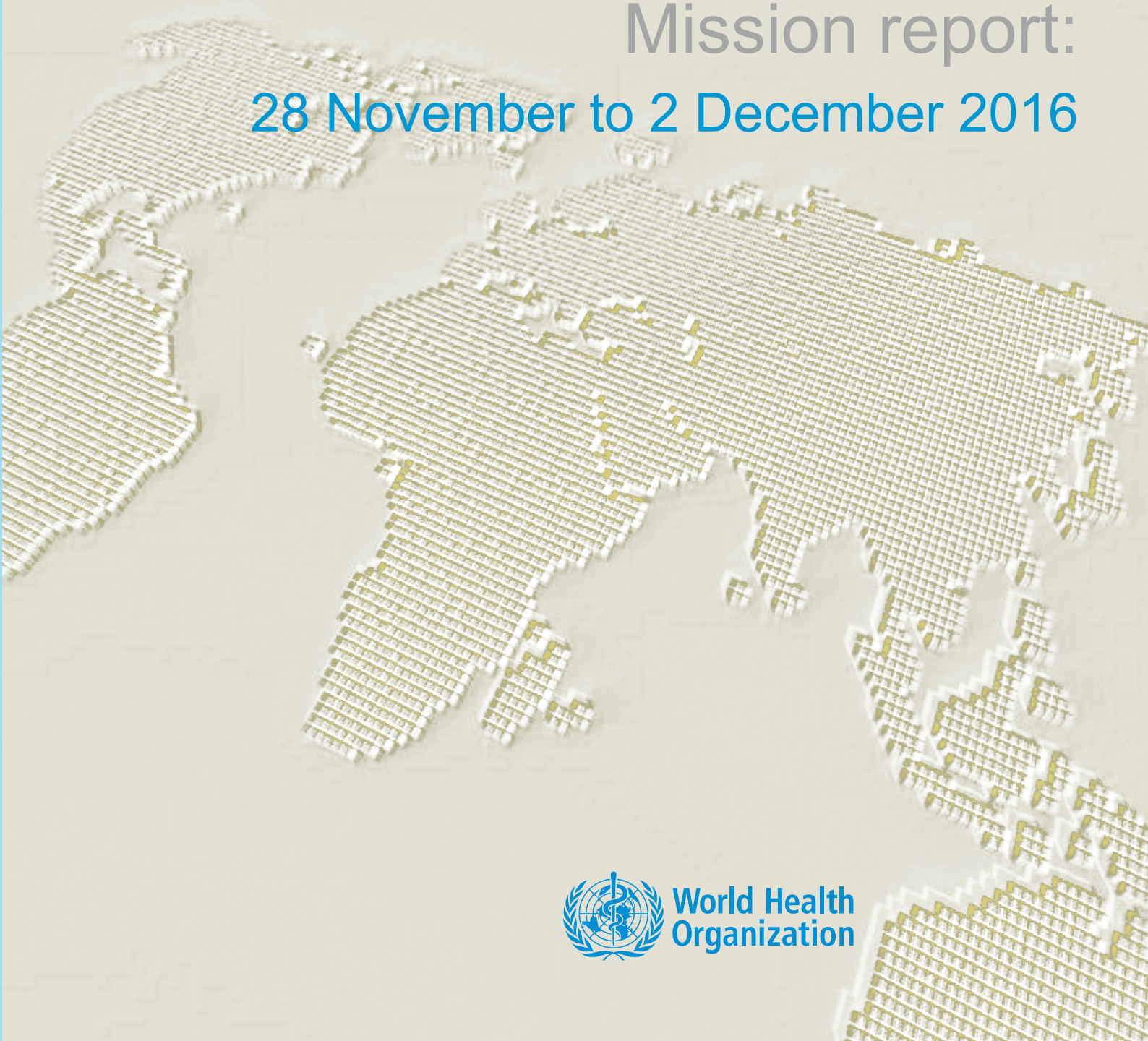
JOINT EXTERNAL EVALUATION OF IHR CORE CAPACITIES

of the

REPUBLIC OF TUNISIA

Mission report:

28 November to 2 December 2016



World Health Organization

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Contents

Abbreviations

AMR	Antimicrobial resistance
ANCSEP	National Agency for the Sanitary and Environmental Control of Products (Agence Nationale de Contrôle Sanitaire et Environnemental des Produits
CSB	Primary health centre (centre de santé de base)
CNRP	National Centre for Radiation Protection (Centre National de Radioprotection)
CNSTN	National Centre for Nuclear Sciences and Technologies (Centre National des Sciences et Technologies Nucléaires)
DRS	Regional health authority (Directions Régionales)
DSSB	MoH Directorate of Primary Health Care (Direction des Soins de Santé de Base)
EBS	Event-based surveillance
EMPHNET	Eastern Mediterranean Public Health Network
EOC	Emergency operations centre
EPI	Expanded Programme on Immunization
FAO	Food and Agriculture Organization of the United Nations
GHS	Globally harmonized system of classification and labelling of chemicals
GIZ	German Agency for International Cooperation
HACCP	Hazard analysis of critical control points
HCAI	Health care-associated infection
HIV	Human immunodeficiency virus
IAEA	International Atomic Energy Agency
IBS	Indicator-based system
IEC	Information, education and communication
IFRC	International Federation of Red Cross and Red Crescent Societies
IHR	International Health Regulations (2005)
ISST	National Institute of Occupational Health and Safety (Institut de Santé et de Sécurité au Travail)
JEE	Joint External Evaluation of the IHR
MCM	Medical countermeasures
MediPIET	Mediterranean Programme on Intervention Epidemiology Training
MoH	Ministry of Health
NFP	National Focal Point
OACA	Civil Aviation Authority (Office de l'Aviation Civile et des Aéroports)
OIE	World Organisation for Animal Health
ONMNE	National Observatory for New and Emerging Diseases (Observatoire National des Maladies Nouvelles et Émergentes)
ORSEC	Disaster Emergency Plan (Organisation de la Réponse de Sécurité Civile)
PHEIC	Public health emergency of international concern
PNURN	National Plan for Radiological and Nuclear Emergencies (Plan National d'Urgence Radiologique et Nucléaire)

PVS	Performance of Veterinary Services
SHOC	Strategic Health Operations Centre
SONEDE	National Water Distribution Utility (Société Nationale d'Exploitation et de Distribution des Eaux)
UNICEF	United Nations Children's Fund
VPD	Vaccine-preventable disease
WHO	World Health Organization

Executive Summary – Findings from the Joint External Evaluation

The Joint External Evaluation (JEE) of the International Health Regulation (IHR) (2005) capacities allows countries to identify the most urgent needs within their health security system; and to prioritize opportunities for enhanced preparedness, detection and response capacity-building, including setting national priorities and allocating resources based on the findings.

The Republic of Tunisia is the 25th country globally and the 9th in the World Health Organization (WHO) Eastern Mediterranean Region to volunteer for a Joint External Evaluation. Tunisia's substantive and ongoing commitment to implement IHR capacities was noted and commended by the JEE external team.

Tunisia has established capacities in all technical areas relevant for the IHR, and has many excellent practices in place. In recent years, the county's health-care system has shown remarkable resilience in providing necessary services to fight emerging and re-emerging diseases and other health security issues. However, enormous efforts are still needed in most IHR capacities.

Tunisia has a substantial legal and regulatory framework to support and enable the implementation of IHR but needs to identify gaps and corrective measures to accelerate this implementation. While a national multisectoral commission was established in 2014 to coordinate IHR implementation, it is not yet active, especially in terms of regular information sharing with the IHR NFP. The country also has a technical platform to detect antimicrobial resistance pathogens, but no national plan covering surveillance and detection, nor comprehensive legal framework across the human, animal health, agriculture and production sectors. The analytical capacity of the surveillance system and risk assessment for major zoonotic diseases, in both the human an animal health sectors, needs to be strengthened at the regional level. Zoonotic committees exist at national and regional level but information sharing and collaboration between both sectors need to be improved, especially outside crisis situations.

The designated competent authorities in food safety have the legal powers to undertake their tasks. Links exist between the food surveillance network, control of production, laboratories and health personnel, but real collaboration is limited to crises. Initiatives to introduce biosafety and biosecurity practices in Tunisian laboratories include the train-the-trainers approach. However laboratories and hospitals still lack some basic operations or culture related to biosafety.

Routine immunization services are delivered through a mixed strategy of fixed sites, outreach sessions and mobile teams to cover remote areas. The country has achieved high vaccination coverage rates at national level, as well as in almost all districts and population groups. The laboratory system covers human, veterinary, food, and environmental sectors and is able to detect selected priority diseases. A specimen transportation mechanism exists, as well as a system for laboratory licensing, but systematic evaluation of resources, capabilities and quality are lacking. Tunisia has many public health surveillance systems. Indicator- and event-based surveillance systems are in place to detect public health threats. However, real-time surveillance is limited by poor participation of the private sector, which is particularly important given the current influx of migrants/refugees.

Despite efficient detecting and reporting of events, coordination between the IHR NFP and other partners is lacking, particularly for radionuclear and chemical events; a review of the terms of reference of the IHR NFP and IHR multisectoral committee might improve notification and information sharing.

Human resources are available in various disciplines and sectors, but a field epidemiology training programme should be established as a priority. A situation analysis would allow a clear human resource strategy for all components of workforce capacities to secure adequate and homogenous coverage. In addition to the national plan for preparedness, response and resilience for diseases of potential epidemics, specific hazard plans have been developed for certain risks such as H5N1, floods, and the Disaster Emergency Plan. A Strategic Health Operations Centre was established in 2009 to ensure preparedness, early detection and better management of any public health emergency. All IHR-related hazards should be incorporated in the national public health emergency preparedness and response plan.

Tunisia has learnt to organize its response to various emergencies. The SHOC room participates in the development of action plans to deal with major emergencies with all parties, and coordinates health interventions for these emergencies. It has managed many public health emergencies in collaboration with different stakeholders, as well as simulation exercises to test the response to public health events, and exercises to test the national preparedness plan. Despite these efforts, the country needs to build the number and capacity of the SHOC staff for better management of public health emergencies. Terms of reference and standard operating procedures (SOPs) should also be developed to describe the structural and operational elements of the Incident Management Structure.

A protocol and administrative letters set out the responsibilities of different ministries concerning the link between public health and security authority operations. Concrete actions have been taken and collaboration and information sharing exist between the Ministry of Public Health and the security authorities (for epidemics, terrorist attacks, etc.). To strengthen this link, security sectors should be included in the training conducted by the public health sector on emerging and re-emerging public heath events, and SOPs should be developed for joint investigation and response to public health events.

Informal mechanisms exist for the provision of medical resources in case of a public health crisis on a case-by-case basis. There is also international cooperation to mobilize resources. However, efforts are needed to develop a national framework for transferring (sending and receiving) medical countermeasures and public health and medical personnel among international partners during a public health emergency.

Tunisia has learnt from various political and health events to strengthen its risk communication capacities. Risk communication and media relations are managed at the national level by a core media team within the Minister of Health's cabinet. While a draft National Risk Communication Strategy 2016 is available, human and financial resources for risk communication activities are limited, and the Strategy needs to be operationalized across the Ministry of Health and other response partners.

Routine capacities at Tunisian points of entry (PoE) are established, but SOPs are needed for daily surveillance and control. The majority of PoE have no public health emergency contingency plan despite technical support provided in this framework. It is therefore urgent to develop such contingency plans which should be integrated within the emergency plan of each designated PoE, with SOPs for the early detection, investigation and response to ill passengers. Linkages between the competent authority and the national surveillance system are functioning as prescribed in IHR Annex 1 and procedures are established and functioning. However, ground crossings with Libya and the People's Democratic Republic of Algeria need to be jointly designated to meet the capacities stipulated in IHR article 21. Coordination between border health control units and the relevant stakeholders at PoEs should be enhanced.

Tunisia is a substantial user of chemicals, particularly in the agropastoral, petrochemical and industrial sectors, but also in the health and domestic sectors. The national poisons centre has established surveillance guidelines and has enough analytical toxicological capacities at the national, but not regional level. Responsibilities are divided among several sectors with little coordination and insufficient exchange of

information, so a legally constituted national interministerial commission on chemical events is needed, with a budgeted programme of work. A national plan coordinated among all stakeholders to manage such events should be developed after a diagnosis of the situation, including a national chemicals profile.

The regulator and national coordinator for radiation emergency preparedness and response in Tunisia is the National Centre for Radiation Protection. This body can request additional technical support from the National Centre for Nuclear Sciences and Technologies for training, expertise and monitoring purposes. Staff members seem to be sufficient and adequate legislation exists for radiation emergency arrangements, although these have never been implemented. A national radiation emergency response plan was drafted in the early 2000s, setting the basis of a structured response at national level. This draft needs to be revised, updated and approved by the different stakeholders. SOPs for first responders (civil protection authority (ONPC)/ ambulance/ hospitals/ customs) for interventions on radio-contaminated people/ environment, including mass decontamination matters must also be developed.

In conclusion, the External Evaluation Team recognizes the enormous effort deployed by the Tunisian Government to strengthen IHR capacities despite the period of transition faced by the country since 2010. While most IHR requirements are in place, there is a general need to formalize structures, and test and share national policies and plans in many areas. At this stage of progress in implementing the IHR, the main challenge is getting decision-makers at the Ministry of Health to include the IHR in their priorities, and persuading all relevant sectors to be more involved in capacity development.

The Team extends its warmest regards to the national health authorities and all participating sectors for the support and openness during the mission, which truly reflected the spirit of the WHO Eastern Mediterranean Regional Committee Resolution EMRC 62.3 and EMRC 63.1 of independence and transparency.

Tunisia 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 IHR	2
	P.1.2 The state can demonstrate that it has adjusted and aligned its domestic legislation, policies and administrative arrangements to enable compliance with the IHR (2005)	1
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	3
Antimicrobial resistance	P.3.1 Antimicrobial resistance detection	2
	P.3.2 Surveillance of infections caused by antimicrobial resistance pathogens	1
	P.3.3 Health care-associated infection prevention and control programmes	2
	P.3.4 Antimicrobial stewardship activities	2
Zoonotic diseases	P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens	4
	P.4.2 Veterinary or animal health workforce	4
	P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional	3
Food safety	P.5.1 Mechanisms are established and functioning for detecting and responding to foodborne disease and food contamination	3
Biosafety and biosecurity	P.6.1 Whole-of-government biosafety and biosecurity system is in place for human, animal, and agriculture facilities	2
	P.6.2 Biosafety and biosecurity training and practices	2
Immunization	P.7.1 Vaccine coverage (measles) as part of the 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	4
	D.1.2 Specimen referral and transport system	4
	D.1.3 Effective modern point-of-care and laboratory-based diagnostics	4
	D.1.4 Laboratory quality system	3
Real-time surveillance	D.2.1 Indicator- and event-based surveillance systems	3
	D.2.2 Interoperable, interconnected, electronic real-time reporting system	2
	D.2.3 Analysis of surveillance data	3
	D.2.4 Syndromic surveillance systems	4
Reporting	D.3.1 System for efficient reporting to WHO, FAO and OIE	3
	D.3.2 Reporting network and protocols in country	3
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	4
	D.4.3 Workforce strategy	3

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

PREVENT

National legislation, policy and financing

Introduction

The 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 specifically 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.[1] 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 of their obligations and rights to comply with and implement the IHR (2005). In some States Parties, implementation of the IHR (2005) may require new or modified legislation. Even where new or revised legislation may not be specifically required under the State Party's legal system, States may still choose to revise some legislation, regulations or other instruments in order to facilitate their implementation and maintenance in a more efficient, effective or beneficial manner. State Parties should ensure provision of adequate funding for IHR implementation through national budget or other mechanism.

