United Nations
Interregional Crime and Justice
Research Institute

Biological Security Priorities in the Middle East

An Analysis of National Needs and Regional Trends

United Nations Interregional Crime and Justice Research Institute (UNICRI)

Canada

Disclaimer

Acknowledgements

This report has been produced thanks to the support of the Government of Canada. It has been prepared by UNICRI Senior Fellow, R. Alexander Hamilton, in coordination with the Public Health Agency of Canada (PHAC). UNICRI would also like to express its gratitude to the national experts who contributed to the report's findings by completing a custom survey and participating in interviews.

Table of contents

List of tables, figures and boxes

Forward

The present report identifies national needs and regional priorities for biological security – capabilities needed to prevent, detect and respond to accidental or deliberate disease events (biological threats) – in the Middle East.

Focusing on three countries in the region – Iraq, Jordan and Lebanon[1] – the report identifies regional capacity-building priorities to help inform the allocation of biological security resources through the Global Partnership Against the Spread of Weapons and Materials of Mass Destruction (Global Partnership), the Global Health Security Agenda (GHSA), and related global programs.

The report is based on an analysis of relevant needs assessments and action plans – with an emphasis on Joint External Evaluations (JEEs)[2] – published articles, and data generated through a custom survey and interviews with experts from the region.

The following methodological considerations informed the choice of data collection methods, the approach to data analysis, and the presentation of results:

- Several methods of data collection, drawing on multiple sources of information, were employed. This approach aimed to strengthen the validity of results by minimizing methodological bias, limiting inaccuracies in reporting, and enabling the identification of common themes.
- Emphasis was placed on understanding biological threats and biological security on a regional basis. This was achieved by comparing country data to identify regional trends, while acknowledging differences between countries based on distinct national perspectives and conditions.
- As biological security encompasses a number of related capabilities – including biosafety and biosecurity, national laboratory systems, surveillance, emergency response operations, and linking public health and security authorities – each of these JEE technical areas were evaluated.

[1] Iraq, Jordan and Lebanon comprise an existing regional network established in the framework of the European Union CBRN Centres of Excellence Initiative.
[2] See: https://www.who.int/ihr/procedures/joint-external-evaluations/en/.

Summary of key findings

Biological threats in the Middle East:

- Regional conflicts and the Syrian refugee crisis have made Iraq, Jordan and Lebanon increasingly vulnerable to communicable disease outbreaks. The growing presence of diagnostic and research laboratories handling dangerous pathogens, coupled with rapidly developing pharmaceutical and medical sectors and the presence of highly capable terrorist groups, have further increased the possibility of accidental and deliberate disease events.

National needs and regional trends by technical area:[3]

Biosafety and biosecurity

- Establish (Jordan, Lebanon) or finalize (Iraq) a comprehensive national regulatory framework for biosafety and biosecurity
- Establish a national list of dangerous pathogens and toxins
- Develop sustainable biosafety and biosecurity training programs focused on cultivating local experts (train-the-trainer approach)

National laboratory system

- Establish national laboratory quality standards, including a system to verify their implementation, and pursue (further) accreditation

Real-time surveillance

- Establish a common (human and animal health sectors) electronic surveillance platform to facilitate reporting and real-time information exchange

Emergency response operations

- Operationalize (Jordan, Lebanon) public health emergency operations center (EOC), including staffing, plans and procedures

Linking public health and security authorities

- Conduct joint training exercises between health and security sectors, including simulation exercises

[3] See "Annex B" for a complete breakdown of needs by country.

1. Introduction

In the past several decades, countries in the Middle East and North Africa (MENA) region have significantly strengthened their public health systems and improved the health status of their populations. However, the region continues to face substantial and diverse political, economic and environmental challenges that have introduced new risks and placed an increased burden on national health systems.[4]

Ongoing conflicts in Iraq, Libya, Syria and Yemen have created a regional refugee crisis that has both increased the risk of disease outbreaks (hepatitis, typhoid and tuberculosis, among others) and placed significant strain on national health systems, which must now struggle to meet the needs of both local and displaced populations. Iraq, Lebanon and Jordan (the target countries of this report) have been especially affected by the refugee crisis caused by the Syrian civil war, which has resulted in a mass influx of 250,000 (representing 0.6% of Iraq's total population), 670,000 (representing 6% of Jordan's total population) and 975,000 (representing 16% of Lebanon's total population) refugees respectively.[5]

The possibility of accidental and deliberate disease events are equally an omnipresent concern. Throughout the MENA region, many countries possess advanced diagnostic and research laboratories that work with some of the world's most dangerous pathogens, such as Middle East Respiratory Syndrome Coronavirus Virus (MERS-CoV), life science and biotechnology sectors are developing rapidly, and a number of well-funded and highly capable terrorist groups exist.

In light of these concerns, and recognizing that biosafety and biosecurity systems remain an underdeveloped component of health systems in the MENA region, a number of biological security capacity-building initiatives and programs have been launched in recent years. To date, these initiatives and programs have primarily been implemented at the country- rather than regional-level, resulting in some duplication of effort.[6] They have also largely focused on general awareness or on introductory courses on biosafety and biosecurity, rather establishing transferable skills based on a train-the-trainer approach. Consequently, further human resource

[4] SHOPS Plus, Health Financing and Governance Project (2018). *Health Trends in the Middle East and North Africa*, report available at: https://www.hfgproject.org/health-trends-in-the-middle-east-and-north-africa/.
[5] Coats, D.R. (2019). Worldwide Threat Assessment of the US Intelligence Community, available at: https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf.
[6] Khan, E. et al. (2016). Biosafety Initiatives in BMENA Region: Identification of Gaps and Advances. *Frontiers in Public Health* 4(44).

training is needed that provides local experts with sound biorisk management skills aimed at building sustainable capacity building programs in the region.[7]

Comprehensive national regulatory frameworks for biosafety and biosecurity, including dedicated legislation and compliance mechanisms, are equally underdeveloped and biosecurity needs not only include developing effective mechanisms to control dangerous pathogens, but also to effectively manage the dual-use implications of life science research and emerging technologies.[8]

In this context, the need for targeted and sustained financial investment and technical support from national governments and regional and international partners has never been more important to ensure all countries in the MENA region have the necessary capabilities to prevent, detect and respond to biological threats.

The following analysis seeks to support this goal by identifying national needs and regional trends in relation to biological security in Iraq, Jordan and Lebanon. The analysis includes an overview of risk factors shaping the threat environment; a summary of the status of relevant needs assessment instruments, and an analysis of capacity-building priorities focusing on data obtained from published JEEs.

2. Risk factors shaping the threat environment

This section of the report presents an overview of relevant biological security risk factors shaping the threat environment in the Middle East. Summarized in Table 1, these risk factors include the presence of naturally occurring and endemic pathogens, criminal and terrorist activity, and capabilities in the biological sciences and biotechnology.[9] Inputs for the table are based on data obtained from the open-source literature, relevant needs assessments and action plans, and a custom survey and interviews with national experts from the region.

[7] Ibid.
[8] Source: Survey and interview data.
[9] Risk factor categories adapted from Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

Table 1: Overview of risk factors in the Middle East

Naturally occurring & endemic pathogens	Criminal & terrorist activity	Biological sciences & biotech capabilities
• Emerging respiratory viruses with pandemic potential, e.g. MERS-CoV • Growth in HIV/AIDS and other sexually transmitted diseases • Displaced populations resulting from the Syrian civil war, which has led to a mass influx of refugees into Iraq, Jordan and Lebanon, increasing the risk of communicable disease outbreaks (Hepatitis A and B, typhoid, polio, tuberculosis, etc.) and increasing pressure on national health systems, including their capacity to provide adequate health care, antibiotic treatments, immunizations, and other essential medical aid	• Conflict in the region, including civil war and sectarian violence has created fertile ground for criminal and terrorist activity in the region, including the emergence of non-state actors with significant financial resources and technical capabilities, e.g. Islamic State in Iraq and the Levant (ISIL, also known as Da'esh)	• Numerous government and private sector diagnostic and research laboratories • Rapidly developing pharmaceutical and medical sectors • Growth in life science university programs and life science academic research • Dual-use implications of emerging technologies, e.g. genome sequencing

3. Status of relevant needs assessment instruments

International and regional organizations and bodies, such as WHO, the World Organisation for Animal Health (OIE), the United Nations Security Council Committee established pursuant to resolution 1540 (1540 Committee) and the European Union (EU), have already, in accordance with their respective mandates and policies, made significant progress towards mapping national needs relevant to biological security, both the Middle East and globally.

