STATE OF LIBYA

National Action Plan on Prevention and containment of Antimicrobial Resistance

2019 - 2023

الملخص التنفيذي:

إن مقاومة الجراثيم للمضادات الحيوية آخذة في الارتفاع إلى مستويات خطيرة بأنحاء العالم كافة، وثمة آليات مقاومة جديدة آخذة في الظهور والانتشار على مستوى العالم وهي تهدد قدرتنا على علاج الأمراض المعدية الشائعة. ويوجد قائمة متزايدة من عدوى الالتهابات - مثل الالتهاب الرئوي والسل وتسمم الدم والسيلان- التي أصبح علاجها أصعب، بل مستحيل أحياناً، بسبب تدني فاعلية المضادات الحيوية.

يعدّ علاج مقاومة الجراثيم للمضادات الحيوية أولوية قصوى بالنسبة إلى منظمة الصحة العالمية. وقد أُقِرّت في جمعية الصحة العالمية مايو 2015 خطة عمل عالمية بشأن مقاومة مضادات الميكروبات، بما فيها مقاومة المضادات الحيوية، وهي خطة هدفها ضمان الوقاية من الأمراض المعدية وعلاجها بأدوية مأمونة وناجعة. وترتكز الخطة على خمس محاور اساسية:

1. زيادة الوعي بظاهرة مقاومة مضادات الميكروبات وفهمها.
2. تعزيز الترصد والبحث.
3. تخفيض معدلات الإصابة بعدوى الالتهابات.
4. استعمال الأدوية المضادة للميكروبات على الوجه الأمثل.
5. ضمان استدامة الاستثمار في مجال مكافحة مقاومة مضادات الميكروبات.

في سبتمبر 2016 قطع رؤساء الدول بما فيها دولة ليبيا في الجمعية العامة للأمم المتحدة بنيويورك التزاماً باتباع نهج واسع ومنسق في معالجة الأسباب الجذرية التي تقف وراء مقاومة مضادات الميكروبات عبر قطاعات متعددة، وخصوصاً منها صحة الإنسان وصحة الحيوان والزراعة. و ايفاءا لالتزاماتنا الدولية, وضع المركز الوطني لمكافحة الامراض خطة عمل وطنية لمقاومة مضادات الميكروبات تحت مظلة مكتب منظمة الصحة العالمية بليبيا وباشراف لجنة واسعة من الخبراء و الاكاديميين من مختلف القطاعات ذات العلاقة. حيث شددت الخطة الوطنية على اهمية العمل بمفهوم الصحة الواحدة واهمية اشراك كافة القطاعات ذات العلاقة وتبنت الخطة الوطنية لمقاومة المضادات الحيوية الخطوط العريضة للاهداف الاستراتيجية التي ترتكز عليها الخطة العالمية لمنظمة الصحة العالمية و تتكون الخطة الوطنية من الاتي:

- خطة استراتيجية توضح الاهداف و الاولويات.
- خطة تنفيذية توضح النشاطات و الية تنفيذها و الجدول الزمني لتنفيذها و التكلفة.
- خطة الرصد والتقييم تحدد مؤشرات الاداء و الانجاز لكافة النشاطات.

ترتكز الخطة الوطنية الليبية على 14 هدف اساسي تتمحور حول ستة محاور مستهدفة 1) التوعية و التثقيف. 2) تعزيز اداء المختبرات و رصد معدلات مقاومة المضادات الحيوية. 3) تعزيز السياسات والبرامج وتطبيق تدابير الوقاية من عدوى الالتهابات ومكافحتها. 4) تنظيم وتعزيز استعمال الأدوية الجيدة النوعية والتخلّص منها كما ينبغي. 5) الهجرة الواردة و اثرها على ارتفاع معدلات مقاومة المضادات الحيوية. 6) البحث العلمي.

اهداف الخطة الوطنية:

1. زيادة الوعي فيما يخص مقاومة الجراثيم للمضادات الحيوية في فئة العامليين في قطاع الصحة و الصحة الحيوانية.
2. تحسين المفهوم العام لمقاومة المضادات الحيوية واثرها على صحة الانسان.
3. تغيير السلوك العام نحو استخدام افضل للمضادات الحيوية.
4. انشاء شبكة رصد وطنية لتحديد انماط ومعدلات مقاومة المضادات الحيوية.
5. تعزيز اداء المختبرات الطبية لتقديم خدمات قياسية يمكن الاعتماد عليها في علاج المرضى و توفير معلومات صحيحة لشبكة الرصد الوطنية.
6. تحديد الاولويات المستهدفة لشبكة الرصد الوطنية.
7. تقوية برنامج مكافحة الامراض في المؤسسات الصحية.
8. استحداث ممارسات للامن البيولوجي في المراكز البيطرية و مزارع تربية الحيوانات و الصناعات الغذائية و الزراعة.
9. تعزيز النظافة و الصرف الصحي السليم في المجتمع.
10. تعزيز النظافة و الصرف الصحي في مخيمات المهاجرين.
11. ضمان توفر دائم لمضادات حيوية ذات جودة عالية.
12. ضمان الاستخدام الجيد للمضادات الحيوية في الانسان.
13. ضمان الاستخدام الجيد للمضادات الحيوية في الحيوان.
14. انشاء شبكة وطنية لرصد استخدام و استهلاك المضادات الحيوية.

CONTENTS

ABBREVIATIONS AND ACRONYMS

ACC	Antimicrobial resistance Coordination Committee
AM	Anti-Microbial
AMR	Antimicrobial Resistance
ARI	Acute Respiratory Infection
ASO	Antimicrobial Surveillance Office
ASP	Antibiotic Stewardship Programs
AST	Antimicrobial Susceptibility Test
CRE	Carbapenemase-Resistance Enterobacteriaceae
DCIM	Department of Compact Illegal Immigration
DIC	Drug information centres
EMRO	Eastern Mediterranean Regional office (WHO)
EQA	Externa Quality Assessment
ESBL	Extended Spectrum Beta Lactamase
EU	European Union
FAO	Food And Agriculture Organization
FDCC	Food and Drug Control Center
GAP	Global Action Plan for AMR
GLASS	Global Antimicrobial Resistance Surveillance System
HAIs	Hospital-acquired infections
HCW	\Health care worker
INGO	International Non-Governmental Organization
IOM	International Office of Migration
IPC	Infection Prevention and Control
KIMADIA	The State Company for Provision of Medicines and Medical Appliances
M & E	Monitoring and Evaluation
MDR	Multi Drug Resistance
MoE	Ministry of Education
MoH	Ministry of Health

MoI	Ministry of Information
MoA	Ministry of Agriculture
NAP	National Action Plan
NCAH	National Centre of Animal Health
NSC	National Steering Committee
NCDC	National Center for Disease Control
NCSD	National Committee for Selection of Drugs
NGO	Non-Governmental Organisation
NRL	National Reference Laboratory
OIE	Oficina Internacional de Epizootias (world Organization of Animal Health)
PHC	Primary Health Care
PL	Peripheral Laboratory
PTC	Pharmacy and Therapeutics Committees
SARA	Service Availability and Readiness Assessment
SHAMS	Strengthening of Health Information and Medicine Supply Chain Management
ToR	Terms of Reference
TWG	Technical Working Groups
WASH	Water, sanitation and hygiene
WHO	World Health Organization
XDR	Extensively Drug Resistance

ACKNOWLEDGEMENT

We wish to acknowledge the world health organization for providing the support and leadership in the development of this action plan. We recognize the valuable contributions of the ministry of health and national center for disease control for the development of this action plan. We offer profound thanks to world health organization representative for his assistance on achieving the goals. The action plan was made possible through collaboration of the planning committee and infection control department. Finally, we appreciate the tireless efforts of the technical working groups who gave so generously of their time and expertise.

INTRODUCTION

Antimicrobial resistance (AMR) is a critical public health issue globally. Effective antimicrobial drugs are prerequisites for both preventive and curative measures, protecting patients from potentially fatal diseases and ensuring that complex procedures, such as surgery and chemotherapy, can be provided at low risk. Yet systematic misuse and overuse of these drugs in human medicine and food production have put every nation at risk.

Resistance to antimicrobial medicines is happening in all parts of the world in a broad range of microorganisms with an increasing prevalence that threatens human and animal health. The Global Action Plan (GAP) on AMR was adopted in 2015 by all countries through decisions in the World Health Assembly, the FAO Governing Conference and the World Assembly of OIE Delegates. This followed reports of alarming rates of resistance to hospital and community-acquired infections as well as reports of resistance in agriculture, livestock and fisheries. Countries agreed to have a national action plan on AMR that is consistent with the GAP, and to implement relevant policies and plans to prevent, control and monitor AMR

The Libyan national action plan has been aligned with WHO five objectives. Analysis of the current situation and addressing the gaps and the needs to reach the main goal “one health” approach involves several national sectors and actors, including human and veterinary health, agriculture and food and drug control center and environmental agencies. Therefore, a large committee of all stakeholders was formed with four technical subcommittees were established to addresses every aspect to contain antimicrobial resistance in the country.