Tunisia level of capabilities

The country has legislation, several regulations, administrative requirements, and other governmental instruments governing IHR-related areas. The following examples were noted during the discussion:

- Immunization: Decree of 5 May 1922 concerning compulsory vaccinations and Law 2005–75 on the importation of vaccines, serums and allergens and their control and Order of the Minister of Health of 28 October 2005 laying down the list of compulsory vaccines.
- Points of entry: Decree of 8 January 1953 regulating the maritime and air sanitary police, Decree of 19 November 1953 regulating the health police at land borders in Tunisia, Decree 94–1744 laying down the modalities of inspection of imports and exports and Order of 30 August 1994 identifying the lists of imported and exported products subject to inspection.
- Radiation emergencies: Law 81–51 on protection against the dangers of ionizing radiation sources, Law No. 90–15 on the ratification of the Agreement between the Republic of Tunisia and the International Atomic Energy Agency on the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons, Law 97–37 of 2 June 1997 on the transport by road of hazardous materials, Law 2004–44 on the approval of the Comprehensive Nuclear-Test-Ban Treaty, Decree 89–1895 on the publication of the Vienna Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency and Decree 89–1902 on the publication of the Vienna Convention on Early Notification of a Nuclear Accident.

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

- Real-time surveillance Law 91–63 of 29 July 1991 on the health organization, Act 92–71 on communicable diseases, amended in 2007, and Order of 1 December 2015 identifying the list of notifiable communicable diseases.
- Zoonoses: Law 99–24 on veterinary health control on imports and exports, Decree 2002–668 organizing the intervention of veterinary doctors and agencies in charge of veterinary services, Decree 2009–2200 identifying the list of animal diseases and their control, and Order of 26 May 2000 laying down the list of laboratories authorized to carry out examinations of imports and exports in the framework of veterinary health control.
- Decree 2014–4776 of 31 December 2014 establishing the National Committee for Monitoring and Implementation of the IHR.
- New laws have been developed but not yet endorsed related to food safety, biosafety and biosecurity, and chemical safety.

The Ministry of Public Health (MoH) has recruited a consultant to review national legislation. The involvement of other sectors in the review is necessary for the effective implementation of IHR. Furthermore, a budget needs to be allocated by the Government to support IHR activities.

Recommendations for priority actions

- Establish a committee of legal advisors representing the different sectors relevant to IHR, tasked to continue to review national legislation, decrees, policies and administrative produces to identify gaps and corrective measures to accelerate the implementation of IHR.
- Accelerate the finalization and endorsement of the reviewed laws such as on food safety, biosafety and biosecurity, chemical safety, and the establishment of an independent body on radiation.

Indicators and scores

P.1.1 Legislation, laws, regulations, administrative requirements, policies or other government instruments in place are sufficient for implementation of IHR - Score 2

Strengths/best practices

- Several laws, decrees, and polices are in place to facilitate the implementation of several IHR technical areas.
- Tunisia is committed to implementing the IHR. An IHR assessment took place in 2014, and a consultant has been recruited to review national legislation as per IHR requirements.
- Awareness and willingness to establish legislation, policies and procedures is recognized by senior and technical officials in the different sectors.

Areas that need strengthening/challenges

- Legal sectors are not well informed about IHR and its requirements and are not involved in the review of the legislation that is currently taking place.
- Governmental human and financial resource are limited to support the implementation of IHR capacities.

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 1

Strengths/best practices

- The country ensures coordination of the legal and regulatory frameworks between sectors. All relevant sectors are invited by the Ministry of Justice to discuss and review the new draft laws.

Areas that need strengthening/challenges

- Other sectors need to be involved in the current review of national legislation to identify any missing laws and regulations and adjust existing laws to facilitate the implementation of IHR.

IHR coordination, communication and advocacy

Introduction

The effective implementation of the IHR (2005) requires multisectoral/multidisciplinary approaches through national partnerships for effective alert and response systems. Coordination of nationwide resources, including the sustainable functioning of a National IHR Focal Point (NFP), which is a national centre for IHR (2005) communications, is a key requisite for IHR implementation.

Target

The NFP should be accessible at all times to communicate with the WHO IHR Regional Contact Points and with all relevant sectors and other stakeholders in the country. States Parties should provide WHO with contact details of NFPs, continuously update and annually confirm them.

Tunisia level of capabilities

The Tunisian IHR NFP is the Directorate of Primary Health Care, which reports to the General Directorate of Public Health in the MoH. In accordance with the provisions of the IHR, the contact information of the IHR NFP representatives were provided to WHO and are continuously updated and annually confirmed. Two national focal officers from the Directorate of Primary Health Care are designated to communicate with all parties.

A national IHR multisectoral committee – the National Commission for Follow-up of the International Health Regulations Implementation – was established and endorsed by decree in December 2014.[2] According to this Decree, the Commission is responsible for strengthening the national support mechanisms for vigilance, screening and reducing health risks, ensuring preparedness to deal with various risks, and coordination between the parties involved in the implementation of IHR.

The Commission is headed by the Minister of Health and has a fully comprehensive membership.[3] Furthermore, the Decree provides that the Chair of the Commission may add any person whose presence is deemed useful for its work. It also stipulates that the Commission meets at the call of the Chair at least every three months and whenever necessary, although to date, this has not been the case.

The role and responsibilities of the NFP and the members of the Commission are clearly defined, but not fully implemented. According to the joint discussions, coordination in a health crisis situation is successful but in normal times, difficulties are sometimes encountered in bringing together all the stakeholders. For example during the JEE meeting, many representatives of the IHR Commission were not present at the workshop.

Communication tools and instruments appear to be available, and the NFP is accessible at all times to communicate with the WHO IHR Regional Contact Points and with all relevant sectors and other stakeholders in the country. However, more efforts are needed in terms of advocacy to get all sectors to become more involved in the implementation of the IHR. One of the main challenges raised in this respect is that information sharing is not systematized between different sectors in the absence of an information technology platform.

[2] Decree No. 2014-4776 of 31 December 2014.

[3] Presidency of the Government (Press and Media Unit); ministries of: Justice, Human Rights and Transitional Justice; Interior; National Defense; Economy and Finance (Directorate-General for Customs); Trade and Crafts; Energy and Mining Industry; Tourism; Equipment, Spatial Planning and Sustainable Development; Social Affairs; Agriculture; Transport; Regional and Local Affairs; Office of Merchant Shipping and Ports; Civil Aviation Authority and Airports; National Civil Protection Office; General Director of Health, MoH; Director of Primary Health Care, MoH; Director General of National Agency for the Sanitary and Environmental Control of Products; Director General of Medical Biology Laboratories Unit, MoH; General Director of National Observatory of New and Emerging Diseases; General Director of Public Health Facilities, MoH; Director of Legal and Litigation Unit, MoH; Director of Environmental Hygiene and Environmental Protection, MoH; Director of School and University Medicine, MoH; Director of Emergency Medicine Unit, MoH; Director of National Radiation Protection Centre; Director General of Pasteur Institute; and representatives of the National Council, National Council of College of Dentists, National Council of the College of Pharmacists, and National Council of the Veterinary Medical Association.

Recommendations for priority actions

- Evaluate the functioning of the national IHR multisectoral commission and use outcomes to develop an adequate mechanism to ensure its regular operation: widely disseminate the 2014–4776 Decree to all stakeholders; and conduct regular meetings and develop an annual progress report on IHR implementation.
- Organize a high-level meeting to brief senior officers from key stakeholders about current JEE conclusions and call for their stronger active participation in the development of the plan of action.
- Develop a mechanism for regular information sharing between the IHR NFP and other sectors as well as within each of these sectors.

Indicators and scores

P.2.1 A functional mechanism is established for the coordination and integration of relevant sectors in the implementation of IHR - Score 3

Strengths/best practices

- The IHR NFP has been designated at national level with clear functions, roles and responsibilities, and personnel to guarantee 24/7 accessibility.
- A law is in place to facilitate implementation of the IHR.
- A Decree has established an IHR multisectoral commission with high-level representation, members of which participated in latest event.
- Many other regulations and committees are in place to facilitate coordination.
- The country has accumulated much experience in managing different kinds of crises, including the involvement of different sectors in health crises.

Areas that need strengthening/challenges

- The IHR multisectoral committee is not yet active and does not include all sectors relevant to IHR implementation. Hence a mechanism for monitoring the implementation and sustainability of IHR capacities is not in place and updates of IHR implementation are not shared with other relevant sectors.
- There is a lack of awareness of IHR and its implementation among stakeholders including decision-makers of non-health sectors.
- An action plan is needed that reflects lessons learnt from multisectoral and multidisciplinary coordination and communication mechanisms, which should be tested and updated regularly.
- An annual report on the status of implementation of the IHR should be developed by the NFP and shared and discussed with other sectors.

Antimicrobial resistance

Introduction

Bacteria and other microbes evolve in response to their environment and inevitably develop mechanisms to defend themselves and avoid 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 turned into a crisis. The evolution of antimicrobial resistance (AMR) is occurring at an alarming rate and is outpacing the development of new countermeasures capable of thwarting infections in humans. This situation threatens patient care, economic growth, public health, agriculture, economic security and national security.

Target

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

Tunisia level of capabilities

The Antimicrobial Resistance Network is the first Tunisian network to monitor bacterial resistance to antibiotics. It was created in 1999 by the Antimicrobial Resistance Research Laboratory with the financial support of the Ministry of Higher Education, Scientific Research and Technology and the MoH. Since 2011, the network includes eight university hospital laboratories. Data generated by the network of laboratories are annually reviewed by a group of experts in the Technical Committee against Antimicrobial Resistance and published in paper and electronic formats. Data from 1999 to 2011 were widely disseminated.

Currently, 12 laboratories are capable of detecting and reporting all WHO priority AMR pathogens. Each of these laboratories performs regular internal quality checks; national external annual checks are also performed by the Tunisian Unit of Clinical Laboratories and the Regional External Quality Assessment Scheme of the WHO Office for the Eastern Mediterranean, with continuing training on standardization of laboratory techniques. Tunisia has 21 universities and 33 regional hospitals, of which 12 university hospitals and all regional hospitals – as well as about 40% of animal farms – can serve as a potential sentinel surveillance sites for AMR.

With regard to the prevention and control of health care-associated infections (HCAI), some hospitals have a multidisciplinary committee for nosocomial infections, managed by a medical or pharmaceutical framework. The role of this committee is to survey HCAI and to conduct hospital training activities in collaboration with hospital hygiene teams. In most public hospitals, an operational technical team responsible for hygiene has, as its main objective, the prevention and control of HCAI in programmes such as hand hygiene, sterilization of medical devices, and waste management. At the national level, the country carried out two national prevalence surveys in 2005 and 2012, the results of which serve as a benchmark for the design, implementation and evaluation of strategies for the prevention and control of HCAI in Tunisia.

However, there are currently no comprehensive national plans for laboratory detection and surveillance of AMR pathogens, nor any national legal framework with clear policy, procedures and accountability, or an

information exchange platform across human, animal health, agriculture and production sectors. Moreover, HCAI prevention and antimicrobial stewardship programmes are suboptimal in all relevant sectors. There is no coordination or collaboration between public health, animal health and other sectors like regulatory authorities in AMR detection, surveillance systems and response.

Recommendations for priority actions

- Establish a regulatory framework and comprehensive national strategic plan for AMR prevention and control including HCAI.
- Identify national priority AMR pathogens from available data in human and animal health laboratories and map their distribution.
- Designate and build animal and human public health laboratory capacity to detect and characterize both global and national priority AMR pathogens.
- Designate AMR sentinel surveillance sites for priority AMR pathogens across the country with clearly defined reporting and feedback mechanisms, and an information sharing platform within and across animal, human, food, environmental and other relevant sectors; to achieve this, strengthen intersectoral coordination and collaboration, and engage the private sector in both animal and human health.
- Strengthen HCAI prevention and control programmes with clear policies, guidelines and procedures, regular training, and systematic monitoring and evaluation of infection prevention and control practices and nosocomial infections.
- Designate health facilities to promote antimicrobial stewardship practices through training and education, treatment algorithm development, monitoring and evaluation of rational drug use, and so on.

Indicators and scores

P.3.1 Antimicrobial resistance detection - Score 2

Strengths/best practices

- Designated laboratories are detecting and reporting some priority AMR pathogens.
- A 5-year laboratory upgrading strategy (2016–2020) has been developed.
- Culture and sensitivity testing is carried out for more than eight human pathogens in different hospitals across the country.
- A network of eight university hospital laboratories exists for AMR testing and reporting.
- Regular quality assurance of hospital laboratories is carried out both internally and externally, e.g. annual evaluation of the Tunisian Unit of Clinical Laboratories, and WHO evaluations.
- An expert committee on AMR reviews laboratory data and works in many areas in collaboration with the WHO focal point.
- Some laboratory capacity is available in regional hospitals.

Areas that need strengthening/challenges

- No comprehensive national plan or information exchange mechanism for AMR detection exist.
- No reference laboratory exists for AMR testing of priority pathogens.
- The capacity of laboratories is limited for accreditation by international standards like Clinical Laboratory Improvement Amendments (CLIA) or the European Committee on Antimicrobial Susceptibility Testing.

- There is limited or no engagement of sectors like animal health and food laboratories in AMR detection, reporting and information sharing.

P.3.2 Surveillance of infections caused by AMR pathogens - Score 1

Strengths/best practices

- At least 12 university hospitals, 33 regional hospitals and 40% of animal farms can be used as sentinel surveillance sites.

Areas that need strengthening/challenges

- There is no established AMR surveillance system with appropriate legal background, clear reporting, feedback mechanism and accountable framework; a national plan for surveillance of infections caused by priority AMR pathogens should be developed and approved.
- An AMR surveillance system should also be implemented in the animal health sector.
- Poor attention is given to AMR surveillance at all levels and across different sectors.

P.3.3 Healthcare-associated infection prevention and control programmes - Score 2

Strengths/best practices

- HCAI prevention and control committee are available in hospitals to monitor hospital hygiene and support investigations; hygiene experts are also present in some hospitals.
- A HCAI prevention and control strategy was developed in 2010.
- Specific programmes related to HCAI prevention and control exist, e.g. for hand hygiene and sterilization.
- Two national nosocomial infection prevalence surveys (2005 and 2012) serve as baseline data.

Areas that need strengthening/challenges

- Not all health facilities (human and animal) are implementing HCAI prevention and control programmes.
- The national HCAI prevention and control strategy has not been implemented over the past few years.
- The draft strategy developed with an action plan for HCAI prevention and control was not endorsed, and a related legal framework does not exist.
- There is no structured mechanism to monitor and evaluate HCAI prevention and control practice in either human or animal health-care facilities.

P.3.4 Antimicrobial stewardship activities - Score 2

Strengths/best practices

- The national plan for antimicrobial stewardship has been approved.
- A prescription for antibiotics for human use is mandated by law.