This section of the report provides an overview (Table 2) of the status of relevant assessments led by the organizations noted above in Iraq, Jordan and Lebanon. This

information is intended to help guide those interested in obtaining access to, or further information on, specific needs assessments or action plans.[10]

Table 2: Status of needs assessment instruments in the Middle East

Country	WHO JEEs	OIE PVS Evaluations	1540 Committee Approved Matrices	EU CBRN National Action Plans
Iraq	Completed (2019), available on WHO website	PVS Evaluation in pipeline	Completed (2015), available on 1540 website	Completed, but not adopted, draft document available to donors & partners based on country authorization
Jordan	Completed (2016), available on WHO website	PVS Evaluation (2009) & Follow-Up (2016) both completed and confidential	Completed (2015), available on 1540 website	Completed & adopted, available to donors & partners based on country authorization
Lebanon	Completed (2016), available on WHO website	PVS Evaluation completed (2008) and confidential	Completed (2015), available on 1540 website	Completed & adopted, available to donors & partners based on country authorization

4. Biological security priorities: National needs and regional trends based on an analysis of five JEE technical areas

Although considerable progress has been made to strengthen national and regional capacity to prevent, detect and respond to biological threats in the Middle East, significant capacity gaps remain. This section of the report identifies capacity-building priorities in Iraq, Jordan and Lebanon based on an analysis of published needs assessments (with an emphasis on JEEs) and data obtained from a custom

[10] For details on the needs assessment instruments introduced in Table 2 – i.e. WHO JEEs, OIE Performance of Veterinary Services (PVS) Evaluations, 1540 reporting and EU Chemical, Biological, Radiological and Nuclear (CBRN) National Action Plans (NAPs) – see *Biological Security Priorities in Southeast Asia: An Analysis of National Needs and Regional Trends* (UNICRI 2019).

survey and interviews with experts from the region.

The analysis focuses more precisely on five JEE technical areas relevant to biological security: "Biosafety and biosecurity", "National laboratory system", "Real-time surveillance", "Emergency response operations", and "Linking public health and security authorities" (see boxes in section 4.2 for details on each technical area).

4.1 Capacity needs at a glance: Summary of JEE scores by country and indicator

Table 3 provides a summary of JEE scores by country for the indicators corresponding with the five JEE technical areas introduced above, covering prevention ("P"), detection ("D") and response ("R") capabilities relevant to biological security. As defined in the JEE Tool,[11] each score – from "1" ("No capacity") to "5" ("Sustainable capacity") – corresponds with a country's current level of advancement for a specific indicator. For this report, scores have also been assigned a unique colour code that is employed in Table 3 and throughout the remainder of the report. Both coding elements are elaborated in Box 1.

Table 3: "Heat map" of JEE scores by country and indicator*

JEE Scores				
Indicator	**Iraq**	**Jordan**	**Lebanon**	**Average**
P.6.1 Whole-of-government biosafety and biosecurity system	2	2	2	2
P.6.2 Biosafety and biosecurity training and practices	3	3	2	2.7
D.1.1 Laboratory testing for detection of priority diseases	4	4	4	4
D.1.2 Specimen referral and transport system	4	4	4	4
D.1.3 Effective modern point-of-care and laboratory based diagnostics	2	3	3	2.7
D.1.4 Laboratory quality system	2	2	3	2.3
D.2.1 Indicator and event based surveillance systems	2	3	4	3
D.2.2 Interoperable, interconnected, electronic real-time reporting system	2	3	2	2.3
D.2.3 Analysis of surveillance data	3	3	4	3.3
D.2.4 Syndromic surveillance systems	N/A	4	4	4
R.2.1 Capacity to activate emergency operations	N/A	2	2	2
R.2.2 Emergency operations centre operating procedures and plans	3	1	2	2
R.2.3 Emergency operations programme	3	3	1	2.3
R.2.4 Case management procedures for IHR-relevant hazards	N/A	5	3	4
R.3.1 Public health and security authorities are linked during biological event	3	4	4	3.7

*Several indicators (marked "N/A" in Table 3) in Iraq's JEE (2019) do not correspond with indicators in Jordan's and Lebanon's JEEs (2016). These differences reflect updates to the JEE Tool (WHO 2018). Since 2018, "D.2.4" has been combined with "D.2.1" and renamed "Surveillance systems"; "R.2.1" has been

[11] See: https://www.who.int/ihr/procedures/joint-external-evaluations/en/ (p. 10).

combined with "R.2.2" and renamed "Emergency operations center"; "R.4" has been moved to "Medical countermeasures and personnel deployment" and a new indicator ("R.2.1 Emergency response coordination") has been added.

Box 1: Colour scoring system used in this report (Adapted from the JEE Tool, Second Edition, WHO 2018, p. 10)
1 = No Capacity: Attributes of a capacity are not in place **2 = Limited capacity**: Attributes of a capacity are in development stage **3 = Developed capacity**: Attributes of a capacity are in place; however, sustainability has not been ensured **4 = Demonstrated capacity**: Attributes are in place and sustainable for a few years, and can be measured by the inclusion of attributes or IHR core capacities in the national health sector plan and a secure funding source **5 = Sustainable capacity**: All attributes are functional and sustainable, and the country is supporting one or more other countries in their implementation

Table 4 offers a more focused look at key capacity gaps by indicator. Countries demonstrating **"Limited capacity"** or **"No capacity"** are listed in parenthesis (see "Annex A" for figures corresponding with all evaluated indicators).

Table 4: Summary of key capacity gaps by indicator

Biosafety and biosecurity (indicators P.6.1-P.6.2)
Whole-of-government biosafety and biosecurity system (P.6.1) • 3 countries (Iraq, Jordan, Lebanon) demonstrate **Limited capacity** **Biosafety and biosecurity training and practices (P.6.2)** • 1 country (Lebanon) demonstrates **Limited capacity**
National laboratory system (indicators D.1.1-D.1.4)
Effective modern point-of-care laboratory based diagnostics (D.1.3) • 1 country (Iraq) demonstrates **Limited capacity** **Laboratory quality system (D.1.4)** • 2 countries (Iraq, Jordan) demonstrate **Limited capacity**
Real-time surveillance (indicators D.2.1-D.2.4)
Surveillance systems (D.2.1) • 1 country (Iraq) demonstrates **Limited capacity** **Interoperable, interconnected, electronic real-time reporting system (D.2.2)** • 2 countries (Iraq, Lebanon) demonstrates **Limited capacity**
Emergency response operations (indictors R.2.1-R.2.4)

Capacity to activate emergency response operations (R.2.1)
- 2 countries (Jordan, Lebanon) demonstrate **Limited capacity**

Emergency operations centre operating procedures and plans (R.2.2)
- 1 country (Jordan) demonstrates **No capacity**
- 1 country (Lebanon) demonstrates **Limited capacity**

Emergency operations programme (R.2.3)
- 1 country (Lebanon) demonstrates **No capacity**

4.2 Capacity needs in focus: Regional priorities by JEE technical area

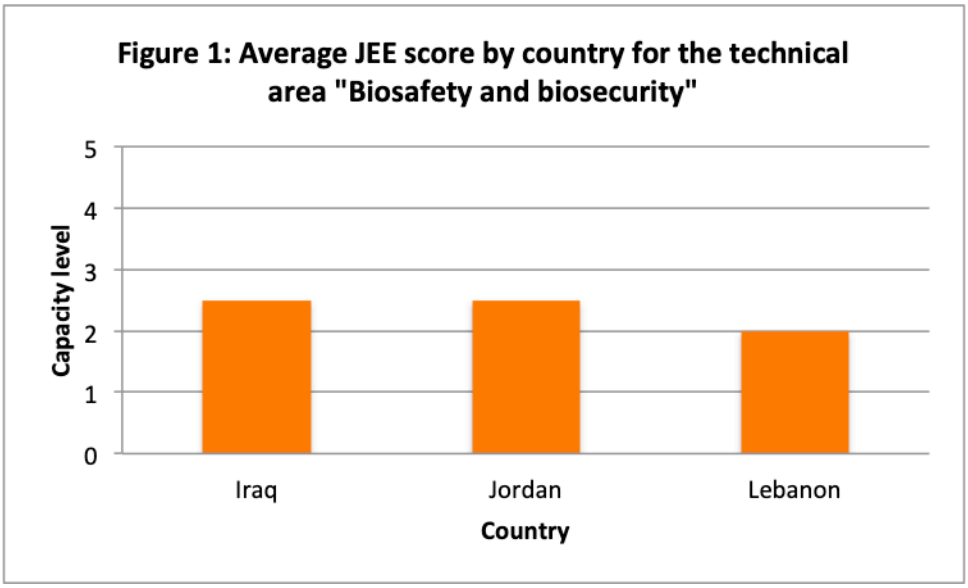
The remaining analysis looks more closely at the five evaluated JEE technical areas, identifying national needs and regional trends for biological security capacity building (see "Annex B" for a summary table).