Recently, Libya has witnessed a dramatic demographic transformation caused by arrival of large numbers of immigrants that burden the healthcare sector and expected to play a major role in threatening the national and the international effort to contain the antimicrobial resistance, therefore an additional objective was proposed to evaluate the effect of the immigration on the AMR situation in Libya.

A country situation analysis concluded in February 2018, focused on the concept of one health approach for strengthening systems to counter infectious diseases and related issues that threaten human, animal, and environmental health. A multidisciplinary team actively participated in this workshop, indicated that Libya is already experiencing high levels of antibiotic resistance. Furthermore, the workshop was convened to explore immediate, short

and long-term actions and research needs that will have the greatest effect on reducing antimicrobial resistance, while taking into account the complexities of bridging different sectors and disciplines to address this global threat.

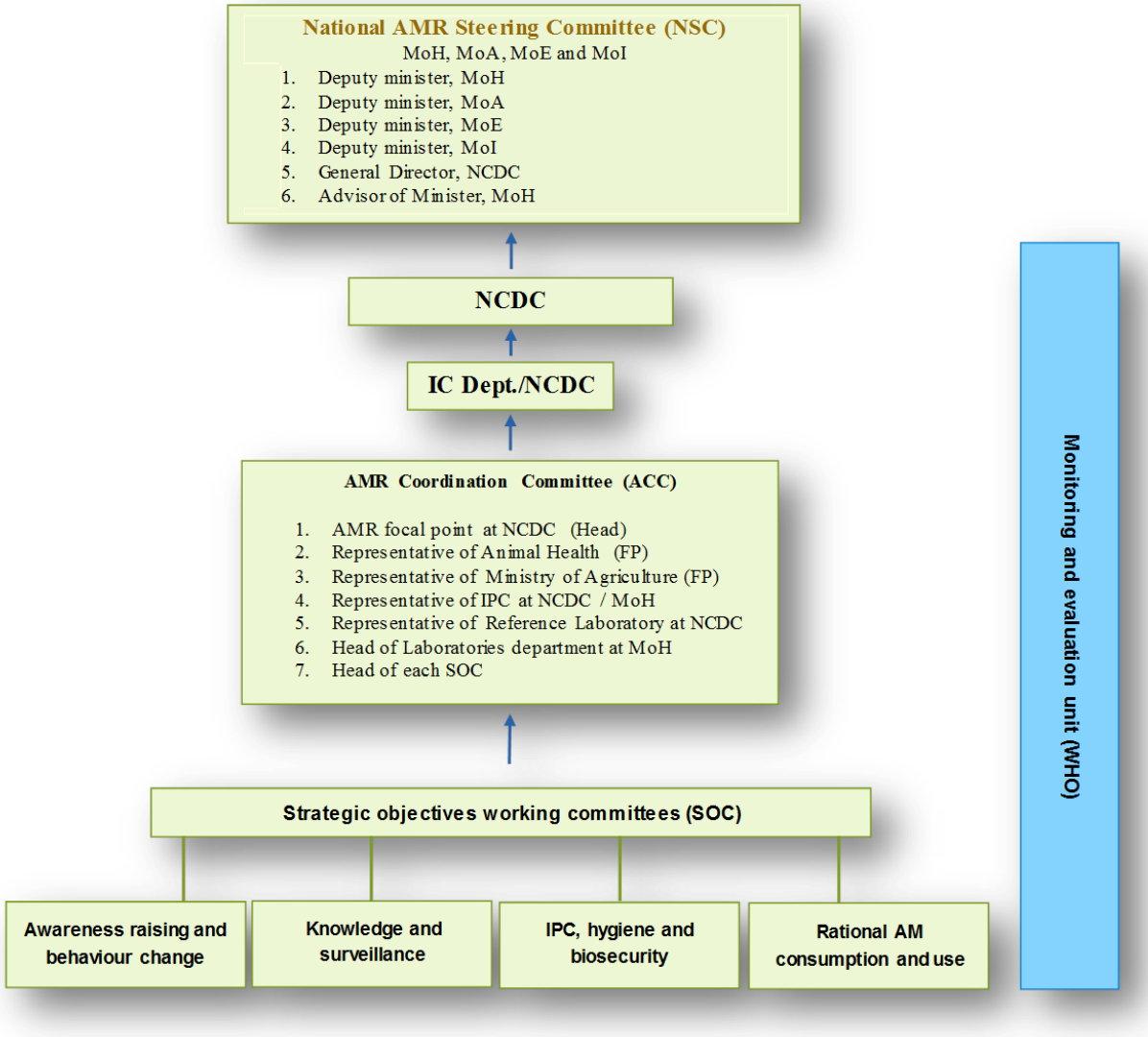
OPERATIONAL FRAMEWORK

To achieve optimal collaborative actions by different stakeholders in association with developing partners and international organizations aiming to strength healthcare, veterinary medicine, food safety, agriculture and research. Libyan NAP is structured around 14 main objectives covering six area of interest: (1) Awareness, education and behavioral change, (2) Surveillance and laboratories capacity , (3) Infection Prevention, hygiene and sanitation , (4) Rational use of antimicrobials, (5) AMR in Migrants and (6) Reasearch.

1. Increase national awareness of AMR among target groups within 5 years up to 85%.
2. Improve knowledge on AMR and related topics.
3. Enhance behaviour change towards better use of Antimicrobial medications (85% among healthcare workers, and 60% among public).
4. Set up a national surveillance system for antimicrobial resistance.
5. Build laboratory capacity to produce high-quality microbiological data for patient management and support surveillance activities in both human and animal sectors.
6. Identify research priorities for AMR surveillance.
7. Strengthening the IPC program in Libya.
8. Establishing bio-security (hygienic practices) in veterinary settings and animal husbandry, health food industry and agriculture.
9. Sanitation and hygiene at community level.
10. Sanitation and hygiene at migrants' camps.
11. Ensure sustainable access to high quality antimicrobial medicines.
12. Ensure appropriate use of antimicrobial agents in human.
13. Improve and ensure appropriate use of antimicrobials in animals.
14. Establish the national surveillance system for antimicrobial use and consumption.

COUNTRY RESPONSE

Governance



A national governance mechanism is far more likely to be effective if it has political support and authority to act, if it is accountable and if it has dedicated funds and an adequate secretariat to operate.

A governance mechanism is essential for coordinating national efforts to combat AMR. in order to comprise a national steering committee (NSC), which will establish supporting technical working group as needed.

Terms of Reference for a National multi-sectoral steering Committee (NSC)

The main purpose of the national steering committee is to oversee activities.

1. **Political support**: As human health is the ultimate concern of activities to control AMR, the ministry of health lead the group, but joint leadership with Ministry of Agriculture and animal worth (MoA), Ministry of Education (MoE) and ministry of Information (MoI).

2. **Authority to act**: The NSC will have sufficient authority to ensure that the ACC recommendations and plans are implemented.
3. **Dedicated funds**: the availability of dedicated funds will increase the operational effectiveness of the ACC. Seed funds from the government and external sources are often required initially, but government funds should be secured as early as possible to ensure political "ownership" and increase the likelihood of programme sustainability.

Terms of references of AMR coordination committee (ACC)

The ***purpose*** of the ACC is to oversee and, when necessary, to coordinate AMR-related activities in all sectors to ensure a systematic, comprehensive approach.

Roles and Responsibility:

1. **Accountability:** The ACC should be lead facilitation or a senior executive function in the government and coordination of a national response to the threat of AMR. Its leadership should take the form of officially delegated authority, with more formal procedures and official monitoring, evaluation and reporting. Moreover making recommendations and progress reports and providing a platform for programme planning and implementation to NCC.
2. **Secretariat:** Operational sustainability is more likely when sufficient dedicated personnel and funding are available to support administrative activities.
3. **Information sharing**: The ACC should provide a periodic progressing report for information for mutually reinforce activities among sectors to NCDC and UN partners (WHO and IOM) which will be discussed at the regular meeting of NSC.
4. **Facilitation and coordination**: ACC should facilitate and, when appropriate and agreed, coordinate efforts to contain and reduce the threat of AMR at subnational, national and supranational levels. Furthermore, ACC should build a collaborative, cooperative, supportive environment for sharing knowledge, information and experience. Each participating party should understand the scope and limits of its own contributions and also its inter-dependence with other parties and with the whole system in order to meet the defined goals. The difficulty of achieving such an environment and building such a system should not be underestimated.
5. **External interactions**: Collaboration with internal and external agencies and organizations is essential for many countries. WHO country office can support Libya in identifying and facilitating relations with external partners. ACC will be invited, encouraged and supported to participate in any existing initiatives of the WHO country office, regional office or WHO headquarters.
6. **Internal interactions**: A national AMR initiative must interact with the health system and public health and disease-specific programmes and general national plan. The nature of these internal interactions and the results will depend on ACC. As many agencies and programmes have responsibilities in areas affected by AMR, a guiding principle of the ACC is to find the most appropriate ways to facilitate and provide synergy with new or existing work so that the overall objectives of the programme are achieved. Furthermore, the ACC must be appropriately integrated and have clearly defined roles and responsibilities in existing health system, public health and disease-specific programmes, animal health and production, the food sector and environmental initiatives. The cross-cutting nature of the ACC should add value to these systems and programmes, not supplant them.