Areas that need strengthening/challenges

- There is no national plan for the use and management of antibiotics, and the antibiotic use law is not enforced.
- There is no antibiotic stewardship programme in the country.
- The situation of antibiotic usage in animal farms and food production sectors is not known.
- No documentation or information sharing mechanism exists.

Zoonotic diseases

Introduction

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

Target

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

Tunisia level of capabilities

Tunisia is one of the founding countries of the World Organisation for Animal Health (OIE) and has been an active regional member, reporting and developing control programmes for various zoonotic animal diseases. Major zoonotic diseases in humans at the moment are rabies, bovine tuberculosis, brucellosis, hydatidosis, and visceral leishmaniasis. The number of human cases is reported annually to the OIE World Animal Health Information Database (WAHIS Interface).

An epidemiological surveillance system exists for various zoonotic diseases in animals and is functional (national, regional and local). There is documented evidence on monitoring existing endemic zoonoses and active surveillance for new or threatening zoonoses (among others, Middle East respiratory syndrome coronavirus, avian influenza, and Zika virus).

Tunisia has an adequate number of trained and qualified health-care workers (doctors, nurses) and veterinarians in the field to diagnose and report zoonotic diseases. However, an increasing number, especially veterinarians, are in the private sector and their commitment to disease reporting needs to be secured. Continuous training for human and animal health stakeholders occurs, mainly in cooperation with WHO and OIE. Training is also available in national programmes and ad hoc training in emergencies or severe outbreaks. Animal health workforce capacity exists within the national public health system and more than half of sub-national levels. This must be aligned to the result of the OIE Performance of Veterinary Services (PVS) follow-up 2013 for the Tunisian veterinary services (professional and paraprofessional numbers and quality)

Although both the human and animal health sectors have established and well-documented workplans, cooperation and information sharing between these two crucial sectors need to be improved. A cooperation and coordination authority exists at the national and regional level, the so-called zoonotic committees, whose mandate and workplans should be reviewed. There is also some regular and ad hoc interdepartmental coordination (e.g. on rabies and brucellosis), although cooperation in general between ministries, agencies and laboratories needs to be enhanced.

Tunisia has several laboratories for basic diagnosis and expertise (regional and university laboratories). National reference laboratories for various zoonotic diseases are established (Tunis Institute of Veterinary Research, National Institute of Marine Science and Technology, Pasteur Institute in Tunis).

Tunisia has a system for collecting data and disseminating health information (bulletins, notifiable diseases) to the authorities and the general public. During recent years, specific campaigns for zoonotic diseases have been effective, e.g. "Helping communities control leishmaniasis in rural Tunisia". With a new understanding of the factors driving disease transmission, researchers have been working closely with farmers and community groups to modify household behaviours, agricultural practices, and irrigation systems. They are also validating the model for an early warning system. Project findings are being integrated into local policy and practice through affiliation with the MoH and engagement of the regional farmers union, agricultural development actors, and the Regional Health Directorate. A new website entirely dedicated to rabies in Tunisia has been launched by the MoH. Apart from general information about the disease and action in case of a bite, the website provides interesting data on rabies epidemiology in Tunisia, the national programme and the ongoing vaccination campaign.

Recommendations for priority actions

- Review the mandate and workplans for the national and regional zoonoses committees.
- Enhance coordination between the human and animal health sectors, including the private sector.
- Develop manuals for zoonotic diseases, especially for leishmaniasis and bovine tuberculosis.
- Enhance the analytical capacity at the regional level (other than rabies which remains centralized).
- Identify and enhance laboratory capacity at national level to act as a reference laboratory, with certification and accreditation of priority methods and laboratories.

Indicators and scores

P.4.1 Surveillance systems in place for priority zoonotic diseases/pathogens - Score 4

P.4.2 Veterinary or animal health workforce - Score 4

P.4.3 Mechanisms for responding to zoonoses and potential zoonoses are established and functional - Score 3

Strengths/best practices

- Functional monitoring systems are in place.
- Interventions are identified regularly to enhance the related national capacity.
- Operational response plans are being implemented.
- Personnel for national, regional and local programmes are available (primary health care, doctors and veterinarians).

Areas that need strengthening/challenges

- An active monitoring system for certain zoonoses is lacking (visceral leishmaniasis, hydatid cyst and bovine tuberculosis). Case definitions for all animal diseases on the list of notifiable animal diseases need to be developed and disseminated, including zoonotic diseases. Active surveillance should be enhanced to include the other notifiable diseases.
- Difficulties have been experienced in applying certain strategies on the ground. Inspection programmes need to be enhanced at points of entry and ways identified to address the illegal smuggling of animals into the country.
- Coordination is weak between different ministries, departments and sectors in routine situations for certain zoonoses (especially brucellosis). A plan for preparedness and response for animal, including zoonotic diseases should be developed and integrated in the public health plan for emergency

preparedness and response. The existing mechanism for information sharing between the animal and health sectors on rabies should be expanded to include other zoonotic diseases.

- The involvement of the (substantial and increasing) private veterinarian and medical sectors in active zoonosis surveillance and reporting should be improved (review the health delegation procedure for private veterinarians in order to increase the size of the field network).

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 (so-called "from farm to fork" and "from catchment area to glass" principles) must be developed. The assurance of food and water safety is a shared responsibility that requires efforts by governments, local food and water control authorities, food and water industries and consumers. 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 should have surveillance and response capacity for food- and waterborne disease risk or events. It requires effective communication and collaboration among the sectors responsible for food safety and safe water and sanitation.

Tunisia level of capabilities

National legislation concerning food and water safety and official control is in place and publicly available. The relevant designated competent authorities have the necessary legal powers to undertake their tasks. Tunisia has achieved the highest access rates to water supply and sanitation services among the Middle East and North Africa. As of 2011, access to safe drinking water became close to 100% in urban areas and 90% in rural areas. The quality of the water supplied by the national water distribution utility (SONEDE) and by local utilities in rural areas varies according to local conditions. Drinking water quality is monitored by SONEDE and the MoH from production to distribution for bacteriological and physicochemical quality.

However, during the last years very few laws and regulations regarding the food industry have been updated or renewed and many laws are pending or have been cancelled. The promising new Tunisian food law prepared by the Ministry of Commerce in accordance with local and European food agencies is under review but is currently postponed. The law was expected to harmonize Tunisian legislation with the European Union food regulation 178/2002 and to encompass all principles, requirements, and procedures concerning food and consumer safety. Challenges in the Tunisia's political situation have delayed the new legislation and replaced it by several amendments to the existing laws for the food sector.

Currently the Tunisian food legislation consists of several general laws intended to organize the food sector and to protect consumers. Several ministries, agencies and laboratories are involved in food and water safety and control, each with their own responsibilities. Different food commodities (e.g. food of animal and non-animal origin, fisheries and seafood, vegetables, drinking water) are regulated and controlled by different ministries, agencies and laboratories. Food control activities are coordinated by the National Agency for the Sanitary and Environmental Control of Products (ANCSEP), created in 1999. ANCSEP also ensures the observance of national and international standards in matters of sanitary and environmental food controls.

The official control system is not risk based. However, official controls are carried out regularly, with appropriate frequency and fully cover operations associated with primary and other food production.

The traceability of products back to the producers or primary producers is possible, although remains challenging. The Rapid Alert System for Food and Feed notifications exists but needs improvement in effectiveness. There are national reference and regional laboratories in place that have the capacity to perform tests on selected microbiological parameters based on conventional cultivation methods and physicochemical analysis.

There is documented evidence on several foodborne outbreaks that have been effectively investigated and reported. Some outbreaks have also been reported internationally, e.g. using the International Food Safety Authorities Network (INFOSAN) and the Programme for Monitoring Emerging Diseases (ProMED-mail). However, universally and also in Tunisia, outbreaks of foodborne disease often remain unrecognized, unreported or are not investigated. Many resources are available for the identification and investigation of foodborne disease outbreaks, including international and general guidelines that serve as an introduction to such outbreaks in a variety of settings. Numerous other resources provide additional, more detailed, information on surveillance, epidemiology, statistical analyses and the medical aspects of foodborne diseases. It is important to remember that no general guidelines will fit any situation perfectly, and the local environment will always need to modify investigation techniques and teams to reflect the unique characteristics of an outbreak in a given setting.

It is also important to note that addressing the risk of foodborne disease is not only the responsibility of the public health care system. Ultimately, this requires the implementation of a well-functioning and integrated food control system. Collaboration is essential among all components of the food control system, including a food law and regulations, food control management, inspection services, epidemiological and food monitoring (laboratory services) and awareness of and communication with the consumer.

Recommendations for priority actions

- Build and strengthen the analytical capacity for food analysis (especially for viruses, Campylobacter spp., Escherichia coli and other specified pathogens and toxins). Testing methods and laboratories need to be certified and accredited.
- Organize specific communication programmes, training and/or education campaigns for consumers.
- Organize targeted training on risk-based systems (e.g. Hazard Analysis of Critical Control Points) for the food and water sector and business operators.
- Review and harmonize the existing food laws as well as the regulatory and institutional framework. Enhance cooperation between the various administrative bodies and stakeholders and consider the simplification of the administrative structure.

Indicators and scores

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

Strengths/best practices

- Operational links are established between surveillance and response staff, food safety, animal health and laboratories, with permanent monitoring systems.
- The personnel structure is good, as is coordination in the event of crisis; however, the coordination body ANCSEP has mixed effectiveness.
- Laboratories for microbiological analysis of foodstuffs are available locally and regionally throughout the country (the majority provide basic analyses, and some a few more advanced analyses).
- A national reference laboratory has the capacity to test for Salmonella, Shigella and Vibrio spp.

Areas that need strengthening/challenges

- There have been difficulties in implementing strategies and food safety and control programmes, especially risk-based programmes. Available Hazard Analysis of Critical Control Points plans are sometimes inadequate and lead to faulty critical control points. An understanding of the concepts of risk-based systems and critical control points requires efforts in terms of training for both the food sector and competent authorities.
- Coordination remains insufficient between different ministries, agencies and sectors in routine surveillance (overlap of activities). Numerous authorities are in charge of supervision and inspection, and companies do not always know who does what. Similarly, communication with other entities in the food chain is limited.

Biosafety and biosecurity

Introduction

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

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

Target

A whole-of-government national biosafety and biosecurity system is in place, ensuring that especially dangerous pathogens are identified, held, secured and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach are conducted to promote a shared culture of responsibility, reduce dual-use risks, mitigate biological proliferation and deliberate use threats, and ensure safe transfer of biological agents; and country specific biosafety and biosecurity legislation, laboratory licensing, and pathogen control measures are in place as appropriate.

Tunisia level of capabilities

An ad hoc committee on biosecurity was established in 1999, a technical committee on biosecurity in 2013, and a national committee on biosecurity is planned in 2017. The technical committee focuses on the legal framework, education, and laboratory issues including genetically manipulated organisms, pathogens, toxins, and exotic species invading environments. Although several international agreements and protocols have been ratified, national legislation guiding biosafety and biosecurity in practice is limited, or waiting to be finalized. This legislation aims to protect humans, animals, the environment, and biodiversity by using organisms and their metabolites in a sustainable way, including waste management and biosafety issues. The stakeholders involved in biosafety and biosecurity include the MoH, Ministry of Agriculture, Ministry of Local Affairs and Environment, Ministry of Education, and the Tunisian Association of Biosecurity.

Initiatives exist to introduce biosafety and biosecurity practices in Tunisian laboratories. Education on biosafety and biosecurity has started at some institutes and laboratories, implemented using a train-the-trainers approach with support from Robert Koch Institute, Germany. However, laboratories and hospitals still lack some very basic operations or culture related to biosafety. For instance, possibilities to wash hands and dry them with paper towels were far from optimal. Also, differences in general cleanliness and conditions exist between laboratories, some of which are in need of, or are currently under renovation. Personal protective equipment and biosafety hoods are generally available, but maintenance and correct use may be difficult in some laboratories.

Institutes holding pathogens and toxins are not mapped at national level. No general documentation or inventory of pathogens at institute level was available. Awareness of the contents of freezers and

containers is highly dependent on key personnel. Often, access to freezers is not restricted to authorized personnel only; anyone who has access to the laboratory also has access to freezers containing pathogens.

Field visits to evaluate biosafety and biosecurity capacities in practice were performed in Rabta hospital and laboratory, Veterinary Research Institute, Centre Technique de l'Agro-Alimentaire, and Pasteur Institute laboratories, which contain several reference laboratories. No laboratories outside the capital were visited.

Recommendations for priority actions

- Finalize the law on biosecurity.
- Create a national strategy and plan for biosecurity and biosafety. In addition to laboratories and health care of humans and animals, this plan should include roles and tasks of public security and environmental authorities.
- Engage the laboratory network in practical planning and implementation aiming for advanced biosafety and biosecurity at operational level, e.g. guidelines for adaptation of international quality standards, exercise audits, education, mapping laboratories with dangerous pathogens and toxins.
- Consider the establishment of a biosafety level 3 (BSL 3) laboratory.

Indicators and scores

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

Strengths/best practices

- Tunisia has started the process to develop and monitor an updated inventory of dangerous pathogens and toxins and facilities that store them. Efforts are also being made to reduce consolidating dangerous pathogens and toxins in facilities.
- Comprehensive national biosafety and biosecurity legislation is in the stage of development; and norms and practices of WHO reference laboratories are inspected through audits related to accreditation.
- Laboratory licensing system is available
- The nationwide survey on possible polio-containing samples for polio containment was successful.
- Pathogen control measures, including standards for physical containment and operational handling and failure reporting systems, are being developed.
- Diagnostics that preclude culturing dangerous pathogens are being encouraged.

Areas that need strengthening/challenges

- A systematic process to develop a national plan and strategy for biosafety and biosecurity should be established, with each institute/laboratory implementing its requirements. Implementation could start with capacities listed in the JEE tool, such as an updated inventory of pathogens within facilities, pathogen containment measures, and failure reporting and oversight monitoring.
- All laboratories should build up a quality system, followed by oversight monitoring and enforcement mechanisms, even if accreditation would not be realistic in the short term.

P.6.2 Biosafety and biosecurity training and practices - Score 2

Strengths/best practices

- A training needs assessment identified gaps in biosafety and biosecurity training; a train-the-trainers approach is used to educate a pool of experts to disseminate national knowledge on biological risk analysis and biosafety.

- Collaboration takes place with international partners in biosafety education.

Areas that need strengthening/challenges

- A comprehensive training curriculum for biosafety and biosecurity, especially for institutions who maintain or work with dangerous pathogens and toxins, should be included in academic and technical education, in universities and institutes of applied sciences. Institutes/facilities should also have their own biosafety and biosecurity training programmes for their personnel.
- Guidance on biosafety practices should be included in laboratory SOPs.
- There is a general lack of awareness among the laboratory workforce of international biosafety and biosecurity best practices for safe, secure and responsible conduct.

Immunization

Introduction

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

Target

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

Tunisia level of capabilities

The national Expanded Programme for Immunization (EPI) in Tunisia was established in 1979, targeting infants with five antigens. Today, the programme include nine antigens: (Bacillus Calmette–Guérin (BCG), diphtheria–pertussis–tetanus, hepatitis B, Haemophilus type b, oral/intravenous poliovirus, measles–rubella and tetanus toxoid for child bearing age women). Other antigens have been introduced under the responsibility of other MoH departments: schoolchildren, pilgrims (influenza and meningitis vaccines), health-care workers (influenza and hepatitis B vaccines) and other high-risk groups (influenza and typhoid vaccine).