4.2.1 Biosafety and biosecurity

Box 2: Target for JEE technical area "Biosafety and biosecurity"

"A whole-of-government multisectoral national biosafety and biosecurity system with dangerous pathogens identified, held, secured and monitored in a minimal number of facilities according to best practices; biological risk management training and educational outreach conducted to promote a shared culture of responsibility, reduce dual-use risks, mitigate biological proliferation and deliberate use threats, and ensure safe transfer of biological agents; and country specific biosafety and biosecurity legislation, laboratory licensing and pathogen control measures in place as appropriate." (WHO 2018, p. 38)

Figure 1 illustrates the average JEE score by country for the technical area "Biosafety and biosecurity" (indicators P.6.1-P.6.2). The average capacity level (average score) for this technical area is the lowest among the five evaluated technical areas. The region as a whole demonstrates **Limited capacity** for the technical area.



Based on a more detailed analysis of each country's JEE (and other sources, where specified) the following ***capacity-building priorities*** were identified:

Establish (Jordan, Lebanon) or finalize (Iraq) a comprehensive biosafety and biosecurity regulatory framework

Countries in the region are currently working to establish (Jordan, Lebanon) or finalize (Iraq) comprehensive national regulatory frameworks for biosafety and biosecurity. In the case of Iraq, a comprehensive national regulatory framework for biosafety and biosecurity is currently being finalized before submission for endorsement. In the case of Jordan and Lebanon, although some biosafety and biosecurity regulatory elements are in place (e.g. guidelines), no specific legislation exists. Comprehensive biosafety and biosecurity legislation, including for laboratory licensing, needs to be finalized and oversight, monitoring and enforcement mechanisms need be strengthened.

Map facilities and establish a centralized database or registry (Lebanon)

In Lebanon, although a Health Laboratory Mapping Tool is under development, laboratories throughout the country are not centrally listed and those working with dangerous pathogens and toxins are not registered with the government. All facilities in the country need to be mapped; information concerning these facilities needs to be centralized in a database or registry, and a national inventory of pathogens and toxins of concern needs to be established.

Reduce the number of facilities that store or process dangerous pathogens (Jordan)

The number of facilities in Jordan that store or process dangerous pathogens and toxins needs to be reduced, and appropriate pathogen control measures, including standards for physical containment, need to be established.

Improve laboratory infrastructure and maintenance of key equipment (Iraq, Lebanon)

The JEEs of both Iraq and Lebanon identify the need for improved laboratory infrastructure and maintenance of key equipment (including biosafety cabinets) at some facilities. In the case of Iraq, infrastructure at some facilities is in poor condition; equipment requires maintenance, and there are no longer qualified engineers in the country to maintain and certify Class II Biosafety Cabinets. Some facilities also have difficulty procuring reagents and validated kits in a sustainable manner. In the case of Lebanon, there is insufficient funding at some facilities for essential maintenance functions, including certification of biosafety cabinets.

Develop sustainable biosafety and biosecurity training programs (All)

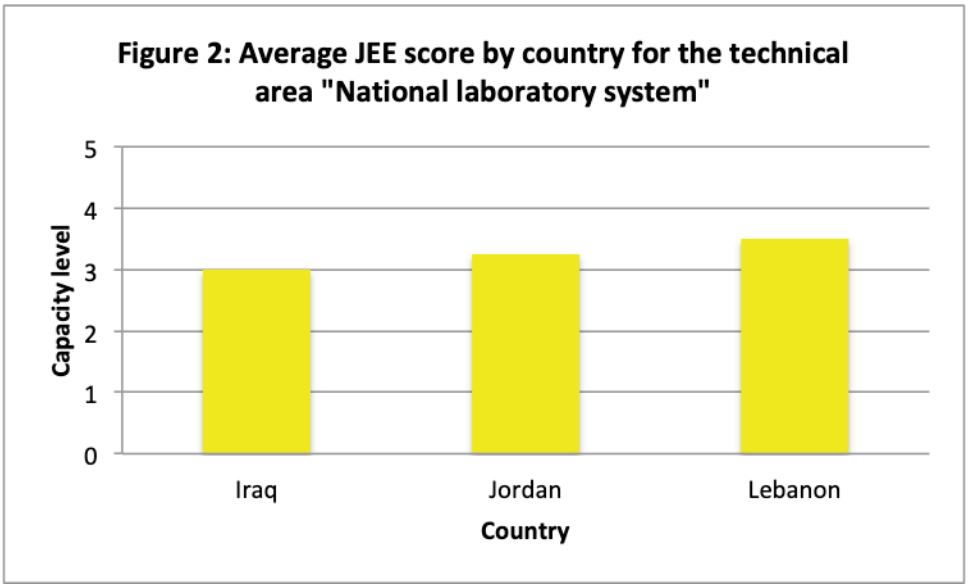
Capacity building aimed at strengthening biosafety and biosecurity training and education is a universal priority in the region. In general, there is need for capacity building that places emphasis on cultivating local experts through a train-the-trainer approach to help enable the region establish and maintain sustainable biosafety and biosecurity training programs.[12] In the case of Iraq, specific needs include (refresher) trainings on how to safely collect, handle, pack and transport specimens and on risk assessment and management for high-threat pathogens. In the case of Jordan, there is a need to include biosafety and biosecurity in different healthcare curricula to build a culture among future healthcare workers and research centers. In the case of Lebanon, although major human health laboratories and academic institutions offer in-house biosafety training, a national training program in biosafety and biosecurity for all laboratories in all sectors (human and animal health) is needed to ensure the implementation of standardized protocols at all facilities working with dangerous pathogens and toxins.

4.2.2 National laboratory system

Box 4: Target for JEE technical area "National laboratory system"
"Surveillance with a national laboratory system, including all relevant sectors, particularly human and animal health, and effective modern point-of-care and laboratory-based diagnostics." (WHO 2018, p. 49)

Figure 2 illustrates the average JEE score by country for the technical area "National laboratory system" (indicators D.1.1-D.1.4). Among the five evaluated technical areas, the average capacity level (average score) for this technical area is relatively high (second only to "Linking public health and security authorities"). The region as a whole demonstrates **Developed capacity** for the technical area.

[12] Khan, E. et al. (2016). Biosafety Initiatives in BMENA Region: Identification of Gaps and Advances. *Frontiers in Public Health* 4(44).



Based on a more detailed analysis of each country's JEE (and other sources, where specified) the following ***capacity-building priorities*** were identified:

Develop national laboratory policies and/or strategies (Iraq, Lebanon)

The JEEs of both Iraq and Lebanon identify the need for national laboratory policies and/or strategies. In the case of Iraq, the country would benefit from developing, endorsing and implementing a national laboratory policy and a subsequent national laboratory strategy to provide direction and streamline laboratory services. In the case of Lebanon, the country would benefit from developing a national policy for health laboratory services that defines clear goals and objectives.

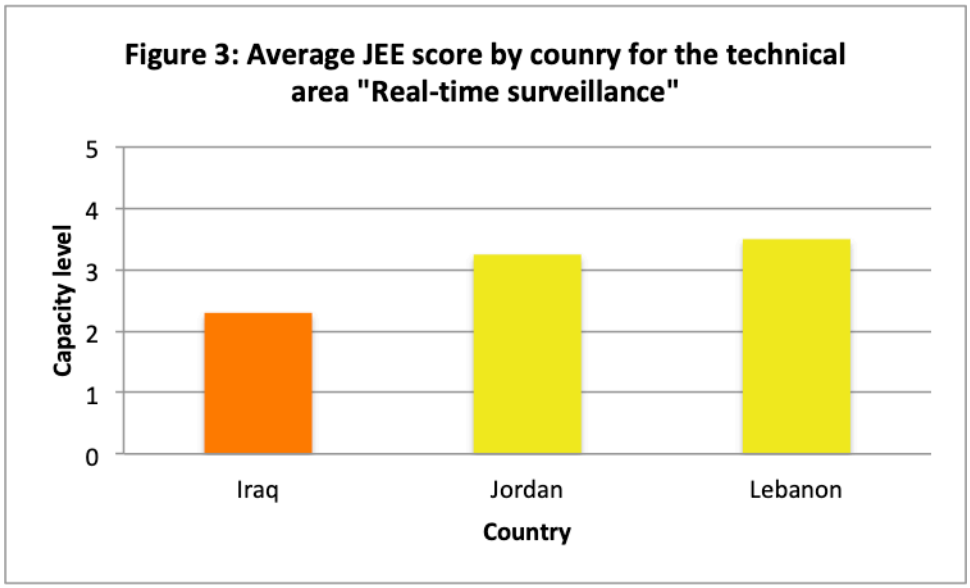
Establish national laboratory quality standards (All)

Countries in the region lack adequate laboratory quality standards and systems to verify their implementation. In the case of Iraq, no national laboratory quality standards exist that serve as a minimum set of standards that can be adapted and applied to laboratories at every level of the health-care system. In the case of Jordan, there is a need to upgrade quality control processes, seek accreditation for public health laboratories, and update laboratory licensing to require a quality management system. In the case of Lebanon, although a laboratory accreditation and licensing system is in place, there are some gaps in quality control and quality assurance following licensure (notably, in the case of hospital-based laboratories) and there is a need to develop an external quality assessment (EQA) program for all laboratories at all levels.