Membership of AMR coordination committee:

The national ACC will be composed of members representing the relevant sectors, notably human health, animal health and production and the food and environment sectors, ideally, the head of the ACC will be the national AMR focal point.

Representatives should be given sufficient authority by their institutions to make decisions which will present periodical in NSC regular meeting. While it is important to have sufficient representation of these key stakeholders, the ACC should remain small enough to be functional, striking a balance between full representation and the functionality of the coordinating group.

Meeting format and rules

The meeting format and rules should conform to national norms. Standard operating procedures may be elaborated, transparently and according to the principles of best practice, to guide the activities of the coordinating committee.

Members should be selected to ensure that all relevant stakeholders are equitably represented. NSC members may be invited to propose members of ACC, but the focal point and head of ACC should ensure that the proposed members have sufficient skills, knowledge, authority and influence and can collaborate. It is advisable to achieve a gender balance.

ACC will form subcommittees SOCs aligned with global strategic objectives of AMR: awareness raising and behaviour changes, knowledge, surveillance, Infection Prevention and Control (IPC), hygiene and biosecurity and rational antimicrobial consumption and Use. Each committee has a clearly defined mandate and an appointed chairperson. In addition, technical working groups can be established and mandated for tasks that include providing technical input for ACC decision-making.

The ACC should be supported by an appropriately resourced *secretariat* responsible for the logistics of meetings; minute-taking; preparation and circulation of documents (e.g. background papers, reports and advisory notes to NSC); and storage and archiving.

The committee should has a mechanism (with appropriate records) to ensure that its members have no conflicts of interests and that the work of the ACC in the interests of public health is transparent. Failure to ensure these elements could undermine the credibility and limit the effectiveness of the committee.

National focal point

A national AMR focal point should be designated to coordinate AMR activities and tasks in the health sector.

Scope, roles and responsibilities

The focal point should:

- Build sustained partnerships and work nationally and internationally on containment of AMR;
- Identify stakeholders and facilitate formation of an inclusive NSC and ACC.
- Lead and coordinate drafting of a national action plan for containment of AMR.
- Facilitate and oversee implementation, M&E of the plan through the ACC.
- Ensure regular data collection and information sharing by instituting effective communication and coordination among all stakeholders, the members of ACC and their constituencies, sectors and disciplines.
- Coordinate national activities for establishment of AMR surveillance systems.
- Report on the prevalence of and trends in AMR to the global AMR surveillance system (GLASS).

- The focal point will be the primary contact for all issues related to AMR in the country.

Technical working group

ACC may decide to form a technical working group (TWG) mandated with specific tasks such as providing technical input, conducting situational analyses or drafting NAPs.

Scope, roles and responsibilities

The terms of reference (ToR) of the TWG shall be established by the ACC, providing specific scope, role and responsibilities. These will usually be task-specific, and focused on areas which the coordinating group have determined to be of particular focus for the country. The TWG will remain a national group and shall interact with country representatives of the required sectors, as determined by the scope of work. The TWG remains a group mandated by the ACC. As such, reporting and communications with the ACC should be regular and will be defined in the TWG ToR. Activities may include drafting technical advice and reports, contributing to country situation analyses or participating in national action plan development.

Membership

Depending on the purpose, scope and tasks of the TWG, membership of a TWG may come from any of the relevant technical specialities. These may include experts from areas such as infectious diseases, microbiology, infection prevention and control, social health, food and drug regulation, surveillance system expertise, environment and others.

AMR Surveillance Unit (ASU):

Establishing AMR surveillance unit affiliated to the IP&C administration at the NCDC to oversee the development and functioning of the national AMR surveillance system and has multidisciplinary team comprising a range of disciplines: epidemiologist, microbiologists, clinicians, data managers and the focal point for AMR surveillance and reporting to GLASS.

Term of reference for the ASU:

1. Define AMR surveillance objectives within the national AMR strategy.
2. Facilitate linkages with AMR surveillance across human health, animal health and environmental sectors.
3. Develop or adapt national AMR surveillance standards, protocols and tools and coordinate their dissemination.
4. Provide guidance and information on data collection and reporting to the national reference laboratory and AMR surveillance sites.
5. Monitor and evaluate the AMR surveillance system on an ongoing basis.
6. Define strategy for participation in GLASS.
7. Assure data management structure and format and IT solutions.
8. Select and facilitate enrolment of surveillance sites.
9. Coordinate collection and compilation of national AMR data.
10. Conduct data analysis and quality assurance.
11. Analyse and feedback AMR surveillance results to AMR surveillance sites in collaboration with the national reference laboratory.
12. Aggregate and report national AMR data and data on implementation status of national AMR surveillance system to GLASS.

SITUATIONAL ANALYSES AND ASSESSMENT

Resistance to antimicrobial drugs is a major health problem that affects the whole world. The problem is still worse in developing countries where lack of antimicrobial-resistance surveys and control policies are the norm. In Libya, misuse of antimicrobial agents by the professional and public is widespread. As in many developing countries antimicrobials can be purchased from pharmacies without prescription in Libya.

Recently, a cross-sectional study was carried out in Tripoli Libya; found that the overall prevalence of ESBL producing *Enterobacteriaceae* was 24.5%. *Klebsiella spp*. (54%) and *E. coli* (34.4%) were the leading ESBL producers. However, these data was higher compared to previous studies carried out in Libya 10 - 20.5% [1-4]. Increased incidence of ESBL infections is also associated with an increase in MDR strains. These results was in agreement with other studies conducted in North Africa: in Algerian hospitals, ESBL existed in 16.4 - 31.4%; while the prevalence ranged from 11.7 to 77.8% in hospitals and was 0.7 and 7.3% in two communities in Tunisia; and ESBLs were found in 11 - 42.9% of Egyptian samples in both hospitals and communities [5].

Carbapenemase-producing *Enterobacteriaceae* (CRE) has been steadily spreading worldwide during the last decade. According to local study, the occurrence of CRE was 9% among *Enterobacteriaceae* isolates. *Klebsiella spp*. was the leading carbapenemase producer (44.6%) followed by *A. baumannii* (24%) and *E. coli* (11.6%), these isolates were autochthonous associated with MDR. Many studies conducted in Libya revealed the presence of carbapenem resistant-encoding genes (OXA-23, OXA-48, NDM-1, VIM-2 and GES) contributed to antibiotic resistance in Libyan hospitals [6-9]. In the Mediterranean basin, during recent years, the emergence of CRE becomes an alarming problem. The prevalence of these CRE is variable across Mediterranean countries [10]. During 2017, extremely high rates of resistance to most of the antimicrobial agents tested among carbapenem resistant Gram negative bacteria isolates, 40% of *Acinetobacter* spp, 32.6% of *P. aeruginosa*, and 12.5% of *K. pneumoniae* were positive for metallo β lactamases isolated in Libya [12]. There is little information on the prevalence of extensively drug resistant (XDR) pathogens in the countries of North Africa (including Libya) and the Middle East. XDR was evident among *A. baumannii* (61.2%); it was predominantly associated with burn patients [13]. This baseline data should engender further research to investigate the encoding genes associated with the resistant in these isolates in Libya.

A study carried out on self-medication with antibiotics in the ambulatory care setting within eight countries of the Euro-Mediterranean region between 2004-2005 found that self-medication in Libya was 24% and nearly 50% of interviewed Libyans indicated that they would take antibiotics for their own use without a prescription if they believe that they needed to [11]. Lack of good administration, resources, maintenance of hospitals, well-trained healthcare workers, and surveillance of different diseases and support of biomedical

research. The poor state of health undoubtedly aggravated the problem of antimicrobial resistance in the country.

Establishing monitoring systems based on routine testing of antimicrobial susceptibility and education of healthcare workers, pharmacists, and the community on the health risks associated with the problem and benefits of prudent use of antimicrobials are some of the steps that can be taken to tackle the problem in the future. Surveillance of antimicrobial consumption and use is desperately needed. Information from both surveillance programs will provide data required to direct policy on the cautious use of antimicrobials and to apprize and evaluate resistance containment interventions at local and national levels. In addition, reducing the impact of hospital-acquired infection in our hospitals is urgently required. Such action will most likely reduce antimicrobial use in the hospital setting and may lead to a reduction in high rates of antimicrobial resistance reported from hospitals in Libya. Programs dealing with control of nosocomial infections in the country should be strengthened and updated regularly. A major component of future policies for prevention and control of antimicrobial resistance in Libya should be education of healthcare workers, pharmacists, students, and the general public.

There are many international agencies such as WHO, scientific societies, and other institutions that provide excellent and accurate educational resources that should be used as guidelines. In addition, local scientific and culture societies, sport clubs, mosques, schools, universities, welfare and correctional centers, and the media should be involved in educating the community about prudent use of antibiotics. The crisis of antimicrobial resistance in Libya has reached a stage that requires the ministries of health, agriculture, information education, and higher education and the research community to join forces in addressing this issue.

