a chemical incident or crisis.

- Guidelines for surveillance and the national poisons centre provide the capacity for this score. However, there is no real-time exchange of information among relevant stakeholder, and the surveillance system for chemical events and their reporting remains inadequate.

- The Poisons Control Centre has a database of over a million cases of chemical exposure, collected 24/7 in real time.

Areas that need strengthening/challenges

- No legislative support is in place to conduct a health impact assessment.

- No national case management plan exists for other proprietary chemical risks.

- MoH has no capacity to confirm other chemical events such as chemical warfare agents or toxic industrial chemicals.

- Laboratory capacity, qualified human resources and finances remain insufficient.

- Coordination of surveillance and detection of events needs to be strengthened as, despite the existence of several committees, responsibilities are divided among sectors with insufficient information exchange.

CE.2 Enabling environment is in place for management of chemical events – Score 4

Strengths/best practices

- Legislation is available for chemical management.

- A draft all-hazard public health emergency preparedness and plan is available for adoption and implementation, which includes chemical emergencies.

- A national guideline on poisoning management is in place and regularly updated.

- While surveillance for chemical events is only partly complete, and a national plan is lacking to manage such events, Oman takes part in international chemical networks such as MENATOX.

- In the case of a serious chemical event, financial resources can be immediately mobilized.

- Stockpiles of antidotes for chemical threats can benefit from GCC sources, and a review has been carried out of existing antidotes in different hospitals.

Areas that need strengthening/challenges

- An independent authority should be established for chemical management.

- A process should exist for chemical facilities/producers to deal with environmental consequences and health impact/risk assessments.

- A national case management plan is needed for priority chemical emergencies, with regular evaluation to enhance the national capacity for diagnosis of chemical warfare agents or toxic industrial chemicals.

- Competent laboratory capacity should be able to confirm priority chemical events and detect chemical agents using sophisticated methods as well as build human resource capacities.

- Simulation exercises for chemical event responses should be undertaken biannually.

Radiation emergencies

Introduction

State Parties should have surveillance and response capacity for radionuclear hazards/events/emergencies, which requires effective communication and collaboration among the sectors responsible for radionuclear management.

Target

State Parties to have surveillance and response capacity for radionuclear hazards/events/emergencies with effective communication and collaboration among the sectors responsible for radionuclear management.

Oman level of capabilities

MECA has primary responsibility for supervision, control and safety of any activity that can result in radioactive emissions, as well as actions related to the use of ionizing radiation sources, materials, devices and radioactive substances in governmental and private sectors. It achieves this with the collaboration of eight relevant stakeholders (Royal Oman Police, Ministry of Foreign Affairs, MoH, MoAF, Ministry of Regional Municipalities and Water Resources Food and Water Laboratories, Public Authority of Civil Defence and Ambulances, Public Authority for Civil Aviation, and Ministry of Commerce and Industry). In addition, the Peaceful Nuclear Technical Office and Committee are responsible for coordination with international agencies for signature/ratification of international conventions as well as trainings and technical support.

The MoH Radiation Protection Department is equipped and resourced with qualified radiation protection officers to ensure safe operations and guidance on potential hazards from radioactive sources in the health sector. MECA has authority to assess facilities, issue and revoke the licences, and set standards and requirements for waste management, including regular monitoring and safety assessment of industrial radiation facilities. Radiation facilities provide periodic safety reports that are reviewed at MECA.

The Nuclear and Radiological Emergency Management System within the National Disaster Management Authority Plan addresses all radionuclear emergencies.

Recommendations for priority actions

- Establish an adequate legislative and regulatory framework for emergency preparedness and response.

- Establish an independent national authority as an umbrella for all stakeholders working on different radiation issues and a national committee for radiological emergencies with contact points of all authorities contributing to any suspected radiological emergency.

- Designate medical facilities to treat contaminated individuals or victims of radiation emergencies with adequate resources.

- Revise and regularly update emergency plans with adequate resources to ensure surveillance, laboratory analysis, hazard assessments, conduction of exercises or drills and allocate additional resources to expand the use of radiation in medical, industrial and other sectors.

- Coordinate risk assessments, risk communication, planning, exercises, monitoring, especially during urgent radiological events and potential PHEIC.

OTHER

Indicators and scores

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

Strengths/best practices

- MECA supervises and controls the safety of activities related to radioactive emissions and/or actions related to the use of ionizing radiation sources, materials, devices and radioactive substances in governmental and private sectors.

- Written SOPs are evaluated and updated for the management of radiation emergencies, including risk assessment, reporting, event confirmation and notification, and investigation.