Immunization is mandatory for all target populations, and is provided free of charge to these populations living in the country regardless of their nationality. Vaccination cards are mandatory for school entry. The programme has so far been 100% financed by the Government, except for some vaccination campaigns supported by WHO, the United Nations Children's Fund (UNICEF) and other partners.

EPI has built a strong vaccine management system. The country relies on a self-procurement mechanism that covers all needed vaccines, including those for the private sector, supported by a strong national regulatory authority and system for adverse events following immunization. The cold chain system covers all administrative levels and secures continuous availability and quality of required vaccines to all vaccination points (no vaccine shortages have been reported for at least 10 years). Routine immunization services are delivered through a mixed strategy of mostly fixed sites as well as out-reach sessions and mobile teams to cover remote areas.

In addition to routine immunization, EPI implements vaccination campaigns as part of its national vaccine preventable disease (VPD) control, elimination and eradication strategy (polio eradication, measles elimination, rubella prevention and control), in addition to some focused multi-antigen campaigns to improve population immunity, in particular in high-risk populations. Regular health education and population awareness activities, with pre-campaign intensification, have resulted in a strong population demand and trust in the national EPI. An effective reporting, monitoring and evaluation system is in place, including a VPD surveillance system.

The programme operates through a multi-year plan, translated into dynamic annual action plans that are in line with global and regional goals and strategies and action plans (Global Immunization Vision and Strategy, Global Vaccine Action Plan, etc.). EPI benefits from a very active national immunization technical advisory group that meets regularly to provide technical advice on the policy, strategy, and progress towards the programme goals.

As a result, the programme has achieved very high vaccination coverage rates at national level (more than 95%), as well as in almost all districts and population groups (figures confirmed by coverage surveys). The incidence of VPDs has decreased drastically: no polio cases have been detected since 1993, for diphtheria since 1994 and for maternal and neonatal tetanus since 1996. Measles incidence was reduced to less than 1 case per million population between 2008 and 2011.

The programme is challenged by the political turbulence that started in 2011, but has been able to maintain almost all its achievements, mainly because of its solid and well-functioning system, its staff commitment, strong population awareness about immunization as well as trust in the quality of immunization services provided by the public health system. However, the programme witnessed a limited measles outbreak in 2012 with 48 notified cases, which increased the disease incidence to 4.2 cases per million total population. Since that time the programme has struggled to return to the former level of 1 case per million (measles incidence stagnated at 1.4 per million between 2013 and 2015), the main reason for which is most probably the presence of some low immunity areas and population groups (19 of the 225 districts have reported coverage figures for the first dose of measles-containing vaccine of less than 90% in 2015, with two of them reporting coverage figures less than 80%).

Recommendations for priority actions

- Update the national strategy to address:
  - low coverage areas and population groups: focus on stronger monitoring and data use for action, microplanning (Reaching Every Community Approach) and increasing population demand;
  - electronic data reporting and analysis system gaps;
  - VPD surveillance gaps, particularly in high-risk areas.
- Conduct a cold chain inventory; develop a practical renewal strategy; and strengthen the use of the WHO Effective Vaccine Stock Management tool in all regions to sustain vaccine management performance achievements.
- Develop a new multi-year action plan in line with the global and regional vaccine action plans and country priorities to secure programme achievements, sustainability, and address current and future priorities including new vaccine introduction.

Indicators and scores

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

Strengths/best practices

- The national policy is supported by a public health law and high government commitment and financing, except for specific vaccination campaigns with partner contributions.
- Vaccination is mandatory for all target populations living in the country regardless of their nationality.
- Up-to-date national immunization schedules are in line with the Global Vaccine Action Plan, except for pneumococcal vaccine for which, despite clear recommendation by the well-functioning National Immunization Technical Advisory Group, introduction has been postponed for financial reasons.
- The vaccine procurement and management system is strong, with no vaccine shortages during at least the last 10 years at any administrative level.
- The mixed routine vaccination delivery strategy (fixed, out-reach and mobile) is able to reach the whole country, and is supported by accelerated VPD control, elimination and eradication campaigns.

- EPI activities are fully integrated at regional, district and local level within a solid primary health care system (more than 2100 primary health-care centres, all of which deliver vaccines).
- Regular and intense public education activities for more than two decades have resulted in strong population awareness about immunization as well as trust in the quality of immunization services provided by the public health system.
- Sustained high routine immunization coverage figures at national level (> 95%) as well as in almost all districts and population groups are validated by surveys and WHO and UNICEF validation tools.
- The incidence of VPDs has been drastically reduced: no polio cases have been detected since 1993, diphtheria cases since 1994, and maternal and neonatal tetanus since 1996.
- A national EPI bulletin is published and widely diffused every year.

Areas that need strengthening/challenges

- EPI is facing financial and human resources difficulties (high staff turnover) since the start of political turbulence) in 2011, which is affecting programme capacity to deliver high-quality immunization services to all areas and population groups, as attested by:
  - the return of measles with the 2012 outbreak and the incapacity to achieve pre-2012 levels of measles incidence;
  - some low immunity areas and population groups (19 of 225 districts have reported coverage figures less than 90% in 2015, with two of them reporting coverage figures less than 80%);
  - delays in implementing the scientific evidence-based recommendation of the National Immunization Technical Advisory Group on pneumococcal conjugate vaccine introduction.
- There are difficulties in achieving and maintaining a highly performing programme monitoring system as well as VPDs surveillance, particularly in high-risk areas and in the booming private sector.
- It has also been difficult to generalize the EPI electronic data reporting and analysis system to all regions.
- Efforts are urgently needed to develop the next multi-year plan for 2018–2022.

P.7.2 National vaccine access and delivery - Score 5

Strengths/best practices

- An intense network of primary health care centres (> 2100) deliver routine immunization services.
- A well-functioning vaccine self-procurement system is available.
- A strong national regulatory authority covers all vaccines, including those for the private sector.
- Cold chain capacity and vaccine management systems are solid, with 100% of districts supplied on a monthly basis and equipped with the necessary cold-chain equipment.
- The global OPTIMIZE project is implemented in the country.
- Close monitoring of vaccine stocks and quality throughout the cold chain phases and in all administrative levels is achieved using the WHO Effective Vaccine Management tool.

Areas that need strengthening/challenges

- No regular inventories of cold chain equipment are carried out, and a cold chain equipment renewal strategy to ensure sustainability is lacking.
- No recent cold chain assessment has been conducted.

DETECT

National laboratory system

Introduction

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

Target

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

Tunisia level of capabilities

Tunisia has an established tier-specific laboratory system covering human, veterinary, food, and environmental sectors capable of detecting selected priority diseases. In addition, the laboratory system is capable of detecting a substantial number of other infectious diseases not covered by the priority list. Laboratory services are available in all 24 regions. Ministries in charge of areas that have laboratories include those of Health, Agriculture, Local Affairs and Environment, Commerce, and Education. The MoH houses the Laboratory Unit that supervises both private and public laboratories. A system for laboratory licensing exists, but continuous and systematic evaluation of resources, capabilities and quality are lacking. National or WHO-appointed reference laboratories exist for polio, measles, rubella, West Nile fever, influenza, HIV, and tuberculosis. However, the need for other reference laboratories, such as for AMR, should be evaluated.

Field visits to evaluate laboratory capacities in Tunisia, largely focusing on public health, were performed in Rabta hospital laboratory, Veterinary Research Institute, Centre Technique de l'Agro-Alimentaire, and Pasteur Institute laboratories, which include several reference laboratories. No laboratories outside the capital were visited.

Recommendations for priority actions

- Secure resources for, and upgrade existing primary laboratories in clinical and veterinary practice to perform qualified and reliable diagnostics (reagents, equipment, education, biosafety).
- Designate official reference laboratories.
- Formalize and issue a mandate for a cooperative laboratory network (suggested tasks include diagnostic algorithms, quality assurance issues, co-audits, sharing new techniques, methodological standardization (e.g. the European Committee on Antimicrobial Susceptibility Testing); and ensure linkage of this laboratory initiative to clinicians and epidemiologists.

Indicators and scores

D.1.1 Laboratory testing for testing of priority pathogens - Score 4

Strengths/best practices

- In addition to the six notifiable diseases (HIV, influenza, polio, tuberculosis, and typhoid fever) defined by WHO, Tunisia has identified four priority diseases of epidemic potential as country-specific diseases (leishmaniasis, measles, rubella, and West Nile fever).
- A WHO regional reference laboratory or national reference laboratory has been appointed for HIV, influenza, measles, polio, rubella, tuberculosis and West Nile fever.
- The tier-specific laboratory system is also capable of detecting a substantial number of other infectious diseases not covered by the priority list.

Areas that need strengthening/challenges

- Differences in sources and allocation of funding were recognized. The primary clinical microbiology laboratories face difficulties in purchasing even some ordinary consumables, let alone renewing instrumentation and laboratory equipment.
- Laboratories fall under different branches of administration for closely related areas. Examples of areas with potential overlap are rubella and tuberculosis reference functions, food safety, and entomology. For tuberculosis, the division of work between the specialist laboratory in the Pasteur Institute and the reference laboratory in Ariana was not clear.
- Capabilities for antimicrobial sensitivity testing using standardized methods are limited. Reporting and use of AMR data to guide antimicrobial stewardship and policy is a neglected area nationally and between sectors.

D.1.2 Specimen referral and transport system - Score 4

Strengths/best practices

- A systematic transport system exists for measles, rubella, influenza and polio.
- Hospitals assure and fund transport of other samples. Sample transportation seems to function even without a systematic procedure, and covers more 80% of the country.

Areas that need strengthening/challenges

- A sample transport system and regulations should be developed and agreed nationally, and guidelines for packing and transport provided.

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

Strengths/best practices

- A general capacity for diagnostic laboratory methods such as culturing of bacteria and viruses, serology, polymerase chain reaction (PCR), and high performance liquid chromatography (HPLC) was demonstrated. Further analyses/typing (pulsed-field gel electrophoresis, Sanger sequencing, mycobacterial interspersed repetitive-unit, spoligotyping) of pathogens is also possible in selected laboratories.
- Point-of-care tests are used according to availability for the priority diseases. Validation of point-of-care tests determines if the test will be used or not.

Areas that need strengthening/challenges

- State-of-the-art diagnosis or typing methods, such as matrix assisted laser desorption/ionization time of flight (MALDI-TOF) or next generation sequencing, are not yet used in Tunisia.

- Electronic data storage or computer-assisted data analysis of laboratory results are not universally used.

D.1.4 Laboratory Quality System - Score 3

Strengths/best practices

- The quality assurance systems in laboratories are increasing. Some laboratories already have an advanced, systematic and established performance system; and some have succeeded in accrediting several methods. Other laboratories will soon follow suit.
- Accreditation to International Organization for Standardization (ISO) is available through the Tunisian Accreditation Council (TUNAC).

Areas that need strengthening/challenges

- The notion and practices of quality assurance and quality control are not widespread. Quality assurance should be included in all development projects in laboratories, not just individual quality assurance projects.
- A system of licensing health laboratories that includes conformity to a national quality standard exists but is voluntary; laboratory licensing should involve all clinical laboratories, not only private laboratories.
- Electronic data storage and analysis seem to be rarely used. Investing in and changing practices towards electronic handling of documentation would greatly enhance productivity.

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

1) Strengthened foundational indicator- and event-based surveillance systems that are able to detect events of significance for public health, animal health and health security; 2) Improved communication and collaboration across sectors and between sub-national (intermediate and local), national and international levels of authority regarding surveillance of events of public health significance; 3) Improved country and intermediate level/regional capacity to analyse and link data from and between strengthened, real-time surveillance systems, including interoperable, interconnected electronic reporting systems. This can include epidemiologic, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; and 4) Advancement in fulfilling the core capacity requirements for surveillance in accordance with IHR and OIE standards.

Tunisia level of capabilities

Tunisia has various public health surveillance systems. Traditional indicator-based systems (IBS) include rather passive mandatory disease surveillance with a defined list of notifiable diseases, and a national programme more actively collecting epidemiologic data on specific syndromes (acute flaccid paralysis, influenza-like illness/severe acute respiratory illness, fever/rash, diarrhoea, meningitis and sexually transmitted infections).

A ministerial order dated 1 December 2015 requires all health professionals, including physicians and biologists in the private sector, to notify 33 mandatory and 15 non-mandatory communicable diseases/ syndromes using a standard form. The forms are sent to regional health authority (DRS) preventive medicine/epidemiology services where data are collated. The national programme with dedicated staff at the primary health care level (CSB) collect aggregated data on specific syndromes to be sent to DRS. DRS sends a monthly surveillance report to the epidemiology department of the MoH (Directorate of Primary Health Care, DSSB) which in turn compiles and publishes a quarterly epidemiology bulletin. At present, the entire collection and reporting of surveillance data is in paper format but an electronic reporting system is scheduled to be introduced in 2017. Basic (microbiology) laboratory capacity for confirmation of diagnosis exists nationwide whereas more specific tests are available only at regional and central level, particularly in university hospitals and institutes in the capital region.

DRS is primarily responsible for detecting and responding to outbreaks. However it relies on the vigilance of health professionals to notify rapidly an unusual/rare case or cluster of cases by telephone or fax (instead of sending the form by mail as usual). In a major outbreak/epidemic, DRS alerts DSSB which convenes, if necessary, a national committee of departments, institutes and agencies according to the risk to manage the event. This institutional mechanism was been formalized by the Decree dated 31 December 2014 under the National Commission for Implementation of IHR.

Apart from the DSSB, other departments and agencies under the MoH (e.g. SHOC, Directorate of Sanitation and Environmental Protection, and ANCSEP) have key roles in public health surveillance. Notably the

National Observatory for New and Emerging Diseases (ONMNE), established by the decree dated 19 December 2005, aims to reinforce national capacity for surveillance and response to new and emerging diseases. ONMNE operates a system for international disease surveillance; sentinel surveillance based on private general practitioners and emergency departments (public and private hospitals); and pilots an event-based surveillance (EBS) system including a platform for regular exchange of information between the 24 regions and a weekly epidemiologic teleconference (EpiTec).

In collaboration with Robert Koch Institute and the German Agency for International Cooperation (GIZ), ONMNE has piloted EBS systems in five regions. Manuals, SOPs, notification forms, hotlines and information technology structures have been introduced; different actors/stakeholders at primary, regional and national levels have been trained; and procedures for detection and triaging of data/information, including media screening, verification of signals, risk assessments and communication, have been tested. ONMNE plans to expand EBS to remaining regions to capture selected events nationwide in 2017.

Recommendations for priority actions

- Finalize and launch the electronic real-time reporting system of notifiable, including zoonotic, diseases.
- Complete the functioning and coverage of EBS nationwide involving broader non-health sectors.
- Address the completeness and timeliness of disease notification, including expanded coverage of IBS from the private sector and nongovernmental organizations.
- Reinforce capacity for data analysis, risk assessment and reporting, particularly at sub-national level.
- Develop an overarching strategy for communicable disease surveillance to enhance coordination and collaboration between all stakeholders within and between sectors, in particular to clarify roles and responsibilities between ONMNE and DSSB.