Libyan Strategic plan

Develop awareness and understanding of antimicrobial resistance through effective communication, education, behaviour changes, and training

Objective 1	**Increase national awareness of AMR among target groups within 5 years**	
	Strategic interventions	***Activities***
	1.1. Establish evidence based public communications programme targeting audiences in human health related practices (Food chain, environment).	**1.1.1.** Estimate awareness and knowledge through behavioural studies about level of awareness of AMR as public health issue. **1.1.2.** Organize training programs for relevant professional groups (physicians, dentists, pharmacists, nurses, Lab. Technicians) on ethics of antimicrobial prescribing, dispensing and use in addition to communication skills. **1.1.3**. Establish a communication plan that includes (financial resources, human resources, training and formulation of national intersectoral coordination body. **1.1.4.** Implement advocacy activity for high-level authorities to ensure implementation of AMR NAP as priority. **1.1.5.** Produce audio-visual materials, training guidelines and Standard Operational Procedures (SOPs) for different activities/Procedures.
	1.2. Establish evidence based public communications programme targeting audiences in animal health related practices (Food chain, environment, plant).	**1.2.1.** Support, train and build the capacity of the veterinarians, veterinary technicians, farmers, animal breeders on AMR including knowledge and communication skills a) Conduct a series of AMR workshops for each category b) promoting the use of healthy alternative for animal weight gross such as food supplements
	1.3. Establish evidence based public communications programme targeting audience in the public (teachers, media personnel, community leaders, local non-governmental organizations (NGOs), influential figures and celebrities, etc).	**1.3.1.** Estimate awareness and knowledge through behavioural studies in different social groups. **1.3.2.** Mapping of media (TV channels, radio stations and printed materials) and the pattern of exposure and reach. **1.3.3** Organize mass public awareness campaigns using different media (traditional media, sub regional and national channels, social media)

1.4. Utilize the well-established public health programs e.g. vaccination program as a platform to enhance the awareness about AMR.	**1.4.1.** Providing the vaccination teams with AMR information to convey to parents during the vaccination activities **1.4.2.** Adding basic AMR messages to the vaccination cards
1.5. Establish and implement risk communication plan to address AMR during the current emergency situation in Libya.	**1.5.1.** Establish donor advocacy plan with focus on AMR among Immigrants. **1.5.2.** Mapping of the illegal immigrants situation in Libya and enhance the coordination with the relevant national and international organizations. **1.5.3.** Implement public awareness activities among Immigrants in detention centres about AMR. **1.5.4.** Enforcement of the legislation regarding the employment of the illegal immigrants. **1.5.5.** conduct training and produce materials for HCWs on how to handle AMR during outbreaks.

Objective 2	**Improve knowledge on AMR and related topics**
Strategic interventions	***Activities***
2.1. Include AMR and related topics as a core component of professional education, training, certification and development	**2.1.1**. Advocate for the AMR curricula among relevant decision makers (higher education) to get their approval. **2.1.2.** Review, draft and produce the AMR and related topics to include them in the undergraduate curricula for human and animal health professionals, food production and agriculture. **2.1.3.** Establish a training programme responsible for training modules. **2.1.4.** Organize training workshops for staff on ways to introduce the new curricula both in schools and medical faculties.
2.2. Include AMR and related topics as a core component of the school curricula	**2.2.1.** Advocate to include AMR in the school curricula among relevant decision makers (ministry of education) to get their approval. **2.2.2.** Review, draft and produce the AMR and related topics to include them in the schools curricula including visual aids and advocacy materials. **2.2.3.** Train teachers, health and school social mentors where available on ways to introduce the AMR curricula.

Objective 3	**Enhance behaviour change towards better use of antimicrobial medications (85% among healthcare workers, and 50% among public)**
	Strategic interventions
	3.1 Establish behavioural changes program addressing the economic, social and cultural factors.
	Activities
	3.1.1. Analyse the current situation with regard to the pattern of AMR related behaviours and the main factors affecting those behaviours.
	3.1.2. Advocate for the development and enforcement of legislations related to dispensing of antimicrobial medications (human and animal health and plants) in governmental and private sectors.
	3.1.3 Advocate for the Initiation of national unified protocols for prescribing and dispensing of antimicrobial medications.
	3.1.4. Organizing community outreach programs and apply cultural sensitive methods to enhance behavioural changes.

Strengthen the knowledge and evidence base through surveillance and research

Objective 4	**Set up a national surveillance system for antimicrobial resistance**
	Strategic interventions
	4.1. Establish AMR surveillance unit (ASU).
	Activities
	4.1.1. Write and approve terms of reference for a national coordinating centre for ASU with the mandate to oversee the AMR surveillance programme, including collecting, aggregating and sharing data.
	4.1.2. Recruit office members (e.g. epidemiologist, microbiologist, clinician and data manager)
	4.1.3. Assign focal points for other sectors
	4.1.4. Training of office members on the surveillance.
	4.1.5. Allocate budget for the ASU office.
	4.1.6. Coordinate with all stakeholders through NCDC.
	4.1.7. Enrolment and data reporting to GLASS.
	4.1.8. Review and modify current procurement plan to ensure sustainable provision of lab supplies.
	4.1.9. Encourage collaboration with international

		organisations. **4.1.10.** Identify and update the list of notifiable diseases. **4.1.11**. Identify national research priority.
Objective 5	**Build laboratory capacity to produce high-quality microbiological data for patient management and support surveillance activities in both human and animal sectors.**	
	Strategic interventions	***Activities***
	5.1. Designate a national reference laboratory (NRL) for AMR surveillance.	**5.1.1.** Write and approve terms of reference for NRL with expertise in methods for confirming and characterizing specific pathogens and organizing quality assurance schemes. **5.1.2.** Assessment of the potential NRL. **5.1.3.** Upgrade the capacity of NRL to fulfil approved term of references **5.1.4.** Implement quality management system relevant to AMR according to the international standard. **5.1.5.** Training of laboratory personnel on implementation of quality management system. **5.1.6.** Harmonise the standard used for interpretation of AST across the country. **5.1.7.** WHONET training
	5.2. Develop national EQA to oversee the lab performance	**5.2.1**. Training the staff on preparation, interpretation, and quality checked of EQA panels. **5.2.2.** Training on shipping standards. **5.2.3.** Assessment of current specimen referral system. **5.2.4.** Design an optimized specimen referral system based on the assessment. **5.2.5.** Simulation exercise to test the efficiency of the developed system. **5.2.6.** Develop monitoring and evaluation plan for improving the system.
	5.3. Building capacity of peripheral laboratories all sectors.	**5.3.1.** Assessment of the potential surveillance sites. **5.3.2.** Training laboratory personnel in referring adequate epidemiological data. **5.3.3.** Training of laboratory technicians on approved standard investigation procedures.

		5.3.4. Participation of EQA. **5.3.5.** WHONET training.

Objective 6	**Identify research priorities for AMR surveillance**	
	Strategic interventions	***Activities***
	6.1. Strengths agreement with all academic and research centres in all sectors.	**6.1.1.** Engage relevant experts to identify current gaps in knowledge and potential research topics. **6.1.2.** Collaboration to leverage available capacity to characterized genetic structure of resistant strains. **6.1.3.** Encourage collaboration with international organizations. **6.1.4.** Encourage the publication in international organizations. **6.1.5.** Establish terms of agreements collaboration for data exchange and publication.

Reduce the Incidence of Infection through Effective Sanitation, Hygiene and Infection Prevention Measures

Objective 7	**Strengthening the IPC program in Libya**	
	Strategic interventions	***Activities***
	7.1. Strengthening the structure of IPC program at governmental /private levels.	**7.1.1.** Establishing a multi-sectorial committee: the committee should include qualified /empowered /authorized members. **7.1.2.** Reactivating a medical subcommittee at health care facility level. **7.1.3.** Establishing IPC at level of PHC **7.1.4.** Establishing IPC at level of DCIM (department of compact illegal immigration). **7.1.5.** Expand vaccination coverage to include health care workers.
	7.2. Creating guidelines and protocols.	**7.2.1.** Implementation packages Train health care workers on those implementation packages. **7.2.2.** Measure compliance of health care workers/health care facilities.
	7.3. Establishing sentinel nosocomial surveillance sites at different regions health.	**7.3.1.** Establish Building capacity of reporting/outbreaks. **7.3.2.** Develop health care outbreak investigation team.

		7.3.3. Establish a national coordination structure for surveillance of AMR. **7.3.4.** Designate and develop NRL facility to coordinate effective epidemiology surveillance.
	7.4. Training and Education of IPC	**7.4.1.** Upgrading IPC diploma. **7.4.2.** Monitoring and evaluation of the current IPC diploma. **7.4.3.** Create a career class for IPC professionals. **7.4.4.** Establishing national training programs for health care workers on IPC principles.
	7.5. Establishing a national M&E program	**7.5.1.** Develop monitoring tools at level of health care facilities infrastructure. **7.5.2** Develop monitoring tools at level of Health care workers on IPC practices.
	7.6 Optimize physical infrastructure of health care facilities	**7.6.1** Develop minimum standards for IPC in health care facilities. **7.6.2** Improve (renovate) existing buildings. **7.6.3** Enforce IPC standards in new health care facilities.