4.2.3 Real-time surveillance

Box 5: Target for JEE technical area "Real-time surveillance"
"(1) Strengthened indicator-based and event-based surveillance systems that are able to detect events of significance for public health and health security; (2) improved communication and collaboration across sectors and between subnational (local and intermediate), national and international levels of authority regarding surveillance of events of public health significance; and (3) improved national and intermediate level regional capacity to analyse and link data from and between, strengthened early-warning surveillance, including interoperable, interconnected electronic tools. This would incorporate epidemiological, clinical, laboratory, environmental testing, product safety and quality, and bioinformatics data; and advancement in fulfilling the core capacity requirements for surveillance in accordance with the IHR and OIE guidelines." (WHO 2018, p. 56)

Figure 3 illustrates the average JEE score by country for the technical area "Real-time surveillance" (indictors D.2.1-D.2.4 in the case of Jordan's and Lebanon's JEEs and indicators D.2.1-D.2.3 in the case of Iraq's JEE). The region as a whole demonstrates **Developed capacity** for the technical area.



Based on a more detailed analysis of each country's JEE (and other sources, where specified) the following ***capacity-building priorities*** were identified:

Establish a single electronic surveillance platform for real-time reporting across human and animal health sectors (All)

The JEEs of Iraq, Jordan and Lebanon all identify the need to enhance inter-operable, interconnected, electronic real-time reporting systems. In particular, emphasis is placed on the need to establish a common electronic platform that integrates surveillance data from all human and animal health sectors and sources to minimize fragmentation in reporting and facilitate information exchange.

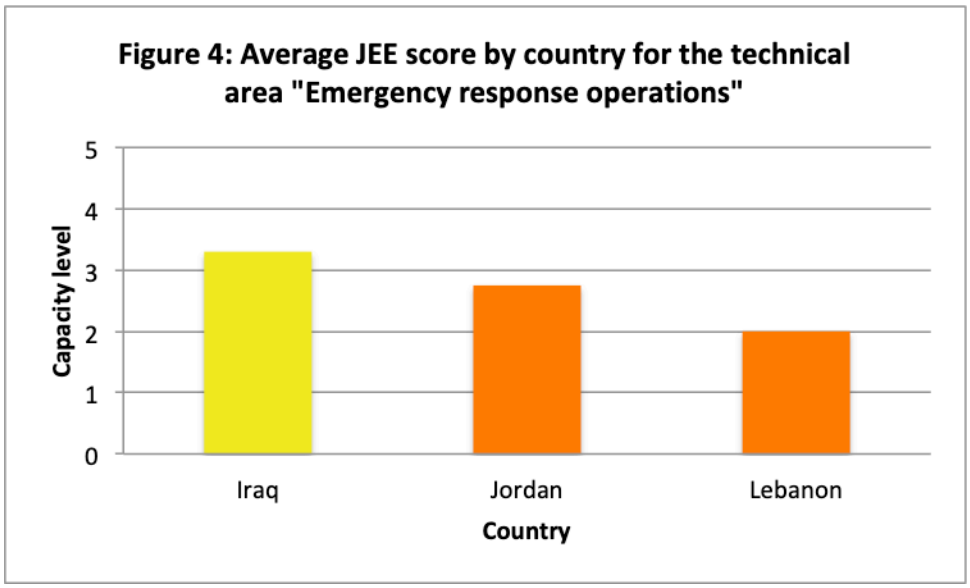
Strengthen capacity for the analysis of surveillance data in real-time (Iraq, Jordan)

Iraq's and Jordan's JEEs both identify the need to ensure electronic systems are in place that enable the automatic or real-time analysis of surveillance data.

4.2.4 Emergency response operations

Box 6: Target for JEE technical area "Emergency response operations"
"Countries will have a coordination mechanism, incident management systems, exercise management programmes and public health emergency operation centre (EOC) functioning according to minimum common standards; maintaining trained, functioning, multisectoral rapid response teams, and trained EOC staff capable of activating a coordinated emergency response within 120 minutes of the identification of an emergency." (WHO 2018, p. 75)

Figure 4 illustrates the average JEE score by country for the technical area "Emergency response operations" (indicators R.2.1-R.2.4 in the case of Jordan's and Lebanon's JEEs and indicators R.2.1-R.2.3 in the case of Iraq's JEE). Among the five evaluated technical areas, the average capacity level (average score) for this technical area is relatively low (second only to "Biosafety and biosecurity"). The region as a whole demonstrates **Limited capacity** for the technical area.



Based on a more detailed analysis of each country's JEE (and other sources, where specified) the following ***capacity-building priorities*** were identified:

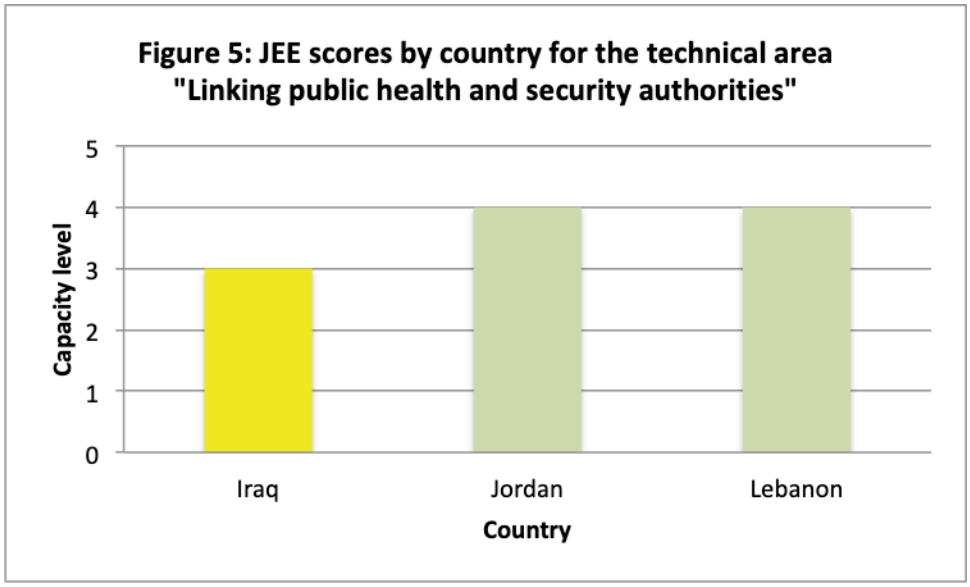
Establish a comprehensive national plan for public health emergencies (Lebanon)
Lebanon has contingency plans in place for specific epidemic and pandemic hazards, but does not have a comprehensive – involving all stakeholders, communities and partners, including the private sector – national plan for public health emergencies.

Operationalize public health emergency operations center (EOC) (Jordan, Lebanon)
Jordan and Lebanon have EOCs, but they are not fully operational. In the case of Jordan, the country has had a fully equipped public health EOC since 2014, but it has not been activated due, in part, to a lack of defined roles and responsibilities, staffing and full recognition from departments within the Ministry of Health. In the case of Lebanon, the country has had an EOC since 2007, but it is not in operation due to a lack of standard operating procedures (SOPs), plans and technical staff to conduct public health emergency response operations.

4.2.5 Linking public health and security authorities

Box 7: JEE target for the technical area "Linking public health and security authorities"
"Country conducts a rapid, multisectoral response for any event of suspected or confirmed deliberate origin, including the capacity to link public health and law enforcement, and to provide timely international assistance." (WHO 2018, p. 80)

Figure 5 illustrates JEE scores by country for the technical area "Linking public health and security authorities" (indicator R.3.1). The capacity level for this technical area is the highest among the five evaluated technical areas. The region as a whole demonstrates **Developed capacity** for the technical area.



Based on a more detailed analysis of each country's JEE (and other sources, where specified) the following ***capacity-building priorities*** were identified:

Improve information-sharing and develop SOPs for joint investigations and response between public health and security sectors (Jordan, Lebanon)

Both Jordan and Lebanon have substantial experience conducting multisectoral response operations for crises and emergencies, including public health events. However, both countries need to define triggers for notification and information sharing between public health and security sectors and need to develop SOPs for joint investigations and response to public health events.