Indicators and scores

D.2.1 Indicator- and event-based surveillance systems - Score 3

Strengths/best practices

- The legal basis, structure, and resources for IBS are in place with standardized reporting mechanisms.
- Some EBS functions exist (maternal mortality) and formal EBS is emerging.
- SHOC-room and are EpiTec functioning well.

Areas that need strengthening/challenges

- Under-reporting (estimated to be 60%), with particularly poor participation of the private sector, limits the capacity of IBS to detect public health threats in a timely fashion, particularly with the current influx of migrants/refugees from Libya and sub-Saharan countries who seek health care in the private sector.
- EBS does not cover non-health sectors, thus expansion of ONMNE functions to monitor non-health sources of information is necessary to achieve the full potential of EBS.
- Better coordination between different departments/agencies within the health system in disease surveillance and response requires a national strategy.

D.2.2 Inter-operable, interconnected, electronic real-time reporting system - Score 2

Strengths/best practices

- An electronic reporting system for IBS is developed, tested and ready to be piloted.
- EBS links and surveillance data are integrated between the public health and agriculture/veterinary sector.

Areas that need strengthening/challenges

- At the current stage no electronic reporting system exists in the country.

D.2.3 Analysis of surveillance data - Score 3

Strengths/best practices

- Both DSSB and ONMNE routinely compile, analyze and report surveillance data.

Areas that need strengthening/challenges

- Intermediate/regional level capacity to analyse and link data and conduct risk assessments is limited.

D.2.4 Syndromic surveillance systems - Score 4

Strengths/best practices

- Syndromic surveillance systems are in place to detect five core syndromes (acute flaccid paralysis, influenza-like illness/severe acute respiratory illness, fever/rash, diarrhoea and meningitis) indicative of public health emergencies.

Areas that need strengthening/challenges

- Expertise to support other countries in developing surveillance systems is lacking.

Reporting

Introduction

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

Target

Timely and accurate reporting of public health events according to WHO requirements and consistent coordination with FAO, OIE, IAEA and other relevant international organizations.

Tunisia level of capabilities

Despite the challenges still to be met, the Tunisian health system is relatively efficient in terms of early detection and reporting of health events. The main source of information on the morbidity of communicable diseases is the notification of reportable diseases. A similar system is also operational in the Ministry of Agriculture. In case of an epidemic, the health system is organized to set up cyclical data collection that accompanies the evolution of the epidemic and usually stops then the epidemic ends. Several structures are responsible for reporting health events to the IHR NFP, including the ONMNE, which was created in 2007 to strengthen the capacity of the national surveillance system in the areas of early detection and early warning. The SHOC room, set up in 2010 under the supervision of the Emergency Medicine Unit (MoH), also participates in the collection and reporting of health events and works in perfect collaboration with the IHR NFP. The DSSB and IHR NFP receive information on all health events and are responsible for their reporting to the WHO IHR contact point.

Since 1924, Tunisia notifies animal diseases to the OIE. These reports are notified to the Ministry of Agriculture by the General Directorate of Veterinary Services, which also notifies outbreaks of animal diseases to the Interafrican Bureau for Animal Resources. Radionuclear events are notified to the International Atomic Energy Agency (IAEA) through the National Centre for Radiation Protection under the MoH. However, a lack of coordination has been reported between the IHR NFP and other partners, particularly for radionuclear and chemical events; moreover, the decision instrument, Annex 2 of the IHR is not exercised by all relevant sectors.

Recommendations for priority actions

- Review existing terms of reference for the IHR NFP and IHR multisectoral committee and ensure they address notification and information sharing.
- Develop SOPs on information sharing related to potential public health emergencies of international concern (PHEIC) between IHR NFP and focal points for other international organizations.
- Establish an electronic platform to facilitate information sharing between national focal points.
- Organize training to raise awareness of the national focal points on the identification of potential PHEIC using the Annex 2 of IHR.

Indicators and scores

D.3.1 System for efficient reporting to WHO, FAO and OIE - Score 3

Strengths/best practices

- An IHR NFP has been designated and is fully functioning and can notify events to WHO within 24 hours.
- An IHR multisectoral committee is in place with focal points for FAO, OIE and IAEA.
- Coordination between the human health and animal health sectors allows identification of potential PHEIC.
- National laboratory capacity can confirm some pathogens, and networking and access to international and reference laboratories is available for the confirmation of public health events.
- The country has access to international expertise for support in assessing the risk of public health events of different origins.
- A direct link exists between IHR NFP and public health programmes at points of entry and the ONMNE.

Areas that need strengthening/challenges

- Capacity is limited to report public health events of chemical and radiation origins.
- Use of the decision instrument (Annex 2 of IHR) to identify potential PHEIC is poor.
- Reinforced coordination is needed in term of events of chemical or radiation origin.
- A regular and more formal information sharing mechanism is needed among IHR NFP and FAO, OIE and IAEA focal points.

D.3.2 Reporting network and protocols in country - Score 3

Strengths/best practices

- IHR NFP has the authority to report a potential PHEIC, particularly infectious, zoonotic and foodborne diseases, to WHO, IEAE and OIC in a timely manner, and coordination for potential and real PHEICs is established with the different stakeholders through the National Committee.
- Good relations exist between the SHOC room staff and the IHR NFP concerning information exchange, as well as with the military and other health services with complementary resources for the detection and exchange of information.
- Transparency has been demonstrated by the Government in sharing information of health events of potential public importance.

Areas that need strengthening/challenges

- The modalities of information exchange between the IHR NFP and other sectors should be clearly determined.
- SOPs based on IHR Annex 2 for reporting PHEICs, including events of chemical and radionuclear origin, should be developed and used, and involve all members of the IHR National Committee.
- An electronic platform to facilitate information sharing between all stakeholders should be established.

Workforce development

Introduction

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

Target

State Parties should have skilled and competent health personnel for sustainable and functional public health surveillance and response at all levels of the health system and the effective implementation of the IHR (2005). A workforce includes physicians, animal health or 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 PVS core competencies.

Tunisia level of capabilities

Multidisciplinary, competent teams to prevent, detect, investigate and respond to public health events all over the country have been available in Tunisia for more than 10 years at national level and in the six geographical regions. However, there is a low coverage at governorate and district levels, mainly because of a lack of experts in some key specialties like veterinary health, field epidemiology and information systems. This gap is covered by the delegation of authority to each governor to urgently mobilize all capacities available in all health and non-health sectors, including the private sector when needed; and deploying multidisciplinary teams in neighbouring governorates, in any of the six regions, or from the national level.

In addition, Tunisia has put in place a system that allows the rapid deployment of multidisciplinary teams (from the national level or from any one of the six regions) whenever there is a risk of an event of public health importance. This mechanism includes in particular good communication and collaboration between the various IHR stakeholders in the country, and especially with Ministry of Defence, which has relatively strong capacities for this area of work. Whenever there is such a risk, the national multisectoral committee is convened at a very high level to make urgent decisions relating to intervention, team composition, etc. To further facilitate this process, the decision was made to secure availability of multidisciplinary rapid intervention teams in each of the six regions in the country rather than in each governorate (taking advantage of the small size of the country).

Collaboration with the Ministry of Defence as well as the Ministry of Interior has proved to be efficient in several opportunities in the past, including in the areas of capacity-building and training as well as field interventions, transportation for field teams, provision of logistics and technical expertise, etc. If the event occurs within the military community, the military will take care of the response. If the event occurs within the population, the military can provide support to the concerned sectors for investigation and response.

In terms of applied epidemiology, Tunisia is in process of establishing a Field Epidemiology Training Programme (FETP) in collaboration with the Eastern Mediterranean Public Health Network (EMPHNET). Several other initiatives to build capacity in field epidemiology have included sending trainees to participate in the FETP run by MediPIET, FETP Morocco, and in universities in some countries (Belgium, France, and the United Kingdom). In addition, ad hoc initiatives have been taken by national universities in Tunisia as

well as institutions and MoH departments, like the National Institute of Health, Pasteur Institute of Tunis, ONMNE, and the Primary Health Care Department. However, a clear country strategy has been lacking to satisfy the country needs in field epidemiology and even to coordinate the above-mentioned initiatives.

While a health workforce strategy is available that includes public health professionals, it has not been evaluated or updated to suit the evolving country, regional and global context, or country needs and priorities in IHR, for some time.

Recommendations for priority actions

- Conduct a situation analysis of available multidisciplinary human resources at the three administrative levels and take necessary actions to secure adequate and homogenous coverage of the country, in particular in high-risk areas
- Build on the various training initiatives and opportunities currently in place to develop a national strategy for capacity-building in field epidemiology that considers country priorities in public health, veterinary health and IHR implementation; and is also accessible to non-MoH sectors.
- Accelerate the ongoing process for implementation of a national FETP course in collaboration with EMPHNET, and open the training to all involved officials (public health, agriculture, etc.) and private physicians and veterinarians as needed.
- Evaluate implementation of the public health-care workforce strategy, and establish a mechanism to ensure that it is regularly monitored and updated to suit the evolving country, regional and global context as well as country needs and priorities in IHR.

Indicators and scores

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

Strengths/best practices

- Multidisciplinary competent teams are available at national level and in the six geographical regions to prevent, detect, investigate and respond to public health events all over the country.
- Mechanisms to overcome the gap in required workforce at governorate and district level are in place through:
    - the delegation of authority given to each governor to urgently mobilize all capacities available in the governorate among all health and non-health sectors, including in the private sector if needed;
    - deploying the multidisciplinary teams available in neighbouring governorates, or in any of the six geographical regions or from the national level;
    - good communication and collaboration between the various IHR stakeholders, in particular with the Ministry of Defence, which has relatively strong capacity-building, field interventions and logistics.
    - securing availability of multidisciplinary rapid intervention teams in each of the six geographical regions rather than in each governorate (given the small size of the country).
- Collaboration with the ministries of Defence and Interior has proven efficient, including for capacity-building and training, field interventions, transportation of teams, provision of logistics, and technical expertise.

Areas that need strengthening/challenges

- Multisectoral, skilled and competent, workforce at governorate and local levels is not always available, mainly because of an insufficient number of some key specialties like veterinarians, field epidemiologists and informaticians.

- The mechanism put in place to overcome this challenge needs to be regularly evaluated and revised accordingly.

D.4.2 Field Epidemiology Training Programme or other applied epidemiology training programme in place - Score 4

Strengths/best practices

- The country has the required training institutions and capacities to produce the required workforce in field epidemiology: several ad hoc initiatives have taken place by four universities (for human and animal health), as well as by institutions and MoH departments.
- The country also has access to FETPs in other countries: several trainees have been supported by the Government to participate in FETP programmes run by MediPIET, Morocco, and universities in European countries.
- Tunisia is establishing a national FETP in collaboration with EMPHNET.

Areas that need strengthening/challenges

- There is a lack of a clear strategy to satisfy the country needs in field epidemiology.
- To date, there has been no clear mechanism of coordination between the numerous country institutions launching ad hoc initiatives in field epidemiology training programmes.

D.4.3 Workforce strategy - Score 3

Strengths/best practices

- A public health workforce strategy exists, including public health professionals, although it does not address all IHR disciplines.
- A mechanism is in place for monitoring and evaluation of the implementation of the strategy.

Areas that need strengthening/challenges

- The national health workforce strategy is not regularly reviewed and updated to suit the evolving country, regional and global context as well as country needs and priorities in IHR.

RESPOND

Preparedness

Introduction

Preparedness includes the development and maintenance of national, intermediate and community/primary response levels, and 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 resources, including national stockpiles of countermeasures, 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.

Tunisia level of capabilities

Tunisia has developed reasonable capacities as required under the IHR (2005) to enhance public health preparedness and planning responses to potential PHEICs. A national plan exists for preparedness, response and resilience for diseases with epidemic potential. The country also established a SHOC room in 2009 as a response measure to ensure preparedness, early detection and better management for any public health emergency.

The country has managed many public health emergencies, in collaboration with different stakeholders, related to events such as the 2011 revolution, the refugee and migrant crisis at the Tunisian–Libyan border in 2011, terrorist attacks at Bardo Museum, Sousse and Mohamed V Avenue in 2015, and the Ben Guerdane battle in 2016.

In addition to the national preparedness plan, specific hazard plans exist for certain risks such as H5N1 and floods; as well as the Disaster Emergency Plan (ORSEC) and sectoral emergency plans. Exercises to test the national preparedness plan have been conducted in collaboration with stakeholders, following which an assessment was conducted to identify gaps and take the required corrective action.

Recommendations for priority actions

- Review and update the national risk assessment in collaboration with the different stakeholders.
- Map national resources for IHR-related hazards and priority risks and develop a plan for management and distribution of the national stockpile of countermeasures.
- Incorporate all IHR-related hazards in the national public health emergency preparedness and response plan.

- Ensure availability of surge capacity to respond to a PHEIC.

Indicators and scores

R.1.1 Multi-hazard National Public Health Emergency Preparedness and Response Plan is developed and implemented - Score 2

Strengths/best practices

- The country has developed a National Plan for Preparedness, Response and Resilience for diseases with epidemic potential.
- Various stakeholders actively participate and collaborate with the MoH in planning for emergency preparedness and response to public health emergencies.
- Different exercises have been implemented in collaboration with stakeholders.

Areas that need strengthening/challenges

- All IHR-related hazards should be incorporated in the National Public Health Emergency Preparedness and Response Plan.
- Ensure availability of surge capacity to respond to a PHEIC.

R.1.2 Priority public health risks and resources are mapped and utilized - Score 2

Strengths/best practices

- A national risk assessment has been conducted to identify potential 'urgent public health events' along with mapping of resources.

Areas that need strengthening/challenges

- Collaboration needs to be strengthened with different stakeholders to conduct a comprehensive public health risk mapping using an all IHR-related hazards approach.
- A national profile of resources and the stockpile for responding to priority biological, chemical and radiological events and other emergencies should be developed and made accessible.
- The findings of the comprehensive risks and resources mapping should be used to feed into development of the multi-hazard national emergency preparedness and response plan.

Emergency response operations

Introduction

Emergency response operations include the plans, policies, programmes, and surge capacities to coordinate and respond to emergencies in an effective and a timely fashion. A public health emergency operations centre (EOC) is a central location for coordinating operational information and resources for strategic management of public health emergencies and emergency exercises. EOCs provide communication and information tools and services and a management system during a response to an emergency or emergency exercise. They also provide other essential functions to support decision-making and implementation, coordination, and collaboration.

Target

The country to have a public health emergency operation centre (EOC) functioning according to minimum common standards; maintaining trained, functioning, multisectoral rapid response teams and "real-time" biosurveillance laboratory networks and information systems; and trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of a public health emergency.

Tunisia level of capabilities

In November 2009, Tunisia established its SHOC room as a response to pandemic influenza A (H1N1). A medical team was on call 24/7 at the MoH where information was gathered on the progress of the outbreak, vaccination, cases of seasonal flu, number of people hospitalized, number of cases per day, patient transfer; and from where a daily report was prepared. From February 2010, the team was gradually replaced by technicians to support the work in the SHOC room. In addition, a committee of representatives from the various MoH departments and WHO experts met to define the SHOC room's mission and structure, and build expertise in health risk analysis.