Areas that need strengthening/challenges

- A mechanism should ensure systematic information exchange between the radiological authorities and human health surveillance units on urgent radiological events and risks that may constitute a PHEIC.

- SOPs should be established to detect and respond to radiation emergencies.

- Adequate resources should ensure surveillance, laboratory analysis, hazard assessments and exercises or drills.

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

Strengths/best practices

- Coordination with relevant stakeholders is in place at national and subnational levels, in sectors like health, environment, emergency services, and reference laboratories, although a focal point for radiological coordination and communication with the MoH and/or IHR NFP is yet to be established.

- National authorities responsible for nuclear and radiation events have a designated focal point for coordination and communication with the IHR NFP.

- A radiation emergency response plan exists, that could be part of the national emergency response plan.

- A plan exists for national and international transport of radioactive material, samples and waste management, including those from hospitals and medical services.

Areas that need strengthening/challenges

- Enlisting and defining medical facilities should be available to treat contaminated individuals or victims of radiation emergencies with adequate resources and well trained personnel.

- The Nuclear and Radiological Emergency Management System should have SOPs with clear delineation of roles and responsibilities, public communication, management of affected population, modes of decontamination and adequate resources.

- Allocation of additional human and financial resources is required due to expansion of the nuclear power programme and increased use of radiation in medical, industrial and other sectors.

- Medical facilities to treat contaminated individuals or victims of radiation emergencies should be available with adequate resources, trained personnel as well as coordination with relevant stakeholders (national and subnational levels of all relevant sectors like health, environment, and emergency services).

Annex 1: JEE background

Mission place and dates

The mission took place in Muscat, Oman, on 2–7 April 2017. The team held multisectoral discussions and site visits in the capital city of Muscat and in a few other locations.

Objectives

a)   Assess the implementation of the IHR public health capacities for surveillance and response to public health events including at points of entry.

b)   Review all related documents.

c)   Develop a report describing the progress and gaps in implementing the IHR capacities.

d)   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

- The entire JEE process was facilitated by the WHO Country Office, Oman.

- Prior to the visit, several communications took place with assessment team members and experts in Oman to review the agenda, responsibilities, and logistics.

- A national training was conducted on 23–24 January 2017 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.

- A one-day orientation was provided to the JEE experts on the process, 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 and with national technical teams involved in the evaluation to present the outcomes of the JEE, best practices and priority actions.

Limitations and assumptions

Assumptions

- The results of this assessment will be made publicly available.

- The assessment is not an audit, and while information provided by Oman was cross-checked and validated by the team as far as possible, everything could not be independently validated.

- This is a peer-to-peer review. Information provided by Oman was discussed and an assessment rating was mutually agreed between the host country and assessment team.

Limitations

- The assessment was of one week's duration, which limited the amount and depth of information that could be managed.

- Some background documents were only available in the local language. While the national team could summarize the content of these documents, a review of the background documents was limited.

- The evaluation meetings were conducted at the national level. Nationals from some regions participated in the discussion; however, not all sectors from all regions – and not all regions – were represented in the discussion. Having all regions represented might have affected the scores, particularly as no field visits could be conducted to any of the provinces, due to the short duration of the mission.

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- Maria Cristina Profili, Team lead, World Health Organization Representative, Jordan, Amman.

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- Dalia Samhouri, Country Health Emergency Preparedness and International Health Regulations, World Health Organization Eastern Mediterranean Regional Office, Cairo, Egypt.

- Mohammed Badi, Central Preventive Medicine Department, Ministry of Health and Prevention, Dubai, United Arab Emirates.

- Jessica Barry, International Health Regulations Consultant, United States of America.

- Hicheme Bouzghaia, Performance of Veterinary Services Pathway Expert, World Organisation for Animal Health, Tunis, Tunisia.

- Wael El Kholy, Egyptian Nuclear and Radiological Regulatory Authority, Cairo, Egypt.

- Philippe Gasquet, Global Capacities Alert and Response, World Health Organization headquarters, Lyon, France.

- Francis Grenier, Health Emergency Information and Risk Assessment, World Health Organization Eastern Mediterranean Regional Office, Cairo, Egypt.

- Jari Jalava, National Institute for Health and Welfare, Helsinki, Finland.

- Ljubica Latinovic, Risk Communications Consultant, Mexico City, Mexico.

- Mohammed Moussif, Mohammed V International Airport, Casablanca, Morocco.

- Markos Tibbo, Livestock Officer, Food and Agriculture Organization Regional Office for the Near East and North Africa, Cairo, Egypt.

