National Action Plan
for
Combating Antimicrobial Resistance
In the
Hashemite Kingdom of Jordan
(2018-2022)

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Abbreviations and Acronyms

ACUC	Animal Care and Use Committee
AM	Antimicrobials
AMR	Antimicrobial Resistance
AMU	Antimicrobial utilization
ARI	Acute Respiratory Infections
ASP	Antibiotic Stewardship Programme
AST	Antimicrobial Susceptibility Testing
CDE	Centre for Disease Epidemiology
CLSI	Clinical Laboratory Standards Institute
CPHL	Central Public Health Laboratory
DIC	Drug information centers
EMRO	Eastern Mediterranean Regional Office of WHO
EQA	External Quality Assessment
ESBLs	Extended Spectrum Beta Lactamases
FAO	Food and Agriculture Organization of the UN
GAP	WHO Global Action Plan for AMR
GDP	Gross Domestic Product
GLASS	Global Antimicrobial Resistance Surveillance System
GMA	Greater Amman Municipality
HAIs	Hospital Associated Infections
HCAC	Health Care Accreditation Council
HCP	Health care providers
HIV	Human Immunodeficiency Virus
IEC	Information, education and communication

IPC	Infection Prevention & Control
J-RMS	Jordan Royal Military Service
JDA	Jordan Dentists Association
JFDA	Jordan Food & Drug Administration
JMA	Jordan Medical Association
JNA	Jordan Nurses Association
JOVAC	Jordan Bio Industry Centre
JPA	Jordan Pharmacists Association
JUH	Jordan University Hospital
JUST	Jordan University for Science and Technology
JVA	Jordan Veterinarians Association
KAH	King Abdullah 1 Hospital
KIMADIA	The State Company for Provision of Medicines and Medical Appliances
LIMS	Laboratory Information Management system
M&E	Monitoring and Evaluation
MDR	Multi Drug Resistance
MoA	Ministry of Agriculture
MoE	Ministry of Education
MoEnv	Ministry of Environment
MoH	Ministry of Health
MoMA	Ministry of Municipal Affairs
MRSA	Methicillin Resistant *Staphylococcus aureus*
NAMRU	Naval Medical Research Unit of USA
NAP	National Action Plan
NCARE	National Centre of Agriculture Research and Extension
NCC	National Coordination Centre
NEQAS	National External Quality Assessment Scheme

NFP	National Focal Point for AMR
OIE	World Organization for Animal Health
OTC	Over the Counter Sale
PPD	Plant Protection Division
PPE	Personal Protective Equipment
REQAS	Regional External Quality Assessment Scheme
SOP	Standard Operating Procedure
UHC	Universal Health Coverage
UNWRA	United Nations Relief and Works Agency for Palestine Refugees in the Near East
USAID	United States Agency for International Development
VISA	Vancomycin intermediate susceptible *Staphylococcus aureus*
WHA	World Health Assembly
WHONET	WHO software for analyses of AST data

Foreword

Antimicrobial Resistance – the inability of antibiotics to treat infectious diseases - has assumed serious proportions all over the world. It is one of the few challenges that have been ever addressed by the United Nations General Assembly. This has led to a political declaration in 2016 by the world leaders to comprehensively and immediately mount an exacting response. The global community has given this call to mitigate impending impact of antimicrobial resistance on human mortality, morbidity and economic catastrophe. In that sense, it is no longer considered = a medical problem; rather, it has been recognized as a development issue that shall affect much more the emerging economies and developing countries than the developed world.

Antimicrobial resistance is a complex multidimensional problem. It has serious economic, educational, regulatory, behavioural and intersectoral coordination dimensions. Thus, it is a complex and tricky challenge that needs well thought of actions and interventions to prevent and contain it.

In 2015, the World Health Organization came out with a Global Action Plan to combat Antimicrobial Resistance and asked all of its member states to develop and implement country-specific action plans assiduously.

With extensive national consultation and assistance from different international development partners, Jordan has developed its National Action Plan for the next five years. This National Action Plan is in alignment with the WHO Global Action Plan, and it covers all five broad objectives as enunciated in the WHO Global Plan.

Jordan is committed to implementing this National Action Plan through its health system and using the multi-sectoral as well as the One Health approach. A mechanism has been established that brings together senior officials from various sectors, including human and animal health. The focus of national efforts shall be on augmenting awareness on this issue amongst professionals as well as the general public; strengthening nation-wide surveillance; improving infection control practices and biosecurity at all levels of health care facilities and animal husbandry services; promoting the rational use of antibiotics and supporting research, especially operational research, that would facilitate the institution of locally-appropriate interventions in Jordan.

We recognize that the battle against antimicrobial resistance shall be long-drawn. We also understand that sustained efforts at political, technical and community levels are prerequisites for mitigating the impacts of antimicrobial resistance and preserving as well as prolonging the efficacy of currently available affordable antibiotics.

I am sure that Jordan will not lag behind in contributing effectively to this global endeavor of ensuring a sustainable fight against infectious diseases.