The SHOC room was able to manage many public health emergency events in collaboration with different stakeholders such as public health-related events during the 2011 revolution, the refugee and migrant crisis at the Tunisian–Libyan border in 2011, terrorist attacks at Bardo Museum, Sousse and Mohamed the Fifth in 2015, Ben Guerdane events in 2016, and managing many road accidents with multiple victims. The public health emergency management team in the SHOC room prepared contingency plans for a possible large influx of refugees and migrants in southern Tunisia (2014–2016), and a contingency plan for case management of Ebola (2014).

Simulation exercises with different stakeholders, mainly the Ministry of Interior, were conducted to test the response to public health events. Exercises were also conducted to test the national preparedness plan, followed by an assessment to evaluate interactions during the exercises and take corrective measures. The evaluation suggested, for example strengthening the communication component, and the debriefing held in the aftermath of the Bardo attack identified gaps in coordination. A revision to guide coordination between the Ministry of Interior and the MoH was therefore conducted.

Recommendations for priority actions

- Build the capacities of SHOC room staff on public health emergency management, and increase the number of the staff available for better management of such events.

- Prepare terms of reference and SOPs describing the structural and operational elements of the incident management structure and different functions of the SHOC.
- Develop case management guidelines for different IHR-related hazards.
- Prepare SOPs for patient referral and transportation for each IHR-related hazard.

Indicators and scores

R.2.1 Capacity to activate emergency operations - Score 4

Strengths/best practices

- In addition to activities for "developed capacity", dedicated EOC staff have received training and can activate a response within two hours.
- 24/7 hotlines are available for reporting outbreaks and public health emergencies.
- A room is dedicated for the public health EOC with telephone, video and teleconference facilities, computers, fax, and printers.
- Some SOPs exist for response when necessary.

Areas that need strengthening/challenges

- Regular exercises (at least twice per year) are required to be conducted to test EOC activation.
- The number of staff should be increased for better management of public health emergency events.
- SHOC room staff should be trained on incident management structure as recommended by WHO for management of a public health EOC, and specialized training given to the EOC staff according to their roles and responsibilities.

R.2.2 Emergency operations centre operating procedures and plans - Score 3

Strengths/best practices

- EOC plans are in place for functions including public health science (epidemiology, medical and other subject-matter expertise), public communications, and partner liaison.
- A national plan exists on preparedness, response and resilience for diseases of epidemic potential.
- Tunisia has established practices, albeit undocumented, for the structure managing public health EOC.

Areas that need strengthening/challenges

- Prepare terms of reference and SOPs describing the structural and operational elements of the incident management structure and different functions of the SHOC.

R.2.3 Emergency operations programme - Score 4

Strengths/best practices

- Different exercises have been implemented in collaboration with relevant stakeholders.
- Evaluation of exercises and corrective measures are taken to address the gaps.

Areas that need strengthening/challenges

- Regular exercises to test the different functions and SOPs of the EOC are required with assessment of the results and implementation of corrective measures.

R.2.4 Case management procedures are implemented for IHR relevant hazards - Score 2

Strengths/best practices

- Case management guidelines are in place for epidemic-prone diseases.

Areas that need strengthening/challenges

- Case management guidelines should be prepared for other IHR-related hazards.
- SOPs should be prepared for patient referral and transportation for different IHR-related hazards.

Linking public health and security authorities

Introduction

Public health emergencies pose special challenges for law enforcement, whether the threat is manmade (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

A country will be able to conduct a rapid, multisectoral response, including the capacity to link public health and law enforcement, and to provide and/or request effective and timely international assistance, including to investigate alleged use events.

Tunisia level of capabilities

Collaboration between public health (human and animal) and security authorities (police, customs, health security services, etc.) exists and is deployed according to formal procedures regardless of the threats. Laws and decrees are in place to define the roles and responsibilities of the concerned ministries at the national and regional levels. Collaboration between the concerned authorities at the regional level comes under the authority and coordination of regional governors.

Coordination and collaboration between the public health and security sectors to respond to public health events also exists at points of entry and is also supported by laws and decrees. Protocols and SOPs are in place setting out the responsibilities of each ministry. While there is no mechanism for regular sharing of information between the two sectors, information is shared through the existing coordination structure in the country. A risk assessment is usually conducted to define the response measures for each sector.

Several drills have taken place to test the preparedness level to respond to chemical, biological and radiation threats in a coordinated manner. Also, real public health events have tested collaboration between the relevant sectors to implement public health response measures.

Different types of training of personnel from several sectors have been conducted to enhance their capacity in preparedness and response to public health events; however, joint training between the public health and security sectors has not taken place.

Recommendations for priority actions

- Ensure the involvement of the security sectors in training conducted by the public health sector (and vice versa) on emerging and remerging public health events.
- Develop SOPs for the joint investigation and response to public health events.

Indicators and scores

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

Strengths/best practices

- Collaboration between the public health and security sectors is supported by national legislation. The current system allows the public health sector to call for the support of the security sector.

- Well-established collaboration between the sectors, including the animal sector, has occurred in the response to real public health events such as food poisoning outbreaks, avian influenza, West Nile virus, pandemic influenza and the potential importation of Ebola and Zika infections.

Areas that need strengthening/challenges

- SOPs are lacking for the joint investigations and response, although joint response occurs in practice.
- There is no formal mechanism for regular sharing of information between the public health and security sectors.
- Joint training activities are insufficient.

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 is in place for transferring (sending and receiving) medical countermeasures and public health and medical personnel among international partners during public health emergencies.

Tunisia level of capabilities

Although Tunisia has no national plan for transferring (sending and receiving) medical countermeasures and medical personnel among international partners during public health emergencies, informal mechanisms are used during a public health crisis on a case-by-case basis. The Ministry of Foreign Affairs has formed conventions with international partners such as United Nations agencies, OIE and other international organizations such as the International Federation of Red Cross and Red Crescent Societies (IFRC). Decisions for transferring medical countermeasures and personnel are always taken at high political level; it is then up to each stakeholder in the Government to accomplish its part to implement the government decision. Many examples exist of collaboration with international partners in this area:

- Increasing preparedness capacities across the Mediterranean, project between the Tunisian National Office for Civil Protection and the Humanitarian Aid and Civil Protection department of the European Union (draft plan).
- Partnership with the Global Outbreak Alert and Response Network.
- Rabies vaccine bank for veterinary use via OIE.
- Collaboration between the Tunisian Red Crescent and the IFRC.

Recommendations for priority actions

- Develop a national plan and procedures for sending and receiving medical countermeasures during public health emergencies.
- Establish agreements with manufacturers or distributors to procure medical countermeasures during a public health emergency.
- Establish formal agreements with other countries and international organizations that outline criteria and procedures for sending and receiving medical countermeasures.

Indicators and scores

R.4.1 System is in place for sending and receiving medical countermeasures during a public health emergency - Score 4

Strengths/best practices

- The country is able to transfer medical countermeasures during a public health emergency, e.g. management of the Libyan refugee influx in 2011.
- The Ministry of Foreign Affairs has formed conventions with international partners for transferring medical countermeasures during a public health emergency.

Areas that need strengthening/challenges

- Developing a national plan and procedures for sending and receiving medical countermeasures during public health emergencies should be a priority.

R.4.2 System is in place for sending and receiving health personnel during a public health emergency - Score 4

Strengths/best practices

- The country is able to transfer medical countermeasures during a public health emergency, e.g. management of the Libyan refugee influx in 2011 and active collaboration with the Global Outbreak Alert and Response Network.
- The Ministry of Foreign Affairs has formed conventions with international partners for transferring medical personnel during a public health emergency.

Areas that need strengthening/challenges

- Developing a national plan and procedures for sending and receiving medical personnel during public health emergencies should be a priority.

Risk communication

Introduction

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

Target

State Parties should have risk communication capacity which is 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 take informed decisions to mitigate the effects of the threat or hazard and take protective and preventive action. This includes a mix of communication and engagement strategies like media and social media communication, mass awareness campaigns, health promotion, social mobilization, stakeholder engagement and community engagement.

Tunisia level of capabilities

The Arab Spring had a critical impact on public health communications in Tunisia. The Government's commitment to social and economic reform is being met by increased public and media scrutiny, with demands for greater transparency and timely information, particularly on matters of health and security. The ensuing political transitions over the past five years, including the turnover of eight health ministers, has diverted public health communication efforts towards reputational management, thereby stalling work and progress in the area of risk communication and community engagement. In spite of these challenges, Tunisia's MoH remains committed to achieving its risk communications core capacities outlined in the IHR (2005).

A key achievement in this regard is Tunisia's draft National Risk Communication Strategy 2016 which aligns health communication efforts at national, regional and local levels and between different sectors. In addition, a draft emergency preparedness and response plan and the scale-up of the SHOC room provide the foundations for a communications platform that can respond to a public health or humanitarian emergency.

Risk communications and media relations are managed at national level by a core media team within the Minister of Health's cabinet. At a secondary level, communication staff from three main departments responsible for primary health-care services, university hospitals, and hygiene and environmental protection, work directly with the Minister's cabinet and the SHOC depending on the nature of the emergency.

Communication staff within ONMNE, ANCSEP, and the Pasteur Institute work with MoH directors to manage risk communication at the regional level as well as with local health centres.

Since 2014, the new Constitution allows for greater press freedom. More than 48% of Tunisia's population have Internet access, and the public seeks most of its health information online. At the same time, traditional media –TV, newspapers and radio – increasingly cover health issues. For example, Tunisia's main national channel, TV1, dedicates a weekly, hour-long talk show during prime time to matters of public health. However, the MoH faces a key challenge in providing health information in a timely manner due to bottlenecks in information flow from department level to clearance at ministerial level. Basic media monitoring only covers what is being reported in newspapers while the MoH uses Facebook as a one-way channel to provide updates on high-level meetings.

As with many other IHR core capacities, limited human and financial resources are a constraint to successful risk communication activities. A dedicated risk communication team needs to be trained and provided access to appropriate technologies upon which to build an operational platform to work efficiently and credibly with other sectors and partners during both public health and humanitarian emergencies.

Recommendations for priority actions

- Operationalize the national risk communication strategy across MOH and other response partners.
- Conduct regular information sharing sessions with media to provide background updates on local public health threats
- Develop SOPs for coordination mechanism between sectors and partners
- Conduct regular community outreach activities to establish trusted relationships prior to emergencies

Indicators and scores

R.5.1 Risk communication systems (plans, mechanisms, etc.) - Score 2

Strengths/best practices

- A communications/media relations department is housed at the highest level, within the Cabinet of the Minister of Health.
- A SHOC room is in place for health emergencies and is managed 24/7 by three technical staff who have been formally trained in communications.
- A unit in charge of communications and training exists in the ONMNE. Emergency health communications trainings have been conducted with health staff at regional and local levels.

Areas that need strengthening/challenges

- Develop a strong communications operational platform to ensure that risk communication support is provided to all areas of public health in a systematic manner, and across other sectors such as animal health, food safety, immunization, chemicals and radiation.
- Train and scale up a team of dedicated risk communication and community mobilization staff at national, regional and local levels.
- Dedicate a specific budget for national, regional and local communications plans and activities to strengthen multisectoral risk communication capacity.

R.5.2 Internal and partner communication and coordination - Score 3

Strengths/best practices

- A communications committee made up of technical staff from different sectors meets on an as-needed basis. Coordination and collaboration for risk communication exists between sectors and partner but on an ad-hoc basis and with limited partner and stakeholder engagement. However during a public health or humanitarian emergency, informal coordination mechanisms are activated and collaboration between different sectors is strong.
- The SHOC room and the national emergency preparedness and response plan serves as a communications coordination platform during an emergency.
- Internal communication and coordination has been tested in emergency simulation exercises as part of the SHOC room activities.

Areas that need strengthening/challenges

- Strengthen communication coordination mechanisms through regular meetings, joint emergency SOPs and testing the procedures with food safety, chemical and radiological events, and animal health sectors.
- Develop standard processes to increase engagement with civil society, media, private sector, national institutions and leaders at regional and local levels for coordinated communication activities.

R.5.3 Public communication - Score 2

Strengths/best practices

- Public communication is managed by the communications and media relations unit in the Minister of Health's cabinet. If necessary, media engagement can also be delegated to MoH regional directors. Most public health information is disseminated through traditional media – newspapers, radio and TV – as well as the MoH Facebook page.
- National TV1 provides a free-of-charge platform to broadcast important health information and provides a weekly talk show on matters of public health. A high profile, TV health reporter is employed by the MoH to increase public access to health news and improve reputational visibility.
- The MoH with the support of GIZ has provided emergency health communications training for national journalists.

Areas that need strengthening/challenges

- Media engagement plans should be developed or updated to include SOPs and organizational charts for every new public health event or humanitarian crisis.
- Regular media briefings should be organized and press releases, Question and Answer (Q&As) sheets, and infographics disseminated to expand journalist knowledge and engagement on health issues.
- A strong digital platform is needed, expanding use of social media and new technologies to share information and engage the public on health issues.

R.5.4 Communication engagement with affected communities - Score 2

Strengths/best practices

- The national risk communication strategy and the emergency preparedness and response plan outline key components for community engagement, which include stronger linkages with community groups, enhanced interaction between health-care providers and their clients, far-reaching multimedia campaigns, trained staff and monitoring and evaluating activities for their effectiveness. However these activities have yet to be operationalized.

- The MoH develops communication plans that include providing information, education and communication (IEC) materials; engaging local communities through health-care workers and religious leaders for specific infectious diseases such as A(H1N1), measles, rabies; and vaccination campaigns.
- IEC materials focusing on healthy lifestyle behaviours, promoting environmental sanitation, vaccine uptake, reproductive health, nutrition, and maternal and newborn care are produced by MoH technical staff and cleared by the communications team within the Minister's cabinet.

Areas that need strengthening/challenges

- A dedicated, centralized health promotion team with an accompanying budget should proactively lead and coordinate community engagement and social mobilization activities within MoH and across sectors.
- Community engagement activities are top-down in approach, with the MoH disseminating information without feedback from beneficiaries. Thus, a processes should be developed to test health promotion plans, IEC materials and evaluate their impact on the communities that received them.
- Regaining the public's trust in the MoH and other government institutions is critical for Tunisia. Active participation of community members should be harnessed in emergency planning and decision-making to increase engagement, build trust and foster community ownership of life enhancing public health solutions.

R.5.5 Dynamic listening and rumour management - Score 2

Strengths/best practices

- The communications and media team within the Minister's cabinet conducts daily screening of newspapers for any health related news or articles, shares important information with regional and local level health officials, and addresses rumours if needed.
- Disease surveillance and reporting mechanisms at regional and local levels provide some level of community feedback.
- Across Tunisia, the public is very active on the Internet and social media. This can become a rich two way platform for feedback from local communities and information sharing from health-care workers to encourage locally accepted dynamic listening and rumour management systems and build trust in the public health system.

Areas that need strengthening/challenges

- Dynamic listening and rumour management mechanisms need to be formalized and integrated into internal and partner coordination, public communication and community engagement processes.
- Systematic health blogs and social media sites should be monitored to identify public health concerns and patterns that are not picked up through regular media monitoring. The information gathered can be used to proactively manage rumours and enhance two-way information sharing between the public and health-care professionals.

OTHER

Points of entry

Introduction

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

Target

States Parties should designate and maintain the 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.

Tunisia level of capabilities

Tunisia has a western border with Algeria, a south-eastern border with Libya, with the Mediterranean Sea to the north and east. Of its 26 points of entry, 8 are designated airports and 7 authorized ports.