- Martine Van Utterbeeck, Doctors Without Borders, Paris, France.

Key host country participants and institutions

Ministry of Health

- Idris Al Abidani, Head of Communicable Diseases Department.

- Ali Al-Abri, Biomedical Scientist, Central Public Health Laboratories.

- Seif Salem Al Abri, International Evaluation Team Head, Director General of Disease Surveillance and Control.

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- Fatma Al Hikmani, Department of Environmental and Occupational Health.

- Amina Khalfan Al Jardani, Central Public Health Laboratories Department.

- Amal Seif Al Maani, Department of Infection Prevention and Control.

- Salim Said Al Mahrooqi, Department of Surveillance.

- Said Sulaiman Al Nahdi, Head of International Health Regulations and Port Health.

- Amira Abdulmohsin Al Raidhan, Department of Health Education and Awareness Programme.

- Bader Saif Al Rawahi, Head of Immunization and Vaccine Preventable Diseases.

- Shyam Bawikar, Department of Surveillance.

Key stakeholders

- Dhofar Municipality

- Ministry of Agriculture and Fisheries

- Ministry of Commerce and Industry

- Ministry of Environment and Climate Affairs

- Ministry of Foreign Affairs

- Ministry of Information

- Ministry of Regional Municipalities and Water Resources

- Ministry of Transport and Communication

- Muscat Municipality

- National Committee for Civil Defence

- Oman Air

- Oman Airports Management Company

- Public Authority for Civil Aviation

- Public Authority for Civil Defence and Ambulances

- Public Authority of Radio and Television

- Sohar Port and Freezone Company.

Supporting documentation provided by host country

National legislation, policy and financing

- Royal Decree (73/92) addressing communicable diseases.

- Draft Public Health Law.

- National Strategic Framework.

- IHR Committee Decision.

- Standard operating procedures for the GCC unified health procedures at POE.

- Quarantine regulations.

IHR coordination, communication and advocacy

- Royal Decree No. 73/92 addressing communicable diseases.

- Draft Public Health Law to be published.

- Communication pathway for reporting acute public health events, national and governorate along with accompanying standing operating procedures.

Antimicrobial resistance

- National Action Plan – AMR.

- National Antimicrobial Susceptibility Testing Guideline.

- Multidrug-Resistant Organisms Policy.

- Antimicrobial Resistance Surveillance Programme – 2016.

- Country Capacity Review Mission for Early Implementation of AMR Surveillance in Oman – 2016.

- MoH Code of Practice for Infection Prevention and Control,

- Oman Infection Prevention and Control Programme.

- Standards of Practices for Infection Prevention and Control.

- National Antimicrobial Guidelines.

- National Surgical Antimicrobial Prophylaxis Guidelines.

- Infection Prevention and Control Guidelines for Ebola virus disease.

- IPC Guidelines in Health-care Settings for Management of Waste while caring for suspected/confirmed cases of Ebola virus disease.

- How to safely collect blood samples from persons suspected to be infected with highly infectious bloodborne pathogens.

Zoonotic diseases

- OIE PVS-Gap Analysis Report for Oman.

- Ministerial Decree on the Zoonoses Committee establishment.

- Report of human brucellosis outbreak in Saham Wilayat, 2016.

- FAOSTAT 2016. FAO Statistics Division, www.fao.org/faostat/en/#home.

- MERS-CoV national preparedness plan Oman, 2013.

- Zoonotic diseases reported by month, 2016. Department of Communicable Diseases, Directorate-General of Disease Surveillance and Control, MoH, Oman.

- Newsletter – CD-Epi Week 2016_22–30.

- Veterinary Law.

- Communicable Disease Manual, 3rd Edition, 2016.

- MH/CPHL 01/V2/Dec 2016: Laboratory Services at Central Public Health Laboratories: Guidelines for Specimen Type, Collection, Storage and Transportation.

Food safety

- WHO report on National Food Safety Profile of the Sultanate of Oman, 23–27 August 2015.

- Communicable disease manual, 3rd Edition, 2016.

- Food Safety Law issued by Royal Decree No. 84/2008 and its regulations issued by the Ministerial Decision No. 2/2010.

- Consumer Protection Law promulgated by Royal Decree No. 81/2002.

- Regional Municipalities Regulation Law promulgated by Royal Decree No. 96/2000.

- Veterinary Quarantine Law promulgated by Royal Decree No. 45/2004 and its regulations issued by Ministerial Decree No. 107/2008.

- Food Safety regulation, regular inspection reports and plans, and meeting and incident reports.

- National guide for medical fitness examination for veterinarians.