Objective 8	**Establishing bio-security in veterinary settings and animal husbandry, health food industry and agriculture**	
	Strategic interventions	***Activities***
	8.1 Strengthening the structure of bio-security program at governmental/private levels	**8.1.1** Establishing bio-security committee at veterinary settings level and animal husbandry, health food industry and agriculture. **8.1.2** Establishing bio-security at level of Veterinary Clinics.
	8.2 Create a formal organizational structure to ensure proper development and use of bio-security polices and strategies.	**8.2.1** Write and approve a bio-security guideline in animal health Include hygiene and bio-security and control as core content in training education of vet. Professionals.

Objective 9	**Sanitation and hygiene at community level**	
	Strategic interventions	***Activities***
	9.1 Promotion of personal hygiene by social mobilization and behavioral change activities.	**9.1.1** Improve Access to safe and usable water. **9.1.2** Strengthening waste management system. **9.1.3** Control industrial waste. **9.1.4** Improve sanitary services.

	9.2 Expand vaccination coverage to include adults.	

Objective 10	**Sanitation and hygiene at migrants camps and community level**	
	Strategic interventions	***Activities***
	10.1. Promotion of personal hygiene by social mobilization of migrants at camps/community and behavioral change activities.	**10.1.1.** Knowledge of personal hygiene need to be verified as a base line a base line for the social mobilization campaigns. **10.1.2.** Improve IPC at level of health centres at the camps. **10.1.3.** Improve environmental sanitation at level of camps/community. **10.1.4.** Expand vaccination programs to include all migrants at camps and community levels.
	10.2. Improve environmental sanitation of water supply, and waste management (liquid and solid).	**10.2.1.** Improve Access to safe and usable water. **10.2.2.** Strengthening waste management system. **10.2.3.** Improve sanitary services.

Optimize the use of Antimicrobial medicines in human and animal health

Objective 11	**Ensure sustainable access to high quality antimicrobial medicines**	
	Strategic interventions	***Activities***
	11.1. Strengthen the supply chain of AM (selection, procurement, storage and distribution).	**11.1.1.** Training programme on supply chain system. **11.1.2.** Develop SOP for procurement of medicine. **11.1.3.** Assess warehouses of medicine. **11.1.4.** Reconstructing the warehouses to be complied with good storage and distribution practises.
	11.2. Enforcement of legislation to ensure the only safe effective and regulated medicines that are available in the market.	**11.2.1.** Conduct orientation workshop on existing legislation targeting high level decision makers of all stakeholders. **11.2.2.** Enforce regulation to minimize all substandard and falsified AMs for humans and animals.
	11.3. Strengthen the national regulatory authority responsible	**11.3.1.** Training on pharmacovigilance /inspection and registration of medicine.

	for registering , inspecting and monitoring use for human health.	**11.3.2.** Training on registration and inspection of AMs in animal health
	11.4. Strengthen the national regulatory authority responsible for registering and monitoring use for animal health.	

Objective 12	**Ensure appropriate use of AM in human**	
	Strategic interventions	***Activities***
	12.1. Improve awareness and education on rational use of AMs in healthcare facilities (Public & Private health facilities).	**12.1.1**. Assess AMs use in health care facilities through Questionnaire for health care providers. **12.1.2.** Training workshop on rational use of AM. **12.1.3.** Rational use of AM should be mandatory in CME in all health facilities.
	12.2. Establishment of National standard guidelines for common infectious diseases (Public & Private health facilities).	**12.2.1.** Develop standard treatment guidelines for URTI and septicaemia. **12.2.2.** Develop guidelines for use of AMs in surgical & dental problems.
	12.3. Establish AM stewardship program in healthcare facilities.	**12.3.1.** Conduct meeting of expert consultation for developing framework of AM stewardship program in Libya. **12.3.2.** Identify diverse pool of technical experts for collecting and collating evidence based national AMSP and develop training package. **12.3.3.** Piloting AM stewardship program in three geographically selected hospitals.
	12.4. Enforcement of the legislation for the AMs dispense and prescription.	**12.4.1.** Awareness campaign targeting dispensers, prescribers, consumers and healthcare providers on existing rules and regulation governing AM.

Objective 13	**Improve and ensure appropriate use of antimicrobials in animals**	
	Strategic interventions	***Activities***
	13.1. Develop legislation for the control of procurement, prescription and dispensing AMs for animal use.	13.1.1. Establish committee in MOA to review exciting legislation governing the control of procurement, prescription and dispensing AMs for animal use.
	13.2. Restrict use of critically important AMs for human medicine in food production	**13.2.1.** Identify the list of AMs currently in use in animals. **13.2.2.** Develop list to restrict AMs used for

	animals.	critical human cases.
	13.3. Restrict use of AMs as growth promoters.	**13.3.1** Conduct rapid assessment for the use of AMS as growth promoter. **13.3.2** Awareness campaign for the farmers.

Objective 14	**Establish the national surveillance system for antimicrobial use & consumption**	
	Strategic interventions	***Activities***
	14.1. Establish a surveillance system to monitor and assess antimicrobial consumption in human.	**14.1.1.** Develop methodology to estimate AMs consumption in human health through expert consultation.

Operational plan and budget

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 1.1. Prepare an evidence-based public communication programme for people in human health practice.								
Activity 1.1.1. Estimate awareness and knowledge through behavioural studies about level of awareness of AMR as public health issue among human and animal health care workers.								
Sub-activity 1.1.1.1 Measure AMR awareness among the human healthcare workers.	Awareness survey	1	2019	Nationwide	Research department in MoH And research department of NCDC + ACC	20.000	NA	Results of the two studies availability
Sub-activity 1.1.1.2 Measure AMR awareness among the animal healthcare workers.	Awareness survey	1	2019	Nationwide	MoA + ACC مركز الارشاد الزراعي مركز الارشاد البيطري	20.000	NA	Results of the two studies availability
Activity 1.1.2. Establish a communication plan that includes (financial resources, human resources, training and formulation of national intersectoral coordination body)								
Sub-activity 1.1.2.1 Conducting an advocacy workshop for concerned ministers on AMR plan.	workshop	1	2019		ACC + WHO expertise	10.000		

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 1.1.2.2 Assign a team of expertise to draw the outline of the frame for the plan.	plan		Q2 2019		NCDC + MoH ACC (including media representative of each ministries)	5.000		Plan drafted
Sub-activity 1.1.2.3 Submitting the plan for revision and approval by stakeholders and high authority.			Q3 2019		ACC			Plan approved
Activity 1.1.3. Organize training programs for different relevant professional groups (Physicians, Dentists, Veterinarians, Pharmacists, Nurses, and Lab. Technicians) on antimicrobial ethics in prescribing, dispensing and use.								
Sub-activity 1.1.3.1 Create guidelines and training modules covering AMR knowledge and communication skills.		1	2019		ACC	10.000		
Sub-activity 1.1.3.2 Conducting a workshop for different professions related to AMR (Physicians, Dentists, Veterinarians, Pharmacists, Nurses, and Lab. Technicians)**.**	workshop	6	2019		Medical Manpower Development Center + WHO	30.000		

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 1.1.3.3 Conducting a series of cascade training workshops for different professions related to AMR (Physicians, Dentists, Veterinarians, Pharmacists, Nurses, and Lab. Technicians)**.**	workshops	6	2019-2020		Medical Manpower Development Center + WHO	30.000		

Strategic intervention 1.3. : Establish evidence based public communications programme targeting audience in the public (teachers, media personnel, community leaders, local non-governmental organizations (NGOs), influential figures and celebrities, etc).

Activity 1.3.3. Organize mass public awareness campaigns using different media (traditional media, Social media)								
Sub-activity 1.3.3.1 Drafting key messages on AMR best-use practices**.**			2019	local	ACC and concerned stakeholders	5.000		Approved messages
Sub-activity 1.3.3.2 Production of audio-visual and other materials			2019	Nationwide	ACC and concerned stakeholders	50.000		No. of media products
Sub-activity 1.3.3.3 Selection of the channels / primetime for broadcasting including trusted social media accounts.			2019	Nationwide	ACC and concerned stakeholders Media offices in NCDC & MoH			

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 1.3.3.4 Making use of the relevant global events like WAAW and hand hygiene day to disseminate and broadcast the materials of the campaign.	Awareness campaign	1	Relevant dates	Nationwide	ACC and concerned stakeholders	150.000		No. of participating sectors
Sub-activity 1.3.3.5 Reaching out to the immigrants in camps and detention centres with awareness messages on AMR in their own languages.	Awareness campaign	1		Nationwide	ACC and concerned stakeholders including INGOs	Included in the above sub-activity		No. of camps covered

Strategic intervention 2.1. Include AMR and related topics as a core component of professional education, training, certification and development.