Conduct joint training exercises between public health and security sectors (All)

All countries in the region have identified the need to conduct joint training exercises, including simulation exercises (Iraq), to test and improve collaboration between health and security sectors.

5. Conclusions and recommendations

Rapidly changing political, social and economic conditions in the MENA region, ranging from the on-going refugee crisis to the growing presence of terrorist groups, have introduced new biological security threats and placed increased stress on

public health systems. Although the region has benefited from a number of biological security capacity-building initiatives (e.g. introductory trainings on biosafety and biosecurity) in recent years, clear capacity gaps remain.

In the case of Iraq, Jordan and Lebanon (the target countries of this analysis and the present report), two JEE technical areas – "Biosafety and biosecurity" and "Emergency response operations" – stand out as regional priorities.

In relation to "Biosafety and biosecurity", corresponding with the lowest average JEE score among the five evaluated technical areas, capacity-building initiatives are urgently needed to establish comprehensive biosafety and biosecurity regulatory frameworks, and to establish biosafety and biosecurity training programs that are devoted to cultivating local experts based on a train-the-trainer approach.

In relation to "Emergency response operations", corresponding with the second lowest average JEE score among the five evaluated technical areas, capacity-building initiatives are especially needed to help operationalize existing EOCs in Jordan and Lebanon, ensuring that these countries are adequately prepared to respond to public health emergencies in a timely and coordinated manner.

In general, the need for "sustainability" – sustainable funding for the procurement of essential biosafety and biosecurity resources, the need for local expertise to maintain key equipment and laboratory infrastructure, the need for local experts in biorisk management, etc. – cut across the needs identified in this report, underlining the importance of capacity-building programs that place emphasis on long-term and sustainable solutions that build local skills and local ownership.

Definitions

Biological threats: Accidental or deliberate disease events.

Biological security: Capabilities needed to prevent, detect and/or respond to accidental or deliberate disease events.

Biosafety risks: Accidents involving unintended exposure to/release of dangerous pathogens or toxins (e.g. needle-stick injuries).

Biosecurity risks: Incidents involving the deliberate misuse of dangerous pathogens or toxins (e.g. bioterrorism).

Dual-use research: Life science research with the potential to be used both for beneficent and nefarious purposes (e.g. research that results in a new or recreated pathogen).

Emergency response operations: The performance of coordinated emergency response operations, involving capabilities such as: national emergency operations center (EOC), national emergency response plans, national multisectoral rapid response teams, national emergency response training, etc.

Laboratory accreditation: A means of determining the technical competence of laboratories to perform specific types of testing, measurement and calibration.

Laboratory biosafety: Containment principles, technologies, and practices that are implemented to prevent unintentional exposure to pathogens and toxins, or their accidental release.

Laboratory biosecurity: Institutional and personal security measures designed to prevent the loss, theft, misuse, diversion, or intentional release of pathogens, toxins, and other related assets (e.g. equipment).

Linking health and security authorities: Multisectoral coordination between health (public health, food safety, animal health, etc.) and security (law enforcement, border control, defense, etc.) authorities, involving capabilities such as: agreements outlining roles and responsibilities for sharing information, joint exercises, etc.

National laboratory system: Laboratory quality and capacity to perform effective modern point-of-care and laboratory-based diagnostics**.**

One Health: Coordinated global activities to address health risks at the animal-human-ecosystems interfaces to attain optimal health for people, domestic animals, wildlife, plants and the environment.

Preparedness: Capability of the public health and health care systems, communities, and individuals, to prevent, protect against, quickly respond to, and recover from health emergencies, particularly those whose scale, timing, or unpredictability threatens to overwhelm routine capabilities.

Public health emergency: An occurrence or imminent threat of significant illness or health condition, caused by acute exposure to hazards, including biological, chemical, radiological, natural and technological hazards.

Public health security: The proactive and reactive activities required to minimize vulnerability to acute public health events that endanger the collective health of national populations.

Real-time surveillance: The systematic ongoing collection, collation and analysis of data for public health purposes and the timely dissemination of public health information for assessment and public health response.

References

Coats, D.R. (2019). Worldwide Threat Assessment of the US Intelligence Community, available at: https://www.dni.gov/files/ODNI/documents/2019-ATA-SFR---SSCI.pdf.

Khan, E. et al. (2016). Biosafety Initiatives in BMENA Region: Identification of Gaps and Advances. *Frontiers in Public Health* 4(44).

Rozo, M. (2014). *Placing Global Biosecurity Engagement Programs under the Umbrella of Global Health Security*. FAS Issue Brief (May 2014). Federation of American Scientists.

SHOPS Plus, Health Financing and Governance Project (2018). *Health Trends in the Middle East and North Africa*, report available at: https://www.hfgproject.org/health-trends-in-the-middle-east-and-north-africa/.

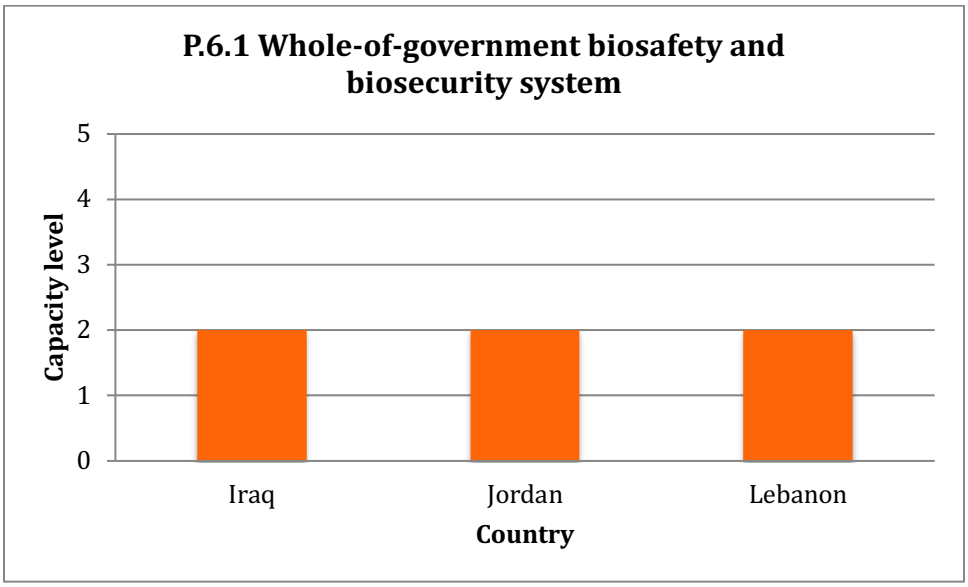
United Nations Interregional Crime and Justice Research Institute (UNICRI) (2019). *Biological Security Priorities in Southeast Asia: An Analysis of National Needs and Regional Trends*.

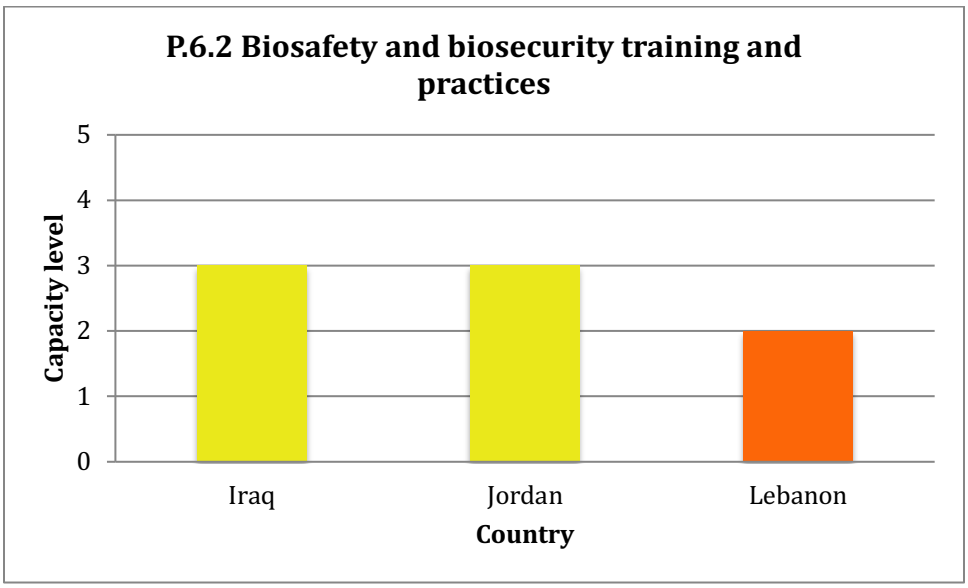
World Health Organization (WHO) (2018). *Joint external evaluation tool: International Health Regulations (2005)*, Second Edition. Geneva: World Health Organization.