Biosafety and biosecurity

- Draft Public Health Law.

- Draft national laboratories biosafety manual.

- Training records (biosafety and infectious samples transportation).

- Biosecurity/biosafety assessment report 2010 by the European Union, Professor Pauli George.

- National standards for private laboratories do exist and prepared by private establishment directorate.

Immunization

- Immunization monthly coverage reports.

- Immunization records (child health card and child health register, adult immunization card, health-care worker immunization card).

- National Immunization Technical Advisory Group Decree.

- EPI manual.

- Defaulter system.

- Adverse event following immunization investigation report form.

- WHO-UNICEF joint reports prepared annually.

National laboratory system

- Draft Public Health Law.

- Communicable disease manual.

- Ebola/viral haemorrhagic fever preparedness manual.

- NARI manual.

- Zika preparedness plan.

- MERS-CoV preparedness plan.

- National guide for medical fitness examination for veterinarians.

- Terms of reference of the National Laboratory Medical Committee.

- Quality records/External Quality Assurance for Central Public Health Laboratory.

- Monthly report or line lists for tests done and results communication.

- Communicable diseases biweekly bulletin.

- Documentation of training from Central Public Health Laboratory.

- National Laboratory Safety manual (draft) pending approval.

- Code of practice from Ministry of Commerce and Industry for new employees in the laboratory (good laboratory practice) and from MoH.

- Draft National Code of Conduct for laboratory personnel

- National susceptibility guideline for AST.

- OIE diagnostic algorithms adapted for MoAF laboratories .

- Laboratory guideline on specimen collection, handling and transportation.

- MoAF guideline on collection and transportation.

- Laboratory inspection checklist and copy of report examples from laboratory committee.

Real-time surveillance

- Communicable disease manual.

- Standard operating procedure documents for surveillance.

- Periodic reports.

- E-notification standard operating procedures.

Reporting

- Public Health Law (draft).

- GCC Early Warning System.

Workforce development

- Country presentation on workforce development.

- Report: Human Resources for Health.

Preparedness

- National strategic framework for the management of emergencies.

- Strategic framework for medical and public health response sector.

- Emergency plan for zoonotic diseases.

- Mapping of radioactive sources and major chemical resources.

- Management of hazardous materials plan (chemical, radioactive and biological).

Emergency response operations

- Strategic Framework of Medical and Public Health Response sector.
- EOC operational and communication manual.
- EOC Governorate plan.
- Audio and videoconference manual.
- Royal hospital mass influx (full scale).
- Royal hospital fire response SOP test (table top).
- Management of zoonotic diseases.

Linking public health and security authorities

- Ministerial Decree establishing NCCD.
- NCCD Structure, Terms of Reference, Command and Control Structure, Activation Algorithms.
- Medical and Public Health Response Sector – National Strategic Framework.
- Governorate NCCD plans.
- MoH EOC plan for management of emergencies.

Medical countermeasures and personnel deployment

- All-hazard public health emergency preparedness and response plan.
- National Strategic Framework.
- Note: Documentation on procedures for receiving and sending health personnel was orally reported to exist but is not in the public domain.

Risk communication

- IHR Committee (Ministerial Decree).
- Framework for Emergency Operations in Public Health.
- Communicable disease manual.
- Reports between Ministry of Information and Public Authority of Radio and Television during crises.

Points of entry

- Royal Decree No. 73/1992 regarding Communicable Disease Control Law.
- Royal Decree No. 67/2003 regarding implementation of the unified customs law for the GCC countries.
- The GCC Points of Entry Guidelines – 2016.
- Public Health Emergency Plan 2016–2017 for Al Batinah North Governorate.
- Muscat Airport Emergency Plan 2016.
- Salalah Airport Emergency Plan.
- Sohar Port Emergency Response Plan.
- Royal Decree No. 45/2003 regarding the publication of the Veterinary Quarantine Law.

Chemical events

- National Committee for Chemical Management (Royal Decree).

- National guideline on poisoning management.

- Regional international environment conventions to which the Sultanate accede.

- Legislation on the management of chemical substances.

- Chemical substances registration procedures.

- Inventory of unintentionally produced persistent organic pollutant by-products in the Sultanate of Oman.

- Inventory of persistent organic pollutants, polychlorinated biphenyls, in the Sultanate of Oman.

- National profile for management of chemicals.

- Draft of all-hazard public health emergency preparedness and response plan.

Radiation emergencies

- The IAEA evaluation and certification (findings).

- Reports of exercises and drills.

- Legislations mentioned.

- Nuclear and Radiological Emergency Management System Plan.