Minister of Health

Prof. Dr. Mahmoud Yassin Al-Sheyyab

Executive Summary

Antimicrobial medicines (like antibiotics) save millions of lives. Modern medicine's dependence on antibiotics has been phenomenal since the development of these drugs beginning in the 1940s. However, the misuse and overuse of these medicines with humans and animals has facilitated the emergence and spread of antimicrobial resistance (AMR), rendering many of these drugs ineffective. Until recently, diseases such as typhoid fever and gonorrhea and most infections acquired in health-care facilities responded rapidly to affordable antibiotics, but this is no longer true. The pipeline for the development of new classes of antibiotics has also dried up, and it is unlikely that new, effective and affordable medicines will soon be available. The rise of AMR means that many common infections may again be fatal.

AMR is deadly and expensive. Current estimates are that AMR now kills 700,000 people worldwide every year. This number is projected to rise to 10 million by 2050. Most of these deaths will occur in developing countries. AMR may have severe adverse effects on the global economy. If AMR is not addressed now, the world may produce around US $8 trillion less per year by 2050, and a cumulative $100 trillion could be wiped off the world's productivity over the next 35 years. The world's GDP could drop by as much as 3.5%. Economic losses will be greatest in developing countries. The poor will be hit hardest.

AMR is thus no longer only a health issue. It has grave potential to impede economy, food security and health of the people. AMR has thus become a challenge to global development invoking its political dimensions. The United Nations General Assembly and various other international agencies, especially World Health Organization (WHO), Food and Agriculture Organization (FAO) and World Organisation for Animal Health (OIE), have recently witnessed strong petitions by all countries to mount globally coordinated action to prevent and contain AMR.

In May 2015, the sixty-eighth World Health Assembly (WHA) endorsed the Global Action Plan on Antimicrobial Resistance (GAP-AMR), including antibiotic resistance, the most urgent drug resistance trend. The WHA resolution 68.7 has urged member states to align their National Action Plans on AMR with GAP-AMR by May 2017. Commitment by global leaders to combat AMR was further strengthened at the High-Level Meeting on AMR at the United Nations General Assembly on 21 September 2016. WHO has developed a framework for the drafting of action plans that are aligned with WHO Global Action Plan on AMR but are implementable in local contexts.

In accordance with the commitment in the World Health Assembly, and to contribute to global health, Jordan initiated the

drafting of its national action plan (NAP) that was coordinated by the National Focal Point under the guidance and supervision of the National Committee.

The objectives of NAP are aligned with the global action plan based on national needs and priorities. The emphasis is on One Health approach with all sectors especially human health, animal health and environment contributing towards minimizing the emergence and impact of AMR in Jordan.

Five objectives have been identified under the NAP. These are

1. Improving awareness and understanding of AMR through effective communication, education and training;
2. Strengthening knowledge and evidence through surveillance;
3. Reducing the incidence of infection through effective infection prevention and control;
4. Optimizing the use of antimicrobial agents in health, animals and food; and
5. Promoting investments for AMR activities, research and innovations;

NAP AMR is expected to reflect the five principles based on which the global action plan on AMR strategies has been enunciated. These include:

1. Whole-of-society engagement including a One Health approach,
2. Prevention first,
3. Access,
4. Sustainability, and
5. Incremental targets for implementation.

NAP Objective 1 focuses on improving awareness and understanding of AMR through effective communication, education and training, and has three components viz. improving awareness and change behaviours regarding hygiene and the appropriate use of antibiotics among public, animal and human health care providers, farmers, and students, strengthening political commitment for AMR and improving knowledge of AMR and related topics.

NAP Objective 2 aims to strengthen knowledge and evidence through the surveillance of AMR, with two components viz. establishment of a national One Health surveillance system for AMR and strengthen laboratory capacity.

NAP Objective 3 attempts to reduce the incidence of infection through effective infection prevention and control in healthcare to reduce the burden of infection in animal health and food to reduce spread of AMR and antimicrobials through animals and food, and in community and environment to reduce the spread of AMR and antimicrobials in the environment with three components viz. improve the national infection control program, ensure the availability of evidence based best practices and nationality consistent standard for IPC in animal sector and Improve knowledge of AMR and related topics to raise level of hygiene.

NAP Objective 4 shall optimize the use of antimicrobial agents for human health, animals and food through strengthening regulations, ensuring access and surveillance of antimicrobial use, antimicrobial stewardship in healthcare as well as animal health and agriculture. Its components are: ensure that tailored, evidence based antibiotic prescribing guidelines are available for all sectors; ensure the availability of evidence-based, best-practice and nationally consistent approaches to AMS across human health and animal care settings; develop tailored, evidence-based resources to support the implementation of AMS programmes; review existing health care providers' qualifications and health institutions' accreditation to ensure they appropriately support and encourage compliance with best practice AMS approaches and strengthening and modifying the existing regulations to better support appropriate and careful use of antimicrobials.

NAP Objective 5 aims to promote investments for AMR activities, research and innovations through new medicines and diagnostics, innovations to develop alternative approaches to manage infectious diseases, and sustainable financing to ensure adequate resources for containment of AMR. It also aims to support research in AMR to assist policy setting in containing AMR and promoting economic studies of the AMR burden.