Apart from Tunis-Carthage airport which is directly under the authority of the DSSB at central level, all other PoE are under the technical tutorship of the DSSB but report directly to the public health regional directorates. The border health control units at PoEs make up the "competent authority" as per the IHR. Moreover, they are able to reach the IHR NFP whenever needed, pursuant to IHR article 22. The linkage between the competent authority and the national surveillance system is functioning as prescribed in the IHR Annex 1. Furthermore, all seven seaports are declared authorized and are entitled to issue Ship Sanitation Control Certificates, Ship Sanitation Control Exemption Certificates as well the extension of the ship sanitation certificates.

Overall, the border health control units are part of both of the facilitation committees and EOCs. However, the lack of coordination between the competent authority and representatives of the Directorate of Sanitation and Environmental Protection, the Ministry of Agriculture and other relevant stakeholders jeopardizes its overarching mission of early detection, notification and response.

Finally, there is no joint designation of adjacent ground crossings, with Libya or Algeria, for IHR capacities.

Recommendations for priority actions

- Enhance coordination between the border health control units and the relevant stakeholders at PoE.
- Establish sustainable communication channels between the DSSB and the Directorate of Sanitation and Environmental Protection regarding activities carried out at PoE.
- Develop a public health emergency contingency plan to be integrated within the emergency plan of each designated PoE, and SOPs for the early detection, investigation and response to ill passengers at PoE.

- Organize training for public health staff, matching their needs to the borders context.

Indicators and scores

PoE.1 Routine capacities are established at PoE - Score 4

Strengths/best practices

- Beside the border health control units, the OACA (Civil Aviation Authority at Airports) and OMMP (Ports and Merchant Navy Authority) provide appropriate medical services including diagnostic facilities, adequate staff, equipment and premises.
- OACA provides ambulances to ensure the transport of ill travellers to appropriate medical facilities. Otherwise, ambulances from the MoH or from the Emergency Medical Services are accessible.
- All eight seaports are declared authorized in compliance with the IHR article 20 and the personnel are well trained to issue ship sanitation certificates.
- A functioning programme exists for the control of vectors and reservoirs in and near PoE, involving routine entomological surveillance targeting exotic species, especially Aedes aegypti and A. albopictus.

Areas that need strengthening/challenges

- Activities, through inspection programmes, to ensure a safe environment for travellers – including drinking water, food safety, vector control and solid and liquid waste management – are carried out by different entities without involving or sharing outcomes with the competent authority.
- These entities include OACA through its medical and social division and its environmental division, OMMP, Tunis Air Handling, TAV airports (subcontractor in charge of the management and operation of airports in Tunisia) and the public health regional services in charge of sanitation, which are under the authority of the Directorate of Sanitation and Environmental Protection.
- Greater communication and collaboration, preferably formalized, are recommended between the medical services under OACA and OMMP and the competent authority, in order to share information, to collect relevant data and to foster the declaration of notifiable diseases in the interests of the national surveillance system.
- There is no procedure to check the health part of the Aircraft General Declaration.
- Regarding vector control, it is recommended that an emergency surveillance plan is added to the overall surveillance plan for rapid action in case of invasion by exotic species; implementation of integrated vector management measures is also recommended.

PoE.2 Effective public health response at points of entry - Score 1

Strengths/best practices

- Several practical trainings for public health staff have been conducted in order to deal with public health emergencies at PoE.
- A simulation exercise, involving the competent authority at Tunis Carthage airport, has been organized.
- Thermal devices are available, along with personal protective equipment for both personnel and travellers.

Areas that need strengthening/challenges

- The emergency contingency plan needs to be finalized without delay, validated by the public health authority and by all the relevant stakeholders, and incorporated within the airport/port emergency plan.

- The emergency contingency plan should be tested through tabletop or full-scale exercises.
- There are no procedures to monitor, in consultation with customs, baggage, cargo, containers, conveyances, goods, and postal parcels as per the IHR requirements; or to apply measures in case of a public health emergency of international concern.

Chemical events

Introduction

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

Target

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.

Tunisia level of capabilities

Tunisia is a substantial user of chemicals, particularly in the agropastoral, petrochemical and industrial sectors, but also in the health and domestic sectors. Chemicals are often managed poorly or in a piecemeal fashion. Pesticides and industrial chemicals are of particular concern. There is a basic legislative infrastructure in place for response to events of chemical origin, but no complementary regulations for the control of chemicals and hazardous substances produced intentionally or unintentionally. Moreover, existing legal measures do not address the whole life cycle of chemicals. The main stakeholders are the ministries of Health; Interior; Local Authorities and Environment; Defence; Industry and Internal Trade; Transport; and Energy and Mines.

Pharmaceuticals are regulated. While there is legislation for the control of toxic chemical waste (including medical waste), technical capacity for sound management is weak. Thus, the planned Management Centre for Hazardous Waste needs to be put into service, and the relevant regulations and operating procedures revised.

The country lacks adequate capacity to enforce regulations, mainly due to lack of trained human resources and financing. A national chemicals profile giving the administrative infrastructure for management of chemicals has been prepared, but needs regular updating. A chemicals safety policy and a national strategy and action plan for implementing the Strategic Approach to International Chemicals Management (SAICM) are in preparation. The country has ratified the Basel, Rotterdam and Stockholm Conventions, the Paris Convention on chemical weapons, and is progressing towards ratification of the Minamata Convention on Mercury. It is also working towards implementing the System of Classifying and Labelling Chemicals (GHS). The Amendment to the Basel Convention has been ratified and incorporated into legislation on toxic waste. The International Labour Organization (ILO) conventions 170 and 174 are not in force.

Guides and procedures for sound chemical management have been elaborated, but only partially implemented. There is good access to international databases (e.g. INTOX; INCHEM; TOXbase; Toxinz). Environmental monitoring of air and water is in place in parts of the country; surveillance for other media is also partial. A national plan for implementation of the Stockholm Convention on Persistent Organic Pollutants is being prepared.

Coordination among IHR sectors functions during emergencies, while mechanisms for regular consultation, information exchange and communication of chemical risks need strengthening. Indeed, awareness

of chemical risks and events is lacking, and appreciation of the implications for response to chemical emergencies at decision-making levels in the regions is poor. Further training of human resources in risk communication is desirable.

Good laboratory capacity to identify chemical risks with SOPs exists at the national level, but remains weak at the peripheral level. The laboratory of the National Institute of Occupational Health and Safety (ISST) can monitor exposure of workers, and a regional network of such laboratories is needed.

A well-developed national centre for toxicovigilance and poisons control exists providing an important component for 24/7 identification and surveillance of chemical risks, particularly acute exposures. Capacity for identification and surveillance of chemical risks from chronic exposure, with the potential of becoming chemical events, needs strengthening. Capacity exists for identifying chemical risks associated with contamination of food, although capacity to analyse clinical toxicological samples only exist in facilities in Tunis and Sousse.

The health sector cooperates with emergency services (coordinated through the Ministry of Interior) for preparedness and response to IHR-related chemical events and their notification. Law 91–39 on the prevention of, and response to, disasters provides the authority for this cooperation at national and regional levels; and the MoH SHOC room and parallel emergency response centres of other ministries provide the operating mechanisms. The Ministry of Interior and Civil Defence has its own system of plans and programmes for response to all types of emergencies, including chemical events. The system is still under preparation and has yet to be coordinated with other stakeholder responsibilities. The health and military sectors have mobile chemical emergency response facilities, but they do not cover the whole country. Each major industrial installation has its chemical emergency preparedness and response plan for the periphery and interior of the installation; however, such plans do not cover small and medium-sized operations using chemicals, and need regular testing and improvement through simulation exercises.

Recommendations for priority actions

- Establish a legally constituted National Inter-ministerial Commission on Chemical Events, with a budgeted programme of work.
- Activate the Management Centre for Hazardous Waste with revised regulations and operating procedures.
- Ratify the ILO international conventions 170 and 174.
- Reinforce the laboratory capacity of the Tunis Poisons Centre and the ISST to become reference laboratories for follow-up and toxicovigilance.
- Accelerate implementation of the GHS in all sectors.

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

Strengths/best practices

- Guidelines for surveillance are available.
- The Poisons Control Centre has clinical and analytical toxicological facilities and an extensive database of cases of chemical exposure, collected 24/7 in real time; the database does not capture cases throughout the country as there is no hospital reporting system.

Areas that need strengthening/challenges

- Responsibilities are divided among several sectors with insufficient coordination, reporting, and exchange of information on a day-to-day basis, except during major emergencies.

- The National Chemicals Profile needs to be regularly updated with inputs from all stakeholders. In addition, a national chemicals data collection system using standardized definitions and harmonized reporting formats needs to be established, kept up to date and managed through a legally designated and funded institution.
- A programme to evaluate health risks of chemical origin throughout the country needs to be developed. Existing inventories of potential chemical risk sites and mapping of potential hazards also need to be regularly updated and shared among relevant stakeholders and decision-makers for specific action.
- Further, a system should track important hazardous chemical consignments entering the country, and registration and tracking capacity developed, and the obligatory implementation of the GHS in all sectors should to be accelerated.
- Laboratory capacity needs strengthening with accredited laboratories to support diagnosis and management of exposed persons and the monitoring of biomarkers of chemical events, including the integrated transport of analytical samples. This may build on the existing Tunis Poisons Centre and ISST laboratories, and facilities established in industrial zones where there is a high risk of chemical events. Regional laboratory capacity should be enhanced for sampling, preservation and transport under good laboratory conditions to reference laboratories.
- Qualified human resources and finances remain insufficient.

CE.2 Enabling environment is in place for management of chemical Events - Score 3

Strengths/best practices

- An emergency action plan defines the roles and responsibilities of the concerned authorities and includes an inventory of the main potentially hazardous sites and installations.
- There is surveillance for chemical events, although it is not comprehensive. However, Tunisia takes part in international chemical networks such as the WHO International Programme on Chemical Safety INTOX.
- Legislation is in place, but should cover the whole chemical life cycle and guarantee access to information. Pesticide and other chemical residue limits for food are in place.
- In the case of serious chemical events, financial and technical resources can be immediately mobilized through the Disaster Emergency Plan (at national regional and specific levels). Simulation exercises are held from time to time.

Areas that need strengthening/challenges

- A national plan for chemical event management, coordinated among all stakeholders, does not exist.
- A comprehensive, intersectoral health plan for chemical incidents is also needed, which is regularly evaluated. The health sector needs to review its own chemical emergency response plans for health and logistic facilities and pre-hospital management of exposed persons; and to identify areas that need strengthening in cooperation with relevant stakeholders.
- The national poisons centre and related analytical and clinical facilities need to be replicated in all regions, and case data systematically collected in harmonized forms.
- Capacity for health risk evaluation and communication of the risks need strengthening.
- Training of medical personnel in diagnosis and management of chemicals events should be undertaken, with participation in simulation exercises.

Radiation emergencies

Introduction

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

Target

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

Tunisia level of capabilities

To prevent and mitigate the consequences of radiation emergencies, preparedness, response and recovery arrangements should be carefully planned and developed through cross governmental and multinational agreements. The IAEA Safety Standards General Safety Requirements Part 7 classify emergency preparedness scenarios in five different categories, three of which have been identified by the Tunisian authorities as having the potential to occur in Tunisia.

Four existing structures cover all the regulatory and technical aspects of radiation protection in Tunisia, including nuclear emergency response.

- The National Centre for Radiation Protection (CNRP) under the MoH assumes all the regulatory functions dedicated to radiation practices and sources. It is also able to deliver various radiation protection-related services and is the point of contact for any radiological incident and the main responding body. The CNRP also manages the retrieval and storage of any sources recovered during radiation emergencies. In the ORSEC emergency plan, the CNRP strategy for radiation emergency response is being decentralized, notably by reattributing some responsibilities to first responders (fire and rescue services, customs etc.) with regard to immediate countermeasures (related legislation will need to be updated to reflect the CNRP as the first responder). Training has occasionally been provided, especially for customs personnel working at PoE. To improve training management, a competency framework will be developed with a tracked record of all personnel involved in the emergency response plan.
- The National Centre for Nuclear Sciences and Technologies (CNSTN) was established in 1993 as a public research institution under the Ministry of Higher Education and Scientific Research. Its mission is to promote the use of nuclear technologies and lead any nuclear-related educational or research project. The CNSTN can support the CNRP in an emergency response, notably through the use of a mobile laboratory and other instrumentation, although the need for such support has not often been expressed. The CNSTN is present in emergency preparedness activities, where many training courses on instrumentation have been undertaken for first responders, including custom officers.
- The National Atomic Energy Commission (CNEA) is the national warning point known to the IAEA, whose Secretariat is housed within the CNSTN.
- The Commission for Radiation Protection (CNR) is in charge of delivering all documentation related to radiation emergencies, listing all monitoring equipment, nuclear facilities, available assets and competent people existing throughout the various ministries. Its Secretariat is housed within the CNRP.

A broad legislative infrastructure exists for radiation emergencies but has never been truly implemented. The 30-year-old decree (No. 86-433) sets the basis of radiation emergency preparedness and response by detailing the actions to be undertaken to protect the public against ionising radiation. Particular mention is made (art 67 to 72) of the creation of a National Commission for Radiation Protection composed of representative from seven different ministries, with the responsibility to establish the national arrangements for preparedness and response to any radionuclear related incident.

No national or regional radiation emergency plans are currently available, no SOPs exist for first responders dealing with radiation emergencies, and no national exercises or drills are carried out to test the emergency response arrangements. Procedures for monitoring and treating internally contaminated individuals do not exist.

International arrangements have been ratified through several agreements, and international cooperation is carried out via official channels and a National Liaison Officer permanently based at the CNSTN. International arrangements are regularly tested and exercised (Convex). A national monitoring network is operational 24/7 and international scale events can be monitored.

A national inventory of radioactive sources and an inventory of sources existing in Tunisia before the law of 1981 currently exist at the CNRP. The primary use for sources are medical (80%) and industrial research (20%) applications. The industrial sources are used for fixed gauges, fluoroscopy X-rays, mobile gauges (testing density and humidity) and non-destructive testing. Radiopharmaceuticals, mainly produced outside the country, are imported on a regular basis to satisfy national needs. Transport accident concerns have therefore been incorporated into the National Plan for Radiological and Nuclear Emergencies (PNURN).

Current arrangements for radiation emergency response allow the country to deal with simple radiological emergency scenarios (e.g. low activity source detection and recovery). However, Tunisia would be challenged by more complex scenarios, especially if they involved the resuspension of radioactive particulates. This is partly due to its lack of competence in atmospheric dispersion calculation, internal dosimetry (for emergency scenarios) and retrospective dosimetry, and partly because of the absence of a plan setting out the roles and responsibilities of each stakeholder. Such scenarios, while being identified in Tunisia's threat assessment (IAEA-GSR Part 2, Category III, IV and V), are not currently addressed.

Recommendations for priority actions

- Revise, update and set the basis for an agreement between the different stakeholders for the creation of a Radiation Emergency Response Plan.
- Develop SOPs for stakeholders involved in the PNURN, especially for first responders (blue lights).
- Review legislation related to first responder responsibilities such as fire and rescue in order to ensure the necessary training, which should be traceable for all staff involved in the emergency response plan.
- Develop competencies in atmospheric dispersion calculation for people's dosimetry and food bank estimates; as well as in internal dosimetry for emergency scenarios and retrospective dosimetry.