Activity 2.1.1. Include AMR and related topics in undergraduate curricula for human health professionals, animal health professionals and agriculture professionals								
Sub-activity 2.1.1.1. Advocate for the AMR curricula among relevant decision makers (Education and Higher Education) to get their approval**.**	Advocate meeting	1	2020		ACC with MoE	10.000		A decision is taken to include AMR in the curricula
Sub-activity 2.1.1.2. Revising existing undergraduate curriculum for human health professionals, animal health professionals and agriculture professionals to incorporate AMR and	Expert workshop	…	2020	…	ACC with MoE experts from different fields	20.000	…	Revised curriculum introduced

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
related issues and drafting new undergraduate curriculum								
Sub-activity 2.1.1.3. Submitting the new undergraduate curriculum			2020		ACC with MoE and experts from different fields			AMR content included in the Curricula

Strategic intervention 2.2. Include AMR and related topics as a core component of school curricula.

Activity 2.2.1. Include AMR and related topics in schools teaching programmes								
Sub-activity 2.2.1.1. Advocate for the AMR in school teaching programmes among relevant decision makers (ministry of Education) to get their approval**.**	Advocate meeting				ACC with MoE and experts from different fields	10.000		A decision is taken to include AMR in the school teaching programmes
Sub-activity 2.2.2.1. Review, draft and produce AMR related content					ACC with MoE and experts from different fields	5.000		AMR content included in the teaching programme
Sub-activity 2.2.3.1. Train teachers, health and school social mentors where available on ways to introduce the AMR curricula	Training course	10			ACC with MoE and experts from different fields	50.000		Human resources are well trained on introducing

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
								AMR teaching programme

Strategic intervention 3.1. Establish behavioural changes program addressing the economic, social and cultural factors.

Activity 3.1.1. Analyse the current situation with regard to the pattern of AMR related behaviours and the main factors affecting those behaviours.								
Sub-activity 3.1.1.1. Conduct baseline assessment study on patterns of AMR related behaviours	survey	1	2019	Nationwide	ACC with MoE and experts from different fields	15.000		A baseline study is conducted

Activity 3.1.2. Advocate for the development and enforcement of legislations related to dispensing of antimicrobial medications (human & animal health and plants) in governmental and private sectors.								
Sub-activity 3.1.1.2. Review of current laws related to AMR	Expert meeting		2019		ACC with MoH and concerned entities	5.000		Health related laws are revised
Sub-activity 3.1.1.3 Conducting advocacy meeting with the decision makers and introducing the suggested revised or developed legislations			2019		ACC with ministry of health, parliamentarians and concerned bodies	10.000		Advocacy meeting conducted

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 4.1. Establish AMR surveillance unit (ASU).								
Activity 4.1.1. Write and approve terms of reference for a ASU with the mandate to oversee the AMR surveillance programme, including collecting, aggregating and sharing data.								
Sub activity 4.1.1.1. Revise and approve TOR	1	1	Q1 2019	NCDC	NCDC	-	NCDC	Decree approved
Activity 4.1.2. Recruit office members (e.g. epidemiologist, microbiologist, clinician and data manager)								
Sub-activity 4.1.2.1. Write & approve job description for each member	NA	8	Q2 2019	NCDC	NCDC	-	NCDC	Approved
Sub-activity 4.1.2.2 Appoint office members	NA	8	Q4 2019	NCDC	NCDC	-	NCDC	ASU appointed
Activity 4.1.4. Training of office members on the surveillance.								
Sub-activity 4.1.4.1 Develop & approve surveillance protocols and training plan			2019	Local & abroad	NCDC	15.000	NCDC or international organization	Develop & approved
Sub-activity 4.1.4.2 Implementation of training plan	Training course		2019	Local & abroad	NCDC	15.000	NCDC or international organization	Office members trained

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Activity 4.1.7. Enrolment in GLASS.								
Sub-activity 4.1.7.1 Enrolment in GLASS			Q1 2018	Local & abroad	ASU	Free		achieved

Strategic interventions 5.1. Upgrade a national reference laboratory for AMR surveillance.

Activity 5.1.2. Assessment of the potential NRL.								
Sub-activity 5.1.2.1 Write and approve terms of reference for a NRL			2019	NCDC	NCDC	-	-	TOR develop
Sub-activity 5.1.2.2 Assessment of the potential NRL			2019	NCDC	National or international assessor (WHO)	-	-	Assessment report
Sub-activity 5.1.2.3 Developing a plan for improvement & upgrading based on assessment	Expert meeting		2019	NCDC	ASU	5.000	…	Plan develop & submitted
Sub-activity 5.1.2.4 Implementation of the plan			Q4 2020	NRL	ASU&NRL	100.000	NCDC	Implementation of the plan

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic interventions 5.3. a. Building capacity of peripheral laboratories (PL).								
Activity 5.3.1. Assessment of the potential surveillance sites								
Sub-activity 5.3.1.1 Write & approve terms of reference for surveillance sites			2019	NCDC	NCDC	-	-	ToR develop
Sub-activity 5.3.1.2 Assessment & selection of the potential surveillance sites			2019		National international assessor(WHO)	5.000		Assessment report and selected sites
Sub-activity 5.3.1.3 Developing a plan for improvement & upgrading based on assessment			2019	NCDC	ASU		…	Plan develop & submitted
Sub-activity 5.3.1.4 Implementation of the plan			Q1 2020	Participating lab	ASU & NRL		NCDC	Implementation of the plan
Strategic intervention 5.3.b. Assessment of reference and non- human laboratories								
Activity 5.3.1. Assessment of the potential reference and surveillance sites								
Sub-activity 5.3.1.1 Assessment of the potential surveillance sites& identifying the gaps			2019		National or international assessor			Assessment report

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 7.1: Strengthening the structure of IPC program at governmental/private levels								
Activity 7.1 Strengthening the structure of IPC program at governmental/private levels								
Sub-activity 7.1.1 Establishing a technical working group (multi-sectorial).		1	Q2 2019	Nationwide	MoH			TWG established
Sub-activity 7.1.2 Establishing a medical sub-committee at health care facility level.			Q2 2019		Director of the health facility			No. of sub-committee established
Sub-activity 7.1.3. Expand vaccination coverage to include health care workers			2019		MoH			
Strategic intervention 7.2 : Creating guidelines and protocols								
Activity 7.2. Creating guidelines and protocols								
Sub-activity 7.2.1. Develop guidelines and protocols.	Expert meeting		2019		Technical committee/ MoH	30.000		Guidelines developed
Sub-activity 7.2.2. TOT Training course for health care workers on guidelines and protocol	Training course	1	2020		MoH	30.000		
Sub-activity 7.2.3. cascade Training courses for health care workers on guidelines and protocol	Training courses	6	2020-2023	Nationwide		30.000		No. of HCW trained

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 7.2.4. Measure compliance of health care workers/health care facilities	Implementation research	1	2022	Nationwide	MoH	40.000		Study results obtained

Strategic intervention 7.3. Establishing sentinel nosocomial surveillance sites at different health facilities at different regions

Activity 7.3. Establishing Sentinel Nosocomial Surveillance sites at Different health facilities at different regions								
Sub-activity 7.3.1. Develop / update and distribution of nosocomial surveillance manuals	Expert meeting		Q2 2019	Nationwide	NCDC/MoH and hospitals	40.000		
Sub-activity 7.3.2. Build the capacity on reporting of nosocomial infection	workshops	20	Q1 2019		NCDC/MoH and hospitals	60.000		
Sub-activity 73.3. Develop and update NRL facility to coordinate an effective epidemiological surveillances		1	2019-2020		NCDC/MoH and hospitals	40.000		

Strategic intervention 7.4. Training and education of IPC

Activity 7.4. Training and Education of IPC								
Sub-activity 7.4.1. Upgrading IPC diploma			2019-2020		NCDC/ MoH			
Sub-activity 7.4.2. Create a career class for IPC professionals			2019		MoH			

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 7.4.3. Establishing a national training programs for health care workers on IPC principles	Training course	3/ year	2019-2023	Nationwide	MoH	100.000		No. of trained HCW

Strategic intervention 7..5. Optimize physical infrastructure of health care facilities

Strategic intervention 7.5. Optimize physical infrastructure of health care facilities								
Sub-activity 7.5.1. Develop minimum standards for IPC in health care facilities and assessment of existing HCF		1	2019-2022	Nationwide	MoH			No of HCF assessed
Sub-activity 7.5.2. Improve (renovate) existing buildings			2019-2022		MoH			
Sub-activity 7. 5.3. Enforce IPC standards in new health care facilities			2019-2022		MoH			

Strategic intervention 7.6. Establishing a National M&E Program

Strategic intervention 7.6. Establishing a National M&E Program								
Sub-activity 7.6.1. Develop monitoring tools at level of health care facilities infrastructure.		1	2019-2020		MoH	5.000		

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 7.6.2. Develop monitoring tools at level of Health care workers on IPC practices		1	2019-2020		MoH	5.000		…

Strategic Interventions 8.1. Strengthening the structure of ICP (bio-security) program at Governmental/Private levels

Activity 8.1. Strengthening the structure of ICP (bio-security) program at Governmental/Private levels								
Sub-activity 8.1.1 Establishing bio-security committee at veterinary settings level and animal husbandry, health food industry and agriculture.			2019		MoA and FDCC			
Sub-activity 8.1.2 Establishing bio-security program at level of veterinary clinics	Expert meeting		2020		MoA	15.000		Program established and No. of vet. Clinic involved

Strategic Intervention 8.2. Create a formal organizational structure to ensure proper development and use of bio-security polices and strategies

Activity 8.2. Create a formal organizational structure to ensure proper development and use of bio-security polices and strategies								
Sub-activity 8.2.1. Write and approve guideline in animal health Include hygiene and bio-security and control as core content in training education of veterinary professionals	Expert meeting		2020		MoA	15.000		

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 8.2.2. Conduct a TOT training courses on IC (bio-security)	Training course	1	2020-2022	Nationwide	MoA	30.000		
Sub-activity 8.2.3. Conduct a series of cascade training courses on IC (bio-security)	Training course	10	2020-2022	Nationwide	MoA	50.000		No. of professionals trained

Strategic Interventions 9.1. Promotion of personal hygiene by social mobilization and behavioral change activities.