World Organisation for Animal Health (OIE) (2019). *OIE Tool for the Evaluation of Performance of Veterinary Services*, Seventh Edition. Paris: World Organisation for Animal Health.

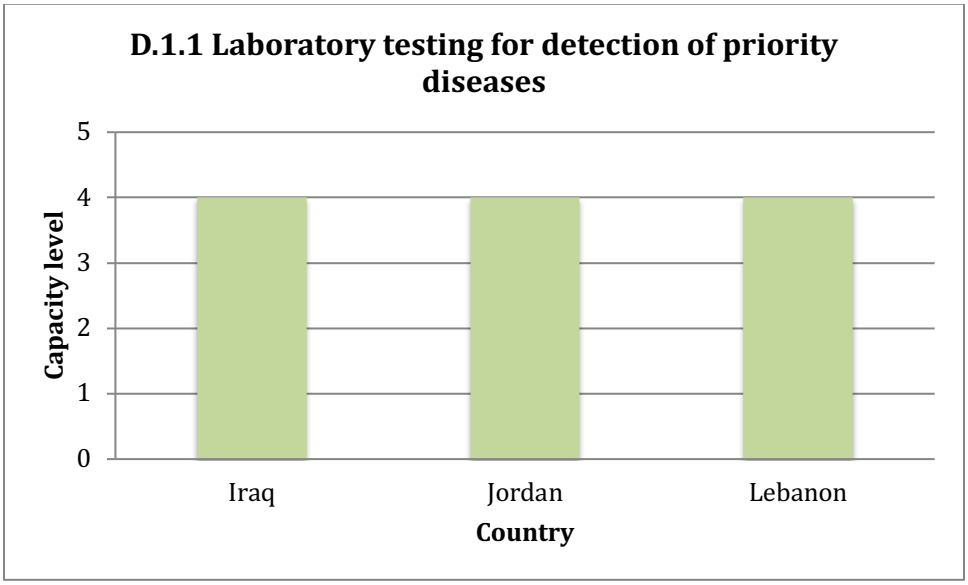
Annex A: Figures corresponding with indicators for each technical area

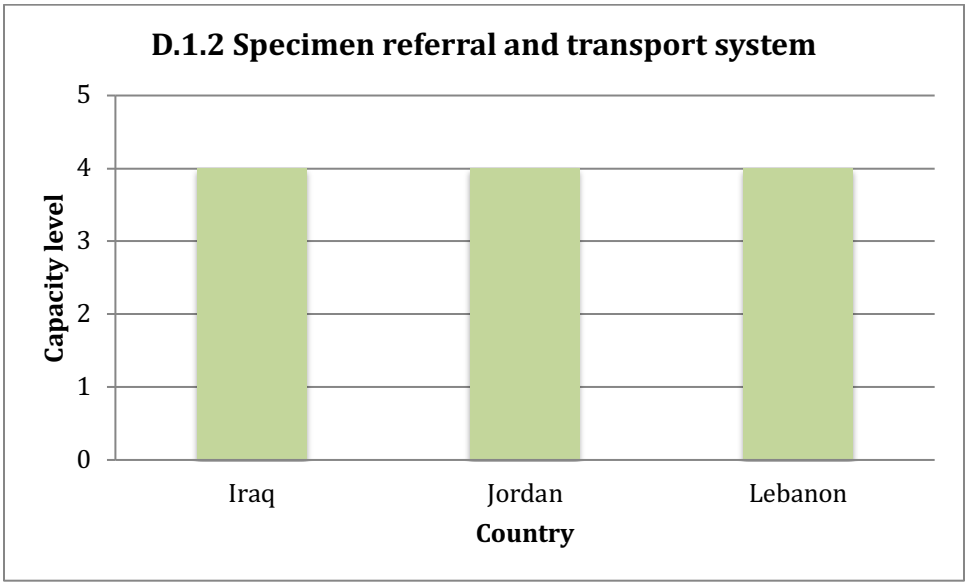
Biosafety and biosecurity (P.6.1-P.6.2)

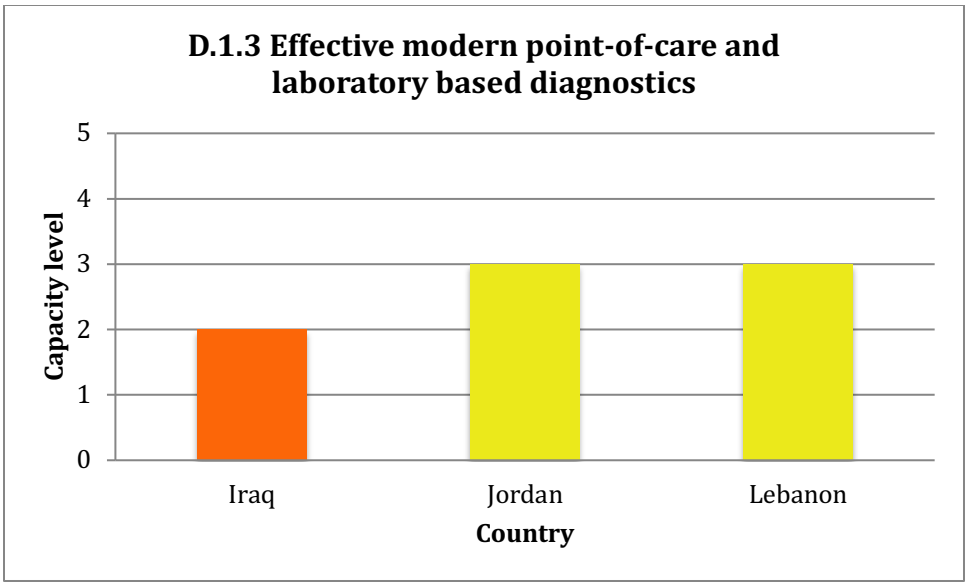


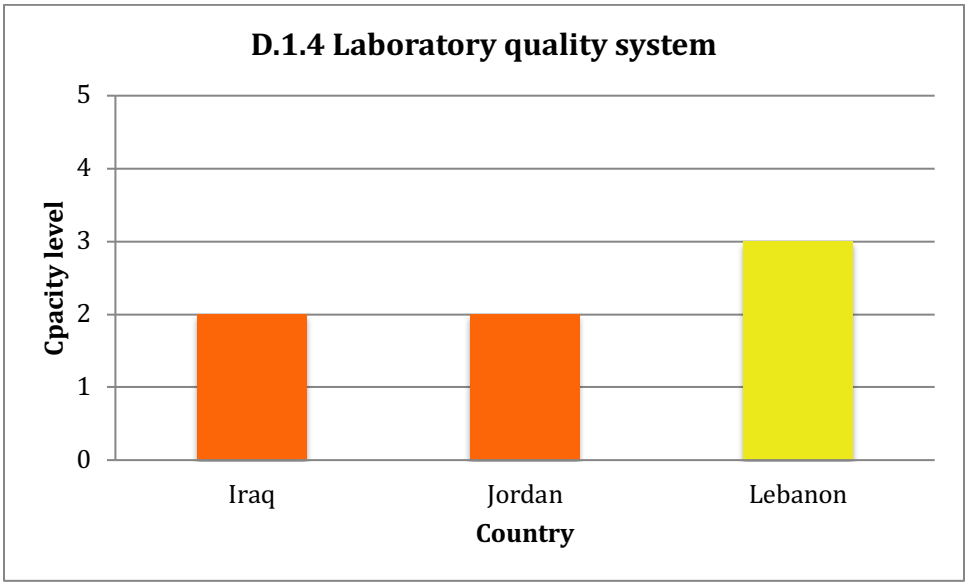


National laboratory system (D.1.1-D.1.4)