Indicators and scores

RE.1 Mechanisms are established and functioning for detecting and responding to radiological emergencies - Score 2

Strengths/best practices

- CNRP is the national expert for any radiological incident and has a focal point with 24/7 response capability, assured through an on-call officer rota. Support from the CNSTN is available on request.
- Environmental and public monitoring capabilities exist with qualified staff. Food can also be qualitatively monitored and limits for food contamination are implemented.

- A set of 24 gamma monitoring network probes together with three air sampling monitors are installed throughout the country and monitor the environment on a 24/7 basis, allowing the country to track down events of international concern. Tunisia is also involved in information and capability exchange arrangements at the international level through the IAEA, which are regularly tested through exercises (Convex). Simulation exercises have also been tested in the airport.
- Tunisian institutions receive financial support from the IAEA, the European Union and US programmes, in the form of monitoring equipment and participation in international trainings. Human resources are sufficient in number, but appropriate training is needed for first responders.

Areas that need strengthening/challenges

- The draft national plan initiated in the early 2000s has never been finalized nor approved by the different stakeholders. Rapid adoption of this plan by all concerned parties is a priority, along with identification of radiological scenarios, stakeholders and roles based on human and equipment resources. Currently the CNRP assumes unofficial responsibility and coordination for emergency response.
- Legislation should be reviewed and updated to reflect the reattribution of the CNRP as first responder and a competency framework with a record of all personnel involved in the emergency response plan developed to improve human resource management.
- Monitoring equipment is housed in different institutions, all of which are involved in emergency response. This overlap can result in confusion over an agency's responsibilities for radiation monitoring.
- SOPs are needed for stakeholders involved in the PNURN, especially for first responders (blue lights). These should be scenario-based, written by technically competent bodies and be approved by the regulator. They should define step-by-step the intervention procedures for any radiation-related incident. The SOPs will be referenced into the PNURN, and therefore tested during exercises. The same applies for environmental contamination and mitigation actions.

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

Strengths/best practices

- Most PoE have trained customs officers equipped with portable monitoring equipment. Systematic monitoring is therefore performed at all times and any medium to large source should be detected. Rades port is also equipped with a portal monitor able to assess any goods transiting through this PoE.
- The private and industry sectors manage their own sources, which are listed in tracked records, and the "polluter-pays" principle applies.
- Tunisian legislation makes provision for the transportation of dangerous goods including radioactive materials, although these are not currently in line with international standards and regulations.
- A radiological waste storage location exists for any source recovered during an emergency situation.

Areas that need strengthening/challenges

- All relevant stakeholders should converge to create a Radiation Emergency Response Plan, to be implemented with regular, mandatory testing through legal means. To optimize resources, strategic and operational stakeholders could be tested on a supra regional level, ideally during the same exercise. Exercises should as far as possible be umpired by the regulator. Any discrepancy of stakeholder actions during exercises with regards to their role in radiation emergencies should be duly noted, and corrective actions enforced by the regulator.
- Most laboratories are not accredited.
- Emergency preparedness and response is limited to simple scenarios and does not provide for more complex scenarios where large numbers of people might be involved. In particular no provisions have been made for the referral, transport and decontamination/treatment of large numbers of affected people.

Annex 1: Joint External Evaluation background

Mission place and dates

Tunis, Tunisia, 28 November to 2 December 2016.

Objectives

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

Mission team members

- Michel Thieren, (Lead) WHO Representative of Pakistan
- Abdelaziz Barkia, (Co-Lead) Public Health Advisor, Member of the IHR Regional Assessment Committee, Rabat, Morocco
- Dalia Samhouri, Country Emergency Preparedness and IHR, WHO Regional Office for the Eastern Mediterranean
- Nhu Nguyen Tran Minh, Infectious Hazards Management, WHO Regional Office for the Eastern Mediterranean
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- Alexandre de Ruvo, Higher Radiation Protection, Emergency Response Group, Centre for Radiation, Chemical and Environmental Hazards, Public Health England, United Kingdom
- Saara Salmenlinna, Bacterial Infections Unit, Department of Infectious Diseases, National Institute for Health and Welfare, Helsinki, Finland
- Ari Horman, University of Helsinki, Finland
- Ezzeddine Mohsni, Eastern Mediterranean Public Health Network, Amman, Jordan
- John Hanes, United Nations Institute for Training and Research, Geneva, Switzerland
- Mohammed Moussif, Public Health Department, Mohammed V International Airport, Casablanca, Morocco
- Laura Ngo-Fontaine, Communications and Advocacy Specialist, Geneva, Switzerland

Preparation and implementation of the mission

- The agenda, responsibilities, and logistics were finalized in collaboration with the assessment team members and representatives in Tunisia.
- A national training was conducted on 10–11 November 2016 to provide national stakeholders with the information and resources necessary to participate successfully in the JEE process; and 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.
- The Ministry of Health with the support of the WHO Tunisia Country Office made the necessary administrative and logistic arrangements for the the external experts' visit to the country.
- One-day orientation was conducted for external experts on the JEE process and tool, objectives and expected outcomes, and to discuss and finalize the agenda of the mission.
- Meetings with the relevant stakeholders and field visits were conducted to validate the collected information and to reach a consensus on the scores and priority actions.
- A debriefing meeting with senior officials and national technical teams involved in the evaluation took place on the last day of the mission to present the outcomes of the JEE; best practices and priority actions.

Limitations and assumptions

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

Key host country participants and institutions

Name	Organization
Bejaoui Mondher	MSP
Youssef Zidi	Ministry of Local Affairs & Environment
Ali Mrabet	MOH
Djaibi Edryss	Ministry of Transport
Chedlia Fendri	CHU La Rabta
Maazaoui Latifa	DSSB
Hassanet Boulaabi	ANCSEP
Gharbi Nesrine	ANCSEP
Aouadi Nader	ANCSEP
Habiba Mamlouk	DSSB
Hourchani Roukaya	DGSV
Guerfalli Naima	DSSB
Dhidah Lamine	CHU Sahloul
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Ilhem Boutiba	CHU Charles Nicolle
Kammoun Ahmed Riadh	DHMDS
Kamoun Dalel	DPM
Gamara Dhikrayet	DSSB
Souissi Amel	Ministry of Defense
Rahali Abdelmoula	MOH
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Nissaf Bouafif	ONMNE
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Kaouther Oukaili	DGSV
Habiba Mamlouk	DSSB
Faidi Olya	DGSV
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Supporting documentation provided by host country

National legislation, policy and financing

- Decrees, Orders and Laws described under the Tunisia level of capabilities.

IHR COORDINATION, COMMUNICATION AND ADVOCACY

- Decree No. 2014–4776 establishing the National Commission for Monitoring the Implementation of the IHR and its functions.
- Index of legal texts governing the public health sector (www.santetunisie.rns.tn/images/actualite-fr/textes_juridiques.pdf).

Antimicrobial resistance

- Data and publication through LART (www.infectiologie.org.tn).
- Nosocomial infection survey reports 2005 and 2012 (NosoTun–05 and –12).
- National hand hygiene programme, Phase II (Five-Year Plan 2009–2013).
- Upgrading strategy for laboratories (2016–2020).
- 1990 Circular on the protection of health workers.
- Guide to good practice on treatment of reusable medical devices.

Zoonotic diseases

- Legal basis for zoonoses.
- National programmes.
- Website (www.rage.tn).
- List of notifiable diseases.
- Reports/data receiving.
- Strategies and response plan.

Food safety

- Act 117–92 on consumer protection.
- Act 2005 on breeding.
- Act 94 relating to external trade.
- Control reports from different departments / data receiver.
- Guides of good practice.
- Procedures, e.g. investigation of a foodborne disease outbreak.
- Strategies and action plan.
- Website Maghreb Association for Food Safety (www.amssa-tunisie.org).

Biosafety and biosecurity

- Tunisian Constitution, 2014, Articles 38 and 45 on guaranteed security and quality of health services and the right to a clean and safe environment.
- Biological Weapons Convention, Ratification 1973.
- Cartagena Protocol on prevention of biotechnological risks, Ratification 2002.

- Protocol for the prohibition of use of asphyxiating, poisonous or other gases, and bacteriological methods of warfare, Ratification 1967.
- A law to support the fight against terrorism and money-laundering, 2003.

Immunization

- National EPI Programme multi-year plan 2013-2017.
- National EPI programme SOPs.
- 2015 national EPI bulletin.
- National guidelines for vaccine preventable disease surveillance.

National laboratory system

- Good practice guide for laboratories.
- Upgrading the strategy for laboratories (2016–2020).
- Check list of accreditation by WHO.
- Circulars for case definitions, control, and specimen transport to laboratories of selected diseases.

Real-time surveillance

- National guidelines for surveillance of communicable diseases.
- Ministerial order dated 1 December 2015 on revised list of notifiable diseases.
- National plan for preparedness, response and resilience to epidemic prone diseases.
- Early warning and response: rationale for event-based surveillance (draft plan).

Reporting

- WAHIS (OIE) Reports.
- ARIS-2 (AU-IBAR) Reports.
- Convention on Early Notification of Nuclear Accidents 1986.
- Decree No. 2014-4776 establishing the National Commission for Monitoring the Implementation of the IHR and its functions.

Workforce development

- Décrets Conseil de l'Ordre des Médecins (COM) et Conseil de l'Ordre des Pharmaciens (COV).
- Loi n° 80-85 du 31 décembre 1980 portant organisation des carrières de médecine vétérinaire.
- Loi n° 97-47 du 14 juillet 1997 relative à l'exercice et à l'organisation de la profession de médecin vétérinaire.
- Commissions Nationales.
- Loi Maladies à Déclaration Obligatoire (MDO).
- Loi & Décrets maladies animales et zoonoses.
- Loi no 2005-95 du 18/10/2005, relative à l'élevage et aux produits animaux.

- Décret no 2009-2200 du 14/07/2009, fixant la nomenclature des maladies animales réglementées et édictant les mesures générales applicables à ces maladies.
- Décret no 2010-1207 du 24/05/2010, complétant le décret no 2009-2200 du 14 juillet 2009, fixant la nomenclature des maladies animales réglementées et édictant les mesures générales applicables à ces maladies.

Preparedness

- The National plan for preparedness, response and resilience for the diseases of epidemic potential "Le Plan de Préparation, de Riposte et de Résilience aux maladies à potentiel épidémique (2P2Rmpe)".
- Law 91–39 on calamities, decree 93–942.
- Law 94–122 on land use planning and urban planning.
- Law 96–29 on marine pollution.
- Specific hazard plan for measles, rabies, Ebola, avian influenza, and floods.

Emergency response operations

- Contingency management plan for potential influx of migrants and refugees: 2011–2014.
- National Plan for Preparedness, Response and Resilience for Diseases with Epidemic Potential (2P2Rmpe).
- Circulaire 50–2002 (plans hospitaliers de gestion d'un afflux massif).
- Guide de coordination des opérations de secours entre le ministère de l'intérieur et le ministère de la santé, 2000.
- Note 236/2010 du 27.02.2010: création du Shocroom.
- Décret n°98-470 du 23.02.1998: création de l'UMU.

Linking public health and security authorities

- Law 92–71 of 27 July 1992 on communicable diseases and amended and completed by Law 2007–12 of 12 February 2007.
- Law 91–39 of 8 June 1991 on establishing the national commission and regional commission to fight disasters, their prevention and the organization of relief and the composition and modalities of work of the national and regional commissions.
- Decree No. 942–93 of 26 April 1993 on the development of national and regional plans for preparedness and response to disasters.
- Decree No. 74–1064 of 28 November 1974 identifying the authority, roles and responsibilities of the Ministry of Public Health.
- Decree 75–316 of 30 May 1975 identifying the authority, roles and responsibilities of the Ministry of Finance.
- Decree 75–342 of 30 May 2001 identifying the authority, roles and responsibilities of the Ministry of the Interior as amended by Decree 2001–1454 of 15 June 2001.
- Decree No. 75–671 of 25 September 1975 identifying the authority, roles and responsibilities of the Ministry of Defence.

Medical countermeasures and personnel deployment

- Increasing preparedness capacities across the Mediterranean, Project between the Tunisian National Office for Civil Protection and the Humanitarian Aid and Civil Protection department of the European Union (draft plan).

Risk communication

- National risk communication strategy to strengthen health security in Tunisia, 2016.
- Emergency preparedness and response plan for diseases with epidemic potential.
- Reports on the WHO mission to review implementation of the IHR in Tunisia, 26 February to 1 March and 27–29 April 2014.
- Report on the health emergency training for national, regional and local health staff, 19–22 July 2016.
- Report on the training on risk communications for journalists, November 2014.
- MoH Facebook page: www.facebook.com/santetunisie.rns.tn/?fref=ts.
- MoH website: www.santetunisie.rns.tn/fr/.
- National TV1 YouTube videos featuring health reporter Ms Awatef Dali and invited guests to discuss diabetes, HIV/AIDS, coronary thrombosis, and fertility issues:
- www.youtube.com/watch?v=aczEA4fJAHw&sns=em
- www.youtube.com/watch?v=_rv8hKFvo50&sns=em
- www.youtube.com/watch?v=zQIo2_uVdno&sns=em
- www.youtube.com/watch?v=DPpnSgoIuX8&sns=em.

Points of entry

- WHO/EMRO Ebola Virus Disease Preparedness and Response Assessment Mission Report, December 2014.
- Two Beylical decrees, in 1953, related to health surveillance at points of entry.
- Law 92–117.
- Animal Husbandry Law in 2005.
- Decree 793–1981.
- The IHR list of authorized ports to issue ship sanitation certificates (www.who.int/ihr/ports_airports/portslanding/en/).

Chemical events

- Law N° 91–39 on prevention of disasters and calamities (ORSEC), decree N° 2004–2723.
- Statistics of Tunis National Poison Control Centre.
- Statistics of the National Health Insurance Fund physicians (ISST)
- National SAICM project: Ministry of Environment.
- Project "Catastrophe Reduction Risks".
- ANPE report on quality of air, ground, sediments and water.

Radiation emergencies

- CNRP report on Tunisian law and decrees for the radiological-related field.
- Decree No 82–1389.
- Law No 81–51.
- Radioactive contamination limits for foodstuff.
- PNURN: Plan National d'Urgence Radiologique et Nucléaire (draft).
- Organigramme du plan jaune.
- List of monitoring equipment belonging to the CNRP (17/10/2008).
- Concept of operations for the detection of radioactive material.
- Tunisian points of entry with respective radiation monitoring capabilities.
- Overview of CNSTN facilities and activities.
- National coordination meeting.
- Tunisia Radiation and Waste Safety Infrastructure Profiles – Emergency Preparedness and Response.
- Department of Technical Cooperation end of mission report (7 June 2013).
- Radiation emergencies: Law 81–51 on Protection against the dangers of ionizing radiation sources.
- Decree 86–433 on protection against ionizing radiation.
- Law 97–37 of 2 June 1997 and decree No. 2002–2015 and 2005–3079 on the transport by road of hazardous materials, Decree 89–1895 on the publication of the Vienna Convention on Assistance in Case of Nuclear Accident or Radiological Emergency
- Decree 89–1902 on the publication of the Vienna Convention on Early Notification of a Nuclear Accident.

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