Activity 9.1. Promotion of personal hygiene by social mobilization and behavioral change activities.								
Sub-activity 9.1.1. Knowledge of personal hygiene need to be verified as a base line for the social mobilization campaigns.	Survey	1	2019-2020	Nationwide	NCDC/ MoH	15.000		Results obtained
Sub-activity 9.1.1. Improve WASH services			2019-2024		Ministry of housing and utilities Water and sanitation company			
Sub-activity 3.2.2. Strengthening waste management system including medical waste			2019-2024	…	Ministry of housing and utilities	150.000		

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 9.2. Expand vaccination coverage to include adults and healthcare workers								
Activity 9.2. Expand vaccination coverage to include adults.								
Sub-activity 9.2.1 Awareness campaigns to include adult vulnerable groups within national vaccination programs	Awareness campaign	1	2019-2020	Nationwide	MoH	15.000		Awareness increased and No. of adult vaccinated
Strategic Interventions 10.1: Promotion of personal hygiene by social mobilization and behavioural change activities of migrants at camps/community								
Activity 10.1: Promotion of personal hygiene by social mobilization and behavioural change activities of migrants at camps/community								
Sub-activity 10.1.1 Knowledge of personal hygiene need to be assessed as a base line for the social mobilization campaigns	Survey	1	2019-2022	Nationwide	MoH and all partners working with immigration	15.000		Results of the survey obtained
Sub-activity 10.1.2 Improve IPC program at level of health centres at the camps	Training course		-		DCIM , INGOs, NGOs , UN agencies	10.000		No. of camps covered
Sub-activity 10.1.3 Improve environmental sanitation at level of camps			-		DCIM , INGOs, NGOs , UN agencies (OIM)			
Sub-activity 10.1.4 Expand vaccination programs to include all migrants at camps and community levels.			-		MoH UN agencies, NGOs, DCIM, INGOs			

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic Interventions 10.2. Improve environmental sanitation of water supply, and waste management (liquid and solid) at level of migrant camps.								
Activity 10.2. Improve environmental sanitation of water supply, and waste management (liquid and solid) at level of migrants' camps.								
Activity 10.2.1 Improve WASH services			-		General water authority , UN agencies (IOM)			
Activity 10.2.2 Strengthening waste management system.			2022		General services company UN agencies (IOM)			
Strategic activity 11.1. Strengthen the supply chain of AM (selection, procurement, storage and distribution)								
Activity 11.1. Strengthen the supply chain of AM (selection, procurement, storage and distribution)								
Sub-activity 11.1.1. Training programme on supply chain Management Focusing on AMs	Training course	1	Q3 2019	Nationwide	MOH, MSO in coordination with SHAMS project	10.000		Number of participant trained
Sub-activity 11.1.2. Develop SOP for procurement of medicine	Expert meeting		Q3 2019		MoH, MSO in coordination with SHAMS project	5.000		SOP developed and endorsed
Sub-activity 11.1.3. Assess MSO warehouses		1	2019	Nationwide	MoH, MSO	5.000		Comprehensive assessment of all warehouses conducted

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 11.1.4 Reconstructing the warehouses to be complied with good storage and distribution practises					MoH, MSO			warehouses up to the international standard

Strategic activity 11.2. Enforcement of legislation to ensure the only safe effective and regulated medicines that are available in the market

Activity 11.2. Enforcement of legislation to ensure the only safe effective and regulated medicines that are available in the market								
Sub-activity 11.2.1 Conduct orientation workshop on existing legislation targeting high level decision makers of all stakeholders	workshop	1	Q3 2019		Pharmacy administration/ MoH	10.000		Number of decision maker attended on legislation
Sub-activity 11.2.2. Enforce regulation to minimize all substandard and falsified AMs for humans and animals			Q4 2019		Pharmacy administration. Inspection and monitoring directorate			% of non-released AMs FDCC report

Strategic activity 11.3. Strength the national regulatory authority responsible for registering, inspecting and monitoring use for human health

Activity 11.3. Strength the national regulatory authority responsible for registering, inspecting and monitoring use for human health								
Sub-activity 11.3.1. Training on pharmaco-vigilance /inspection and registration of medicine	Training course	1	2020		Pharmacovigilance committee/ NCDC . FDCC. MoH	15.000		Number of participant trained

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Sub-activity 11.3.2 Training on registration and inspection of AMs in animal health	Training course	1	2020		MoA/MoH	15.000		Number of participant trained

Strategic intervention 12.1. Improve awareness and education on rational use of AMs in healthcare facilities (public and private health facilities)

Activity 12.1. Improve awareness and education on rational use of AMs in healthcare facilities (public and private health facilities)								
Sub-activity 12.1.1. Assess AMs use in health care facilities (public & private health facilities) through questionnaire for health care providers.	Survey	1	Q4 2019	Nationwide	MoH Infection control administration at NCDC	20.000		Report on the result of Questionnaire
Sub-activity 12.1.2 training workshop on rational use of AM(public & private health facilities)		6	2020-2022	Nationwide	IPC department at NCDC	60.000		Number of participant
Sub-activity 12.1.3 integrate rational use of AMs in CME in all health facilities (public & private health facilities)			2021		Hospitals and primary health care administration			Number of health care facilities adapted rational use of AMs in their CME programs

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 12.2. Establishment of national standard guidelines for common infectious diseases (public and private health facilities)								
Activity 12.2. Establishment of national standard guidelines for common infectious diseases (public and private health facilities)								
Sub-activity 2.2.1 Develop standard treatment guidelines for use of AMs in URTI, septicaemia, surgical & dental problems.	Expert meetings		Q4 2019		MoH, Scientific committees	35.000		STGs published and disseminated in hospitals and private sector
Strategic intervention 12.3. Establish AM stewardship program in healthcare facilities								
Activity 12.3. Establish AM stewardship program in healthcare facilities								
Sub-activity 2.3.1. Conduct expert consultation meeting for developing framework of AM stewardship program in Libya			Q4 2019		MoH, NCDC	20.000		AM stewardship expert meeting is conducted
Sub-activity 12.3.2. Identify diverse pool of technical experts for collecting and collating evidence based national AM stewardship program and develop training package.			2020		MoH, NCDC			List of technical experts
Sub-activity 12.3.3. Piloting AM stewardship program in 1 main hospitals			2020			30.000		APS implemented in 1 main hospitals

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Strategic intervention 12.4. Enforcement of the legislation for the AMs dispense and prescription								
Activity 12.4. Enforcement of the legislation for the AMs dispense and prescription								
Sub-activity 12.4.1. Awareness campaign targeting dispensers, prescribers, consumers and healthcare providers on existing rules and regulation governing AMs		1	2019	Nationwide	Pharmaceutical Admin. /NCDC	60.000		Number of dispensers, prescribers, consumers and healthcare providers reached with the campaign
Strategic intervention 13.1. Improve and ensure appropriate use of antimicrobials in animals								
Activity 13.1. Develop legislation for the control of procurement, prescription and dispensing AMs for animal use								
Sub-activity 3.1.1. Establish committee in MoA to review existing legislation governing the control of procurement, prescription and dispensing AMs for animal use			2020		MoA	5.000		Committee established, legislation reviewed, report produced and disseminated
Activity 13.2. Restrict use of critically important AMs for human medicine in food production animal								
Sub-activity 3.2.1. Identify the list of AMs currently in use in animals			2020		MoA			List produced and validated
Sub-activity 3.2.2. Develop list to restrict AMs used for critical human cases			2020		MoA / MoH			List produced, endorsed and disseminated

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (LD)	Source of funding	Indicator
Activity 13.3. Restrict use of AMs as growth promoters								
Sub-activity 3.3.1. Conduct rapid assessment for the use of AMs as growth promoter	survey	1	2020		MoA / FDCC	15.000		Assessment report produced
Sub-activity 3.3.2. Awareness campaign for the farmers		1	2021	Nationwide	MoA	60.000		% of Farmers covered by the campaign