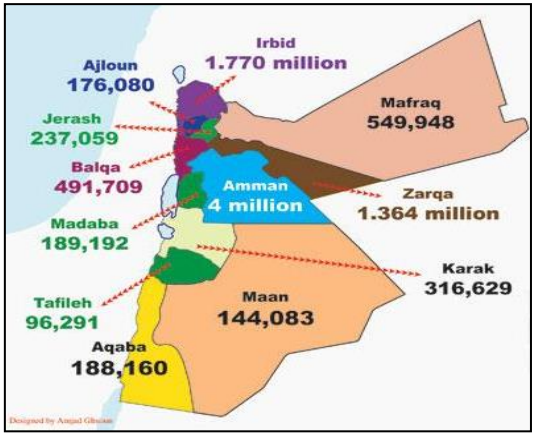
The Operational Plan to implement NAP has identified various activities that need to be carried out by different sectors in a time-bound manner to meet the targets set in this NAP. A monitoring and Evaluation (M&E) Plan has also been proposed to keep track of the progress made and modifying the operational plan, if needed. Provisional costing has been done to have an overview of the resources needed which shall be mobilized from national sources and international development partners.

Using an efficient multi-sectoral model with One Health approach, as envisaged in this National Action Plan, Jordan aims to combat AMR in the near future.

Chapter 1
Introduction

The Country and AMR

Jordan is a developing Middle Eastern country with a total area of 89,342 square kilometres divided into 12 governorates. As of Nov 2016, Jordan has an estimated population of 9,781,563 million, a relatively high total fertility rate of 3.1, birth rate of 29 per 1000 population, death rate of 3.8 per 1000 population, and a median population age of 22 years.



While non-communicable diseases are major contributors to morbidity in the country, around 13% of all deaths are caused by communicable diseases. In Jordan, neonatal disorders, diarrhea, lower respiratory, and other common infectious diseases, and maternal disorders are the most deadly communicable, maternal, neonatal, and nutritional diseases. The three most common infectious diseases have been lower respiratory infections, intestinal infectious diseases, and measles. These make up 87.8% of all deaths from common infectious diseases in Jordan. Lower Respiratory Infections killed 10.7 people out of every 100,000. However, its mortality rate has decreased by 57% since 1990. Intestinal Infectious Diseases took the lives of another 2.0 per 100,000 of the population. Though, its mortality rate has decreased by 13% since 1990. Measles was fatal to 1.4 per 100,000 of the population. Still, its mortality rate has decreased by 70% since 1990.

For several decades, antimicrobial resistance (AMR) has been a growing threat to the effective treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi. AMR results in reduced efficacy of antibacterial, anti-parasitic, antiviral and antifungal drugs, making the treatment of patients difficult, costly, or even impossible. The impact on particularly vulnerable patients is most obvious, resulting in prolonged illness and increased mortality. The magnitude of the problem worldwide and the impact of AMR on human health, on costs for the health-care sector and the wider society are still largely unknown, but several reliable estimates have generated staggering figures.

Every year AMR kills about 700,000 people worldwide – a number that is projected to rise to 10 million by 2050[1] as a consequence of inaction. Most of these deaths will be in the developing world, with enormous adverse social and economic effects. The economic impact of AMR may be devastating. A loss of USD $100 trillion is estimated, and global GDP may decrease by 3.5%. The World Bank estimates that 28 million people are likely to be pushed into poverty as a direct consequence of disease due to resistant pathogens[2]. Global exports may see a decline of 3.8%. Livestock production may be reduced by 7.5% throughout the world, thus decreasing food security[2].

Compared with patients with infections that are sensitive to antimicrobial medicines, patients infected by resistant pathogens will have longer hospital stays, undergo additional investigations, and spread infection for longer periods of time to greater numbers of contacts. Their treatment will require expensive second-line antibiotics, which may not be readily available or affordable and that may have serious adverse effects. Affected patients will lose time from work, incurring individual and societal costs. In the health sector, the costs to the individual and the health system are likely to be high, forcing national governments to divert resources from development activities to health.

1. The review on antimicrobial resistance. The antimicrobial resistance: tackling a crisis for the health and wealth of countries, 2014. Available at https://amrreview.org/sites/default/files/160525_Final%20paper_with%20cover.pdf (Accessed on 11 August 2017)
2. World Bank (2016). http://www.worldbank.org/en/news/press-release/2016/09/18/by-2050-drug-resistant-infections-could-cause-global-economic-damage-on-par-with-2008-financial-crisis Accessed on 10 August 2017

AMR may jeopardize progress in health outcomes and is likely to undo the progress made against HIV, TB and malaria, after investments of billions of dollars. It could also adversely affect the ambitious goal of universal health coverage (UHC) – the most ambitious public health programme yet to alleviate human suffering and poverty.

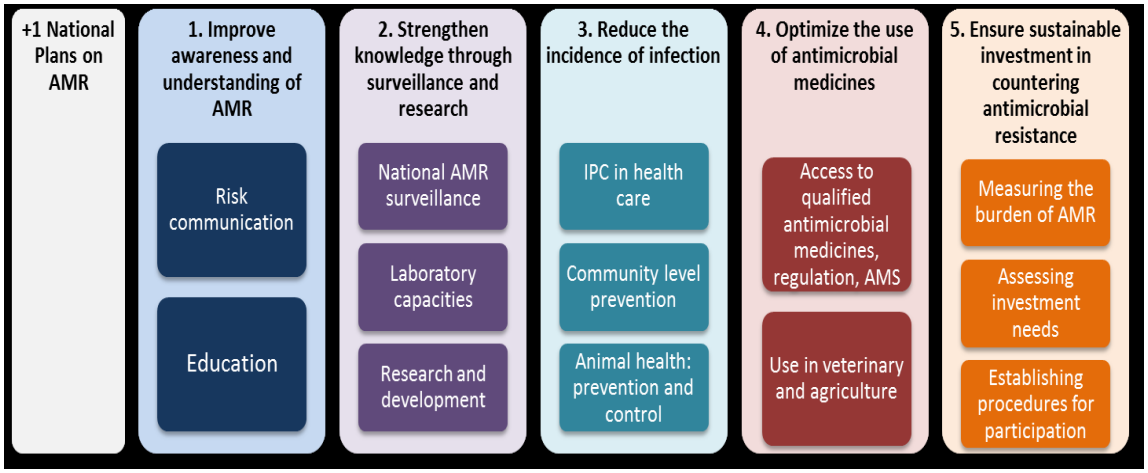
Widespread resistant bacteria in animal populations will be a major obstacle to meeting the projected 60% increase in global meat requirements by 2020[3]. The availability of food may diminish and the cost of available food may increase, thus hitting poor communities hardest. Consumer confidence in the safety and purity of food may diminish. Unless inappropriate use of antimicrobials is stopped, the use of antibiotics as growth-promoting agents in animals will further augment AMR. Success stories from several European countries in eliminating the nontherapeutic use of antibiotics need to be replicated globally and rapidly.

Non-human sources of antibiotics, resistant bacteria and resistant genes found in aquaculture, wastewater from agriculture, and waste products from pharmaceutical are potential sites for the emergence and horizontal transfer of resistance between several types of pathogens. The environment is key to the spread of resistance by these mechanisms that have hitherto been unknown, not well understood, or ignored.

Initiation of the National Action Plan

In response to this developing public health issue, a global action plan on antimicrobial resistance has been developed and at the 68th World Health Assembly in May 2015, Member States approved the resolution WHA68.7 The Global Action Plan (GAP) embraces the 'One Health' concept for integrated management of AMR in the food chain.

3. United Nations Department of Economic and Social Affairs. Food security and the MDGs. (www.un.org/waterforlifedecade/food_security.shtml accessed on 28 March 2017)



The Global Action Plan on AMR provides a broad framework for combating AMR. The goal of GAP-AMR is to ensure, for as long as possible, continuity of successful treatment and prevention of infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them. The Global Action Plan has defined the following five strategic objectives for containment of AMR:

1. Improve awareness and understanding of antimicrobial resistance;
2. Strengthen knowledge through surveillance and research;
3. Reduce the incidence of infection;
4. Optimize the use of antimicrobial agents; and,
5. Develop economic case for sustainable investment based on country needs and increase investment in new vaccines, diagnostics and other interventions.

In particular, GAP suggests that all action plans should reflect the following principles:

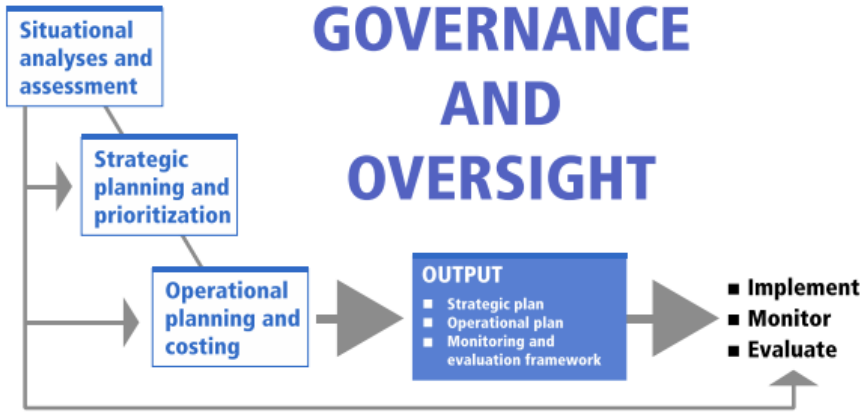
1. Whole-of society engagement including “One Health” approach;
2. Prevention first;

3. Access;
4. Sustainability; and
5. Incremental Targets for implementation.

Governance

In accordance with World Health Organization Resolution WHA 68.7, all member states, including Jordan, agreed on the importance of moving forward to develop national action plans by May 2017. These national plans would be aligned with the GAP for the use of antimicrobial medicines in animal health, agriculture and human health. (WHO, Global Action Plan for Antimicrobial Resistance, 2015).

Accordingly, in 2017 a national committee was formed, membership included representatives from different sectors (Annex 1) and report to the prime minister in Jordan. An approach – as depicted in the below figure and suggested by WHO was adapted.



The national committee was charged with following tasks:

- Select various sub-committees;
- Develop, implement and communicate plans;
- Develop guidance for Information, Education and Communication (IEC) materials;
- Arrange national campaigns;
- Undertake advocacy role with decision makers;
- Launch targeted communication with the professionals, regulators, community, and academia to ensure one message is conveyed;
- Develop teaching/training curricula for different faculties; and
- Develop continuing education programs for different target groups.

It is expected that over the next few years, the efforts of these committees-implemented through various institutions and organizations- shall bring down the prevalence of AMR and reduce substantially its emergence in Jordan through following outcomes:

- AMR reduction;
- Optimization of antibiotic use;
- Availability of well-trained skilled professionals;
- Implementation of regulations; and
- Development of new regulations to regulate the use of antibiotic under supervision of authorized individual(s).

The Jordanian Government designated its National Focal Point (NFP) in the Ministry of Health to lead and coordinate national efforts on the development of its National Action Plan on AMR. The NFP underwent orientation and sensitization in WHO intercountry meetings. A multi-sectoral high-level Committee was subsequently established by the Government of Jordan (Annex 1). This Committee produced an outline of national perspective and directions, which the country has to follow in order to combat AMR. Significant technical assistance was provided by WHO and FAO in the finalization of NAP, which is

an outcome of a multi-sectoral meeting held at Amman in November 2017 with the participation of more than 100 national experts from diverse fields (Annex 2).

Major Stakeholders

A large number of important institutions, organizations and agencies are to actively work together in mitigating AMR to ensure success in the implementation of NAP. Accordingly, all were engaged from the planning stage of development of NAP. Some of these are:

1. Ministry of Health
2. Ministry of Agriculture
3. JFDA: Jordan Food and Drug Agency
4. JPA: Jordan Pharmacists Association
5. J-RMS: Jordan Royal Military Service
6. JMA: Jordan Medical Association
7. JDA: Jordan Dentists Association
8. The Higher Health Council
9. JVA: Jordan Veterinarians Association
10. Ministry of Environment
11. HCAC: Health Care Accreditation Council

Situation Analysis

AMR in human beings

The Ministry of Health of Jordan is the major health care provider in the country and is responsible for all health matters. Other major health providers include The Royal Medical Services, Jordan University Hospital (JUH), King Abdullah I Hospital (KAH) at Jordan University of Science and Technology (JUST), King Hussain Cancer Center, the United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), and the private sector.

There is no resistance report shared with the Central Public Health Laboratory (CPHL) or national surveillance office in the JMOH. Until 2016, there was a surveillance program for *Salmonella* and *Shigella*; the isolates were collected from assigned sites and identification and susceptibility tests were performed at CPHL. The isolates were thereafter sent to NAMRU-3 labs for confirmation. Jordan is in process of implementing GLASS (The Global Antimicrobial Resistance Surveillance System). However, so far not much data has been generated for this purpose.

Several hospitals including university and few private hospitals perform antibiograms for standard bacterial isolates (*Staphylococcus aureus*, Coagulases negative staphylococcus, *Streptococcus pneumoniae*, enterococci, *Streptococcus viridans*, *E coli, Pseudomonas spp, Acinetobacter spp, Klebsiella*, and *Enterobacter*). These antibiograms are not shared with the national authorities. In general, these antibiograms show a high prevalence of AMR. An example of such high rates is the rates of MRSA from *Staphylococcus aureus* which reaches a rate of 45% (Figure 1).

Table 1: Susceptibility percentage of **1072** isolates among **Gram positive** bacteria from **Jan - June 2013**

Bacteria	No. strains	Ampiccilin	Oxacillin	Erythromycin	Gentamicin	Levofloxacin	Penicillin	Vancomycin	Clindamycin
Bacillus sp.	10	50%	40%	70%	100%	100%	----	90%	10%
Enterococcus	361	64%	----	13%	7%	48%	----	82%	14%
Staphylococcus aureus	223	5%	43%	60%	91%	91%	----	100%	75%
Coag Neg Staph	709	9%	25%	27%	68%	58%	----	100%	58%
Corynebacterium sp. (diphtheroids)	42	64%	5%	39%	48%	59%	----	100%	29%
Strept viridans	27	76%	5%	38%	30%	67%	----	95%	----

Strept pneumoniae: 12 isolates: PCN susceptibility 25%; Erthromycin susceptibility 25%
Sources: sputum 3; ear 3; eye 3; blood 1; sinus 1; unknown 1

Figure 1: An antibiogram for Gram positive bacteria from one university hospital in Jordan.

Research articles from academic institutions are available although scarce on AMR. Such articles describe a high rate of resistance. Representative examples of these studies include; *Staphylococcus aureus* with intermediate susceptibility to

vancomycin (VISA)[4], high resistance in Syrian refugees showing that 20 (66%) isolates were multidrug resistant (MDR) and 11(36.7%) were carbapenem resistant[5], highly resistant *Acinetobacter* with resistance rates of *A. baumannii* to imipenem reached 97% among all clinical samples in a public hospital[6],methicillin resistant *Staph aureus* (MRSA) in northern Jordan detected up to 31% of all isolates[7], ESBL prevalence seen up to 42%[8] and resistance levels of 90% and 60.4% to oxacillin and macrolides in *Strept pneumoniae*[9].