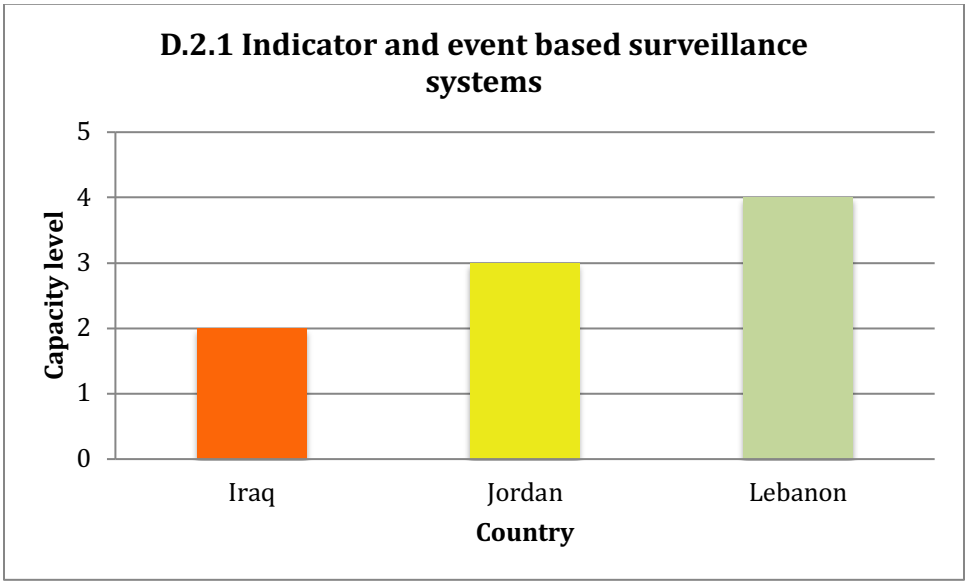


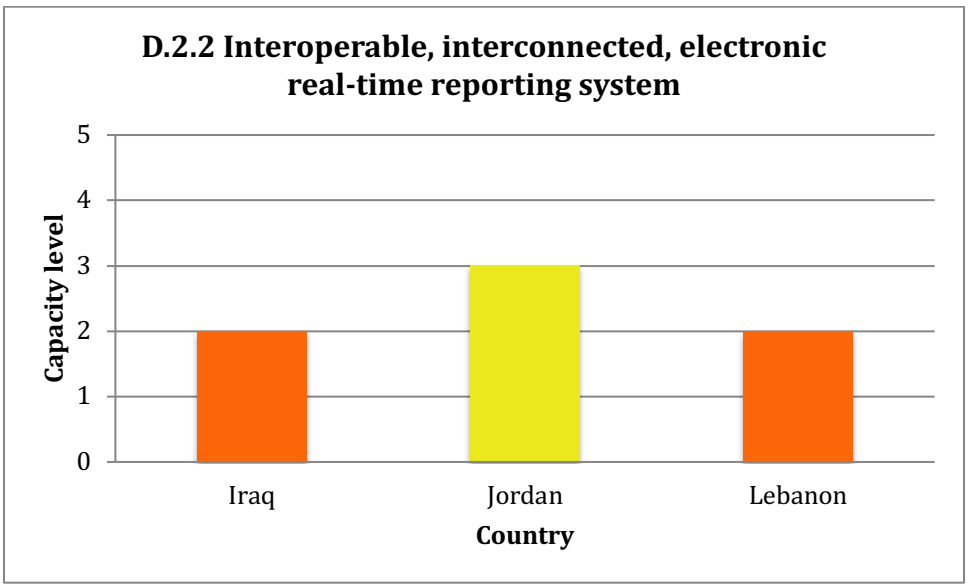


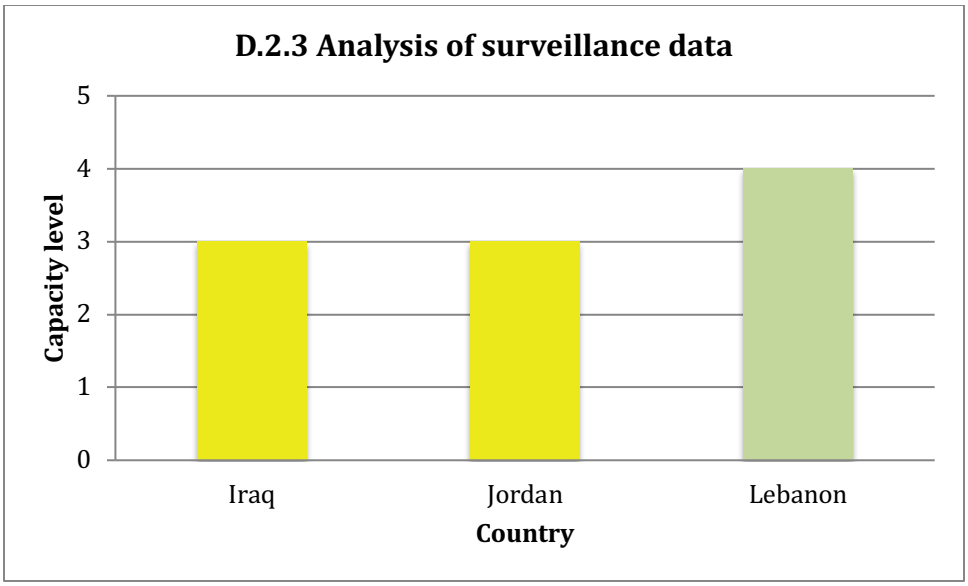

D.1.3 Effective modern point-of-care and laboratory based diagnostics
Capacity level
5
4
3
2
1
0
Iraq
Jordan
Lebanon
Country

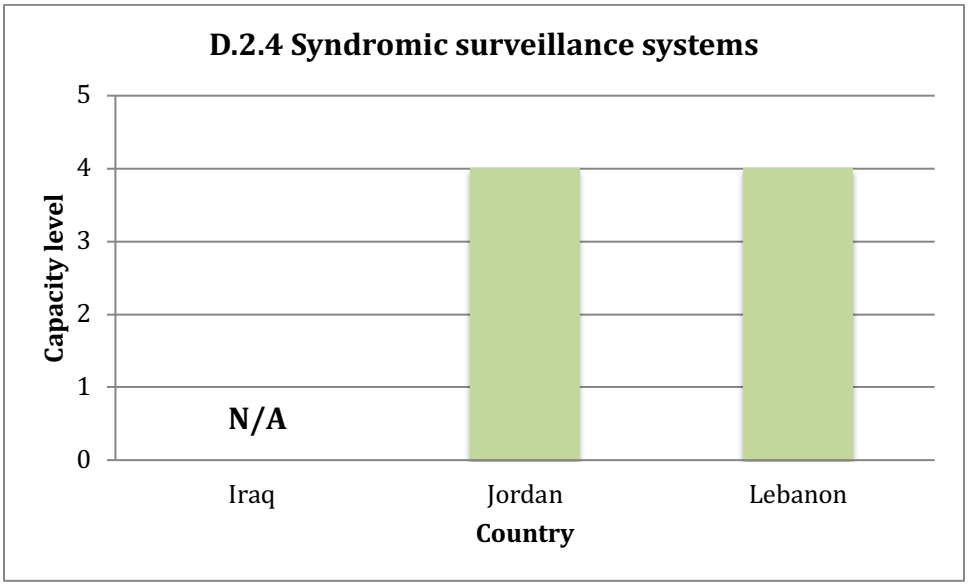

D.1.4 Laboratory quality system
Cpacity level
5
4
3
2
1
0
Iraq
Jordan
Lebanon
Country

Real-time surveillance (D.2.1-D.2.4)