Strategic intervention 14.1. establish the national surveillance system for antimicrobial use and consumption

Activity 14.1. Establish a surveillance system to monitor and assess antimicrobial consumption in human								
Activity 14.1.1. Develop or adopt methodology to estimate AMs consumption in human health through expert consultation			2019		PA/MoH health information centre	5.000		Methodology formulated and approved.
Activity 14.1.1. Training on estimating AMs consumption in human health	Training course	1	2020	abroad	WHO	30.000		Estimation of consumption started

Monitoring and evaluation plan

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
1.1. Increase national awareness of AMR among target groups within 5 years up to 85%.	Level of awareness by all target groups	Assessment of the impact on all target groups	Percentage of increase in the level of awareness among all target groups.	Two; Baseline and final survey assessment	Baseline survey report, post-intervention survey reports	Awareness survey	Measured in baseline survey
2.1. Include AMR and related topics as a core component of professional education, training, certification and development.	Revised curricula available for target professional groups	M&E of outcome	Yes/No No. of curricula /No. of professional groups to target	Annually	MoE	Field visit Regular documentation system Quality assurance offices	AMR related curricula available only in some medical and para medical schools
3.1. Establish behavioural changes program addressing the economic, social and cultural factors in respect to current situation.	The economic, cultural, social factors affecting the AMR related practices are addressed strategically	M&E of outcome	Yes/No	Annually	ACC	AMR surveillance programme implémentation report	No behaviour change programme is available
1.3.3.5. Reaching out to the immigrants in camps and detention centres with awareness messages on	Improvement in the level of AMR awareness among immigrants	Activity	Yes/No Percentage of coverage	Biannually	ACC in collaboration with relevant national	Field visit and Survey	No baseline study is available

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
AMR in their own languages.					agencies and international NGOs		
3.1.1. Analyse the current situation with regard to the pattern of AMR related behaviours and the main factors affecting those behaviours.	A study revealed the patterns, causes and factors related to AMR and reflected the effect of current situation.	M&E of activity	Yes/No	Once	ACC in collaboration with relevant national agencies	In-depth interviews and survey	No baseline data
4.1. ASU functioning and delivering data	Reporting data to GLASS	Output	Yes/ No	Annually	ASU	GLASS platform	NA
5.1. & 5.3 NRL and Surveillance peripheral lab.	Produce high-quality microbiological data for patient	Output	Number of labs involved	Annually	ASU	EQA	NA
3.3b. Assessment of reference and peripheral laboratories non-human sectors	Assessment report	Process	Yes/ No	Once	ASU	Report	NA
5.3.1.4. Implement improvement plan of non-human labs	Data delivered from non-human labs	Output	Number of Labs	Annually	ASU	Report	NA
5.1. Identify research priorities for AMR surveillance	List of AMR priority pathogens	Output	Yes/No	Annually	ASU	Data report and Experts advice	NA
6.1 Develop national EQA to oversee the lab performance	Functional EQA system	Output	Yes/No	Annually	NRL	report from NRL	NA

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
6.1. Evaluate the effect of immigrant on AMR situations	Evaluate AMR in areas heavily populated by immigrants	Process	Proportion	Annually	NRL	Research study	NA
7.1. Strengthening the IPC program (objective)	Proportion of secondary health care facilities applying IPC measures	Output	Proportion	Biannual	Hospital reports and assessment visits	Data analysis	NA
7.1. Training and Education on IPC	Improved KAP among Healthcare workers (HCWs)	Output	Score	Every 2 years	IPC directorate/ NCDC	Knowledge attitude and practice (KAP) studies report	N/A
7.2. Develop guidelines and protocols (Intervention)	IPC guidelines and protocols are developed and updated	Input	Yes/No	Updating every 4 years	NCDC and MoH	Review of guidelines documents	NA
7.3. Establishing Sentinel Nosocomial Surveillance sites at different health facilities at different regions	Proportion of sentinel sites that perform nosocomial surveillance according to national standards	Output	Proportion	Annually	MoH	Surveillance report + assessment	NA
8.1. Strengthening the structure of IPC program at governmental/private levels (intervention)	Committee developed & membership updated	Input	yes/No	Reviewed every 4 years	MoH	MoH documents	N/A

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
8.1. Enhance bio-security and hygienic practices in veterinary settings and animal husbandry, health food industry and agriculture	Create and revise curricula for target vet & related food industry groups	Output	Yes/No	Annually	Key information at MoA	Key informant interview	N/A
8.2.1. Write and approve a bio-security guideline in animal health, health food industry and agriculture. Include hygiene and bio-security and control as core content in training education of vet. Professionals	guidelines and protocols are developed	Input	Yes/No	Every 4 years	NCAH /ministry of agriculture and FDCC	Review NCAH documents	N/A
9.1. Promotion of personal hygiene by social mobilization and behavioral change activities	Improved KAP among population	Impact	KAP Score	Every 4 years	MoH, NCDC, IPC technical committee	KAP study	NA
10.1. Improve environmental sanitation of water supply, and waste management	Percentage of population using a basic drinking-water service in migrants camps	Outcome	Proportion	Annual	DCIM, INGOs, NGOs, UN agencies (OIM), Water and Sanitation Company	Survey study	N/A
11.1.4 Reconstructing the warehouses to be complied with good storage and distribution practises	2 warehouses fully constructed and functioned according to the	Output	Proportional	Once	MoH	Auditing	1

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
	international standard						
12.2.1 Develop standard treatment guidelines for URTI ,septicaemia, surgicl & dental Ams use	STGs published and disseminated in hospitals	Input	Yes/ no	Once	MoH	Guidelines	N/A
12.3.3 Piloting AM stewardship programme in 3 main hospital	AMS programme implemented in 3 hospitals	Output	proportional	Annually	MoH	Auditing	N/A
13.2.2 Develop list to restrict AMS used for critical human cases in animal use	List produced, endorsed and disseminated	Output	Yes/ No	Once	MoA/ FDCC	Formal list	N/A
14.1.1 Develop methodology to estimate AMs consumption in human health through expert consultation	Methodology formulated and approved.	Input	Yes/ No	Once	MoH	Report	N/A

REFERENCES

1. Abujnah AA., et al. "Multidrug resistance and extended-spectrum β-lactamases genes among Escherichia coli from patients with urinary tract infections in Northwestern Libya". Libyan Journal of Medicine 10 (2015): 26412.

2. Ahmed SF., et al. "Fecal carriage of extended-spectrum β-lactamases and AmpC-producing Escherichia coli in a Libyan community". Annals of Clinical Microbiology and Antimicrobials 13 (2014): 22.

3. Zorgani A., et al. "Antimicrobial susceptibility profiles of Gram-negative bacilli and Gram-positive cocci Isolated from cancer patients in Libya". Archives of Clinical Microbiology 3.3 (2012): 1-8.

4. Zorgani A., et al. "Prevalence of device-associated nosocomial infections caused by Gram negative bacteria in trauma intensive care unit in Abusalim hospital, Libya". Oman Medical Journal 30.4 (2015): 270-275.

5. Storberg V. "ESBL-producing Enterobacteriaceae in Africa a non-systematic literature review of research published". Infection Ecology and Epidemiology 4 (2014): 20342.

6. Mathlouthi N., et al. "Carbapenemase and extended-spectrum β-lactamases producing Enterobacteriaceae isolated from Tunisian and Libyan hospitals". The Journal of Infection in Developing Countries 10.7 (2016): 718-727.

7. Mathlouthi N., et al. "Early detection of metallo-β-lactamase NDM-1- and OXA-23 carbapenemase-producing Acinetobacter baumannii in Libyan hospitals". International Journal Antimicrobial Agents 48.1 (2016): 46-50.

8. Karim AG., et al. "New Delhi metallo-β-lactamase (NDM) and OXA-48 carbapenemases in Gram-negative bacilli isolates in Libya". Libyan Journal of Medicine 10 (2015): 29206.

9. Mathlouthi N., et al. "Emergence of carbapenem-resistant Pseudomonas aeruginosa and Acinetobacter baumannii clinical isolates collected from some Libyan hospitals". Microbial Drug Resistant 21.3 (2015): 335-341.

10. Mathlouthi N., et al. "Prevalence and emergence of carbapenemases-producing Gram-negative bacteria in Mediterranean basin". Critical Review in Microbiology 43.1 (2017): 43-61.

11. Scicluna EA, et al. Self-medication with antibiotics in the ambulatory care setting within the Euro-Mediterranean region;results from the ARMed project. J Infect Public Health 2 (2009): 189-97.

12. Zorgani A et al., Extended-spectrum beta-lactamase- and carbapenemase-producing *Enterobacteriaceae* among Libyan children. EC microbiology 12 (2017):126-135.

13. Zorgani A. An increasing threat in Libyan hospitals: emergence of extensively-resistant *Acinetobacter Baumannii*. EC Microb 6.2 (2017): 47-40.