Jordan is a low endemic country for tuberculosis with prevalence rate approaching 7/100,000. However, at present, there is a possibility of missed cases among refugees. The disease is characterized by high stigma in Jordan, which might cause noncompliance to treatment. The National TB program is the responsible entity for management of TB cases in Jordan. It provides anti-TB medicines, PPD testing, tuberculosis culture and sensitivity, and checks for resistance by GenXpert system. The TB laboratories perform sensitivity for the first line drugs: INH, rifampin, ethambutol, and streptomycin. If results are abnormal, testing is done for second line drugs namely ofloxacin, amikacin, and carbomycin. No report on resistance is shared with the national surveillance system or the central labs.

First Voluntary Counselling Center for HIV was established in Jordan in 1983. It performs counselling, provides anti-HIV medicines, and determines the statistics. No resistance tests are performed.

[4]Bakri FG, Al-Hommos NA, Shehabi A, Naffa RG, Cui L, HiramatsuK.Persistent bacteraemia due to methicillin-resistant Staphylococcus aureus with reduced susceptibility to vancomycin in a patient with erythrodermic psoriasis. Scand J Infect Dis. 2007;39(5):457-60

[5]Abbara A, Al-Harbat N, Karah N, Abo-Yahya B, El-Amin W, Hatcher J, Gabbar O. Antimicrobial Drug Resistance among Refugees from Syria, Jordan. Emerg Infect Dis. 2017 May;23(5):885-886.

[6]Batarseh A, Al-Sarhan A, Maayteh M, Al-Khatirei S, AlarmoutiM.Antibiogram of multidrug resistant Acinetobacter baumannii isolated from clinical specimens at King Hussein Medical Centre, Jordan: a retrospective analysis.EastMediterr Health J. 2016 Feb 1;21(11):828-34.

[7]Al-Zoubi MS, Al-Tayyar IA, Hussein E, Jabali AA, Khudairat S. Antimicrobial susceptibility pattern of Staphylococcus aureus isolated from clinical specimens in Northern area of Jordan.Iran J Microbiol. 2015 Oct;7(5):265-72.

[8]Hayajneh WA, Hajj A, Hulliel F, Sarkis DK, Irani-Hakimeh N, Kazan L, Badal RE. Susceptibility trends and molecular characterization of Gram-negative bacilli associated with urinary tract and intra-abdominal infections in Jordan and Lebanon: SMART 2011-2013.Int J Infect Dis. 2015 Jun;35:56-61.

[9]Swedan SF, Hayajneh WA, Bshara GN. Genotyping and serotyping of macrolide and multidrug resistant Streptococcus pneumoniae isolated from carrier children. Indian J Med Microbiol. 2016 Apr-Jun;34(2):159-65.

Regulations for the rational use of antibiotics are weak and poorly enforced. Antibiotics are sold without a prescription. Self-medication is high. Large number of patients has used one or more antibiotics when they first visited doctors. No public awareness campaign for promoting rational use of antibiotics has been undertaken. Promotional activities by pharmaceutical companies are not regulated. It facilitates prescription of high end and expensive antibiotics as "broad spectrum" medicines in contrast to specific and affordable antibiotics. No national treatment guidelines exist. No functional clearing house for development of guidelines exists. Health care providers have not been exposed to any national training on AMR. Sporadic conferences were organized concerning AMR. The national hospital accreditation body, the HCAC, has identified the problem of AMR and included it in the IPC standards.

A national infection control unit is operational from Ministry of Health. All hospitals are required to have an infection control unit, team, and committee. However, adherence to policies is questionable. Major challenges for the programs include a large number of health care facilities, maintaining supply of the personal protective equipment (PPE) and other infection prevention control (IPC) materials, poor compliance with isolation measures, crowding in dialysis centers, poor vaccination uptake by healthcare providers, very few negative pressure rooms in the country, frequent use of single use devices, and incompliance with standards of infection control in the hospital structures.

Regarding innovation and research, Jordan has high quality medical centers. However, no research for developing new antimicrobials or diagnostics exists. The laboratories in public sector are rarely involved in any research. Few academic centers have performed research on AMR. Most of these projects are small studies on epidemiology of AMR. However, these projects are performed according to the investigators preference and are not based on a priority selection. These studies are rarely used for decision making. Public and private sectors are not involved in research and innovation.

Strengths that appeared in the analysis include awareness of AMR does exist, the importance of infection control in health care facilities is well known and implicated, a hospital accreditation system is available and functioning, the National Public Health Laboratory is well established and provides support to communicable diseases, the private sector offers high quality services as evidenced by the presence of health tourism, and finally the presence of systems for quality and availability of drugs.

Areas that need improvement include: the absence of a national plan, the absence of a national AMR surveillance system, rational use of antibiotics in humans and animals, and finally the absence of treatment guidelines**.**

AMR in Animals and Agriculture

Jordan is well served by its Agriculture Law No. 13 of 2015. Higher level administration is fully aware of the law, including relevant articles and many of the available powers to implement improvements on animal and plant health. The mandate of the Ministry of Agriculture (MoA) covers all Agriculture affairs in the Kingdome.

The Jordan Plant Health Services include the Plant Production Directorate (PPD), the Protection and Plant Health Directorate and the Land and Irrigation Directorate, Plant Laboratory Directorate and Olive Trees Directorate under the Ministry of Agriculture (MoA), the Municipalities (including Greater Amman Municipality - GAM) under the Ministry of Municipal Affairs (MoMA), the National Centre of Agriculture Research and Extension (NCARE) & more recently, Jordan Food and Drug Administration (JFDA).

The Jordan Veterinary Services include the Veterinary Services Directorate (VSD), the Animal Production Directorate and the Licensing Department under the Ministry of Agriculture (MoA), the Municipalities (including Greater Amman Municipality - GAM) under the Ministry of Municipal Affairs (MoMA), the Food & Drug Administration (JFDA), the Centre for Disease Epidemiology (CDE) and the Tuberculosis Directorate under Ministry of Health (MoH).

Minimum National Standards in Agriculture (livestock and plant) in Jordan are available and implemented. These are structured around five core functions and nine core capabilities viz. policy development, management, service capability and capacity, information management, livestock tracing, training, communication, R&D and legislation/regulations.

Antibiotics are registered in Jordan and that responsibility falls under Pharmaceutical products registration and monitoring division at MOA (Veterinary Services Department). The division has reacted to combat AMR in Jordan through:

- Issuing recent regulations that prohibit the use of antibiotics as growth promoters
- By the end of the year 2015 competent authority start putting a national plan to reduce AMR
- Some antimicrobials which were used as growth promoters have been stopped or are being strictly monitored.

The main gaps observed in animal health sector in Jordan indicate that current legislation does not clearly specify that antimicrobial agents are prescription only veterinary medicine. Veterinary prescriptions are mentioned in the current legislation for prescribing poisonous chemical products only.

The legislation grants permission for non-veterinarian (Agricultural Engineers) to sell antimicrobial products without veterinary supervision. Agricultural engineers are backbone for the sector however, agricultural engineers do not have the sufficient training nor do have the required background to dispense antimicrobials unsupervised by a veterinarian.

There are currently no formulary restrictions – (Pharmakopedia), no pre-authorisation antimicrobial prescription forms and no prescription guidelines. Moreover, in spite of existence of antimicrobial stewardship committees and legislation framework, implementation at the field level or at the sector level remains inadequate.

Veterinary pharmaceutical products registration division has no reliable data on antimicrobial use, quantity imported or manufactured in the country, and has no control over regulating antimicrobial product importation to maintain a safe pool in country despite being the entity issuing importation permits to pharmaceutical companies in Jordan. It is important that antimicrobial product registration process undergoes modernization.

SWOT Analysis

NAP Objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education, training, advocacy and behaviour change programs.

Strengths	Weaknesses
• Strong political commitment • Behaviour change experts available within the country • Laws and regulations related to antibiotic use formulated • Digital media available and accessible • Internet prevalence and full coverage across the country • National multi-sectoral committee for AMR established with a dedicated focal point to coordinate AMR related issues	• Lack of financial resources to widely sponsor awareness activities e.g. donors / funders • Shortage of qualified trainers and communicators in AMR issues • Few qualified trainers, educators, promoters of the rational use of antimicrobial agents available. • Few professionals and scientists with AMR knowledge available in the country • Cultural and traditional beliefs and myths related to AMR and antibiotics use

• Accredited health care organizations comply with infection prevention and control standards	• Inadequate implementation of laws and regulations • Lack of reliable data and trends on resistance • Inadequate motivation and interest among human and animal health care providers regarding the AMR • Lack of awareness among farmers and the general public
Opportunities	**Threats**
• Partnership and collaboration with the relevant professional associations and related bodies • International agencies willing to provide assistance in AMR awareness • Making best use of global awareness and commitment including antibiotic awareness week • The possibility of making available natural alternative products • Community health committees in the primary care centres can work on AMR • Dedicated leaders in different levels and locations support AMR initiatives and their implementation • Effective enforcement of available laws and regulations • Implementation of laws through awareness campaign	• Sustainability of finances • Coordination with other sectors which do not perceive AMR as a major issue • Waning advocacy • Financial benefits in private sector • Conflict of interest in committee • Conflict of interest with pharmaceutical companies to promote their awareness • Reaching refugees

NAP Objective 2: Strengthen the knowledge and evidence base through surveillance and research

Strengths	Weaknesses
• Established AMR HAI-surveillance in eight sites • Available epidemiological capacities • Established NCC organization and its ToRs available • CPHL nominated as national reference lab • Skilled personnel available • Agreement with veterinary college academia to strengthen the capacities (Agricultural Lab) • Agreement with water and environment center to enhance their capacity and share results • Lab in FDA for food and drugs available for laboratories • Twining establishment of Institutions (JUST) for ID and AMR in collaboration with international bodies e.g. Purdue/USA agreed • Electronic Surveillance system in MOH operational • Internal Quality control system (IQS) available • National external quality assessment scheme for laboratories (NEQAS) available for 47 institution (private, academia, governmental, and RMS) • Regional External Quality Assessment Scheme(REQAS) available	• No national Surveillance • **NC**C not fully activated • Inadequate number of Trained personnel • Inadequate sharing of information by laboratories • Microbiologists with expertise in modern molecular biology techniques are very few • Inadequately equipped labs • Low incentives for microbiologist • Lack of resources available for training personnel • Weak infrastructure • Laboratory information management system (LIMS) inadequate • Limited capacity to detect emerging resistant pathogens (PCR, sequencing) • Lack of lab networking • Lack of collaboration with the private sector • AMR surveillance for animal and agriculture • No efforts to establish correlation between antibiogramand antimicrobial consumption and

• National biorisk management guidelines developed and available • Legislation and Laws on surveillance • Internationally accredited institutions (2 CAP accredited labs in non PHL sectors) • Local accreditation for hospitals (HCAC) ongoing	correlation between antibiotic residue in animals and antimicrobial resistant • Absence of regulation for testing local and imported food antimicrobial residue
Opportunities	**Threats**
• Agreement with other partners to strengthen capacities • Cooperation with Public and academia for Water and JFDA • Stable security situation in Jordan attracts attention	• AMR spread is faster than the operational work • Refugees' problems • Institutional weaknesses in infrastructure and human resource

NAP Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures

Strengths	Weaknesses
• Availability of infection control committee • Infection control programs in each hospital are well established and staffed • Availability of infection control guidelines • Application of information technology • Surveillance program available for HAI • The willingness of the heath sectors to establish programs • Safe drinking water • Good laws and legislation • Vaccination program effective, accessible and free • Regulated processing of hospital waste • School health program running efficiently • In large farms there is adequate biosecurity levels • Availability of trained vets in the field.	• Scattered efforts from each sector • Lack of commitment by leaders in some hospitals • Underestimation of the infection control work by other disciplines • Lack of follow up and monitoring for practice • Insufficient infection control consumables and tools • Specific titles and job descriptions for IPC practitioners not available • Insufficient training for other health care providers • Not including the infection control training in the curricula of healthcare disciplines • Lack of microbiologists and infectious disease specialists in some hospitals • Lack of specialized IPC personnel • The number of veterinary clinics is very small • No regular surveillance system • Inadequate budget • Projects fully dependent on external funding • Absence of formal connection between private and public sectors • There are no clear infection control units or practices and there is no adherence from the workers in the field

	• Many workers do not have professional training • Lack of control over the vet pharmacy. • Lack of supervision of vets on some slaughter houses. • Uncontrolled antibiotics availability for all farms
Opportunities	**Threats**
• Support of political leaders for the health system • International willingness for support for infection control programs • For different sectors for health so, they can collaborate their efforts, best guidelines, best practices • Empowerment of infection control workers • Centralized source of information • Gaining funding from international agencies to improve infrastructure. • Vaccination campaigns • International organizations willing to support the veterinary programs such as FAO and OIE • Integration between MOH and MOA	• Refugees • Aging population growing • New emerging infectious diseases • Rapid spread of MDROs • Cross-border animal diseases • Imported animals • Illegal animal movement. • Livestock markets

NAP Objective 4: Optimize the use of antimicrobial medicines in human and animal health

Strengths	Weaknesses
• Availability of rules and regulations to control both the prescribing and dispensing of antibiotics. • Existence of regulatory and accreditation bodies. • The availability of different types of antibiotics through national procurement departments • The availability of several local GMP pharmaceutical manufacturers which provide cheaper bioequivalent generics. • The availability of essential drug lists. • The presence of well-established pharmacovigilance systems through JFDA	• Weak implementation of existing laws and regulations • The absence of nationally-adopted treatment guidelines. • The absence of prescribing and dispensing control system. • Under-reporting of therapeutic failures. • Inappropriate ordering of antibiotics by non-health care professionals or vets. • The lack of consultation with ID specialists and clinical pharmacists/ PharmDs. • Healthcare professionals' malpractice in prescribing and dispensing antibiotics. • The absence of universal health coverage • Lack of the ability to develop a newer antibiotic on a national level (Costly) • The lack of regulatory bodies to co-ordinate pharmaceutical registration processes for AM for both humans and animals, which must be in touch with AMR surveillance program. • Must include plants and pesticide use. Since antimicrobials can be used in plants and plants may absorb antimicrobials

Opportunities	Threats
• The support of policy makers • The availability of external support from NGOs and international organisations (FAO, OIE, WHO, USAID, FDA). • The availability of highly skilled and qualified health care providers.	• Over-prescribing and over-dispensing of antibiotics leading to the emergence of MDR pathogens. • Patients' non-adherence to their medications. • Increase of old age population and people who are more prone to infections. • Improper disposal of un-used or expired antimicrobials. • Lack of public awareness regarding the appropriate use of antimicrobials. • Use of same antibiotics for both humans and animals. • Mixing antimicrobials with the animals food • The absence of antimicrobial consumption data. • The lack of antimicrobial stewardship programs. • The lack of collaboration between health care providers (HCPs) • The dispensing of veterinary medicines by agricultural engineers

NAP Objective 5: Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions

Strengths	Weaknesses
• Academic institutions including medical, pharmacy, vets with available infrastructure for basic and clinical research infrastructure, (including human and laboratory resources), is available • Collaboration with international parties. • Central public health centre has good capacity for basic research. • Presence of electronic database for human health system.	• Collaboration