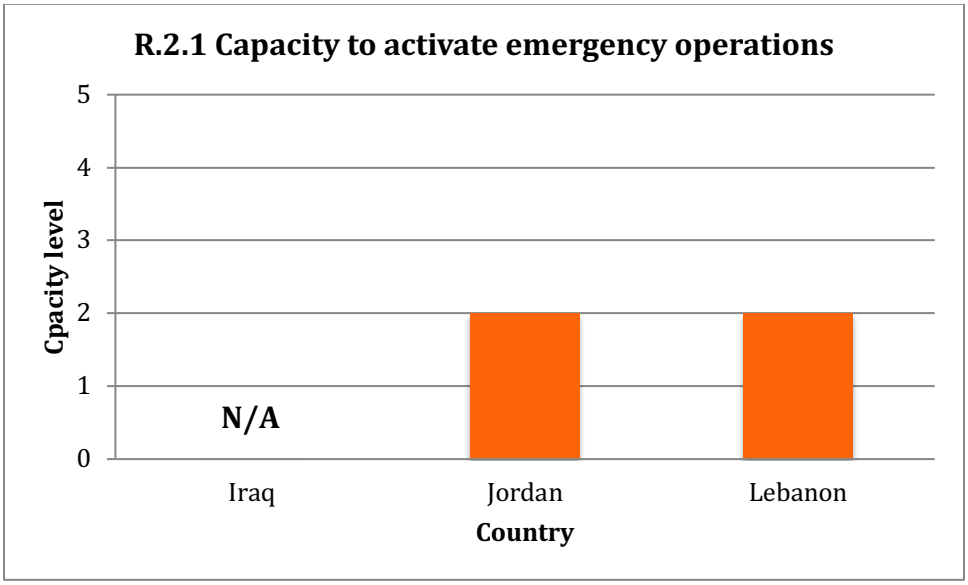


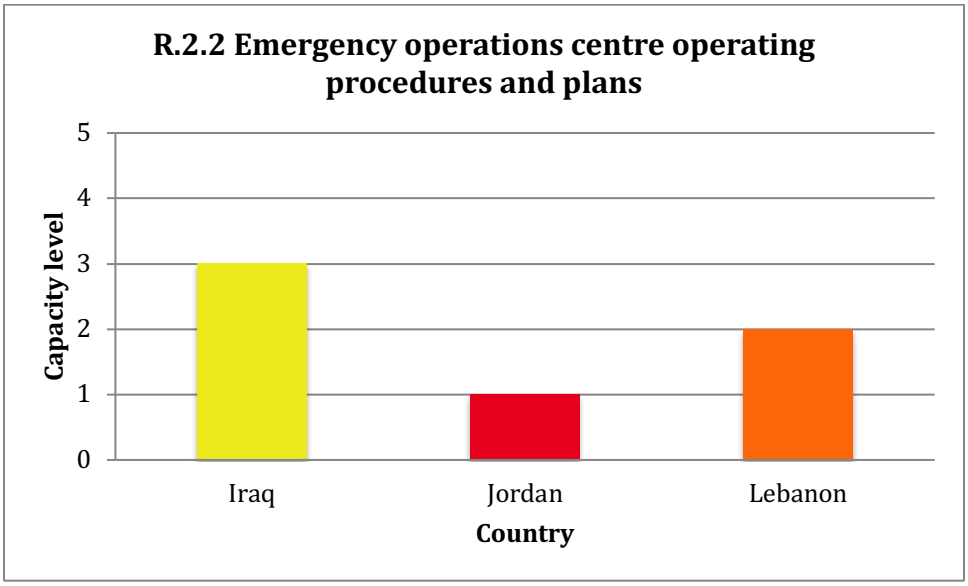


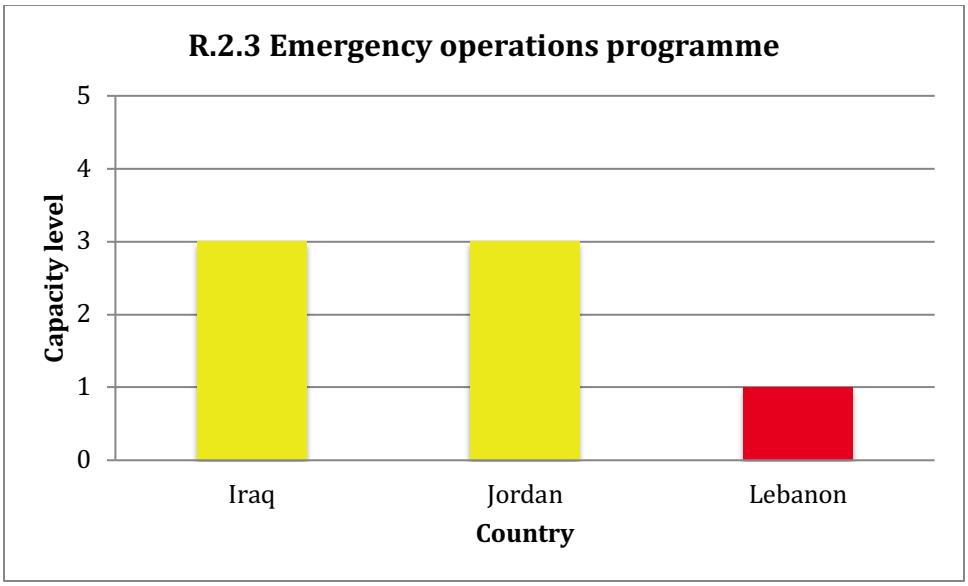

D.2.3 Analysis of surveillance data
5
4
3
2
1
0
Capacity level
Iraq
Jordan
Lebanon
Country

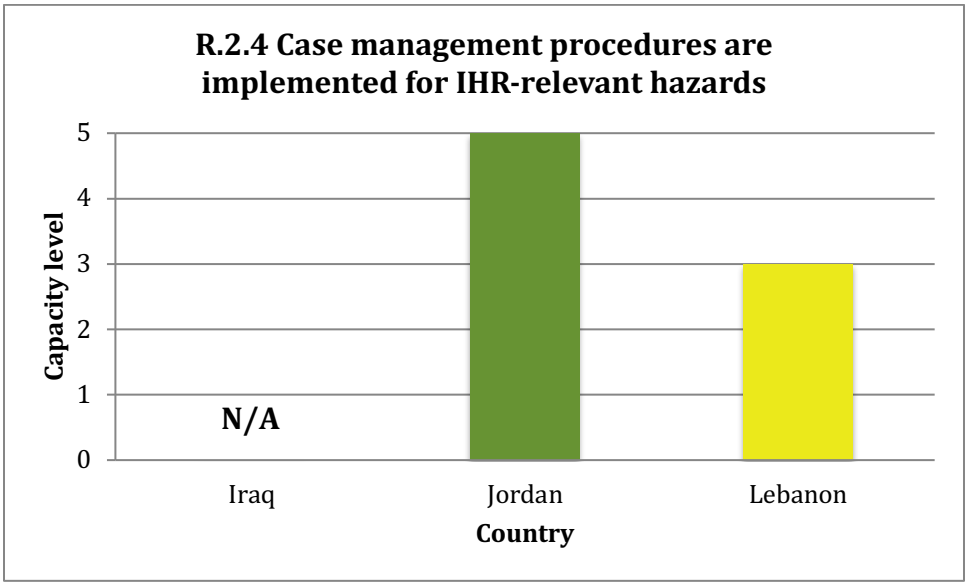

D.2.4 Syndromic surveillance systems
5
4
3
2
1
0
Capacity level
N/A
Iraq
Jordan
Lebanon
Country

Emergency response operations (R.2.1-R.2.4)






R.2.3 Emergency operations programme
Capacity level
5
4
3
2
1
0
Iraq
Jordan
Lebanon
Country


R.2.4 Case management procedures are implemented for IHR-relevant hazards
Capacity level
5
4
3
2
1
0
N/A
Iraq
Jordan
Lebanon
Country

Annex B: Summary of biological security capacity needs by technical area

Summary of biological security capacity needs by technical area			
	Technical area	**Needs**	**Country and source**
PREVENTION	**Biosafety and biosecurity***	Establish (Jordan, Lebanon) or finalize (Iraq) a comprehensive national regulatory framework for biosafety and biosecurity	Iraq (JEE), Jordan (JEE), Lebanon (JEE, NAP)
		Establish a national list of dangerous pathogens and toxins	Iraq (NAP), Jordan (NAP), Lebanon (JEE, NAP)
		Map all facilities housing dangerous pathogens and toxins and establish a centralized database or registry	Lebanon (JEE)
		Establish (Lebanon) or maintain (Iraq) a regularly updated inventory of dangerous pathogens and toxins	Iraq (JEE), Lebanon (JEE)
		Reduce the number of facilities that store or process dangerous pathogens and toxins	Jordan (JEE)
		Improve maintenance and certification of laboratory infrastructure and equipment (e.g. biosafety cabinets)	Iraq (JEE), Lebanon (JEE)
		Strengthen biosafety and biosecurity education and training programs	Iraq (JEE, NAP), Jordan (JEE), Lebanon (JEE)
DETECTION	**National laboratory system**	Develop national laboratory policy and strategy to define goals and objectives and streamline laboratory services	Iraq (JEE), Lebanon (JEE)
		Establish national laboratory quality standards, including system to verify their implementation, and pursue accreditation opportunities	Iraq (JEE), Jordan (JEE, NAP), Lebanon (JEE)
	Real-time surveillance	Establish a single electronic surveillance and notification platform for human and animal health sectors	Iraq (JEE), Jordan (JEE), Lebanon (JEE)

		Strengthen capacity for the real-time analysis of surveillance data	Iraq (JEE), Jordan (JEE)
RESPONSE	**Emergency response operations***	Establish a comprehensive national plan for public health emergencies	Lebanon (JEE)
		Operationalize, including staffing, plans and procedures, public health emergency operations center (EOC)	Jordan (JEE), Lebanon (JEE)
	Linking public health and security authorities	Improve information-sharing and develop SOPs for the detection of public health events and joint investigations and response	Jordan (JEE), Lebanon (JEE)
		Conduct joint training exercises between health and security sectors, including simulation exercises	Iraq (JEE), Jordan (JEE), Lebanon (JEE)

Key
• Technical areas marked with asterisk (*) = Limited capacity (lowest average JEE scores among the five technical areas) • World Health Organization (WHO) Joint External Evaluation = JEE • European Union (EU) CBRN National Action Plan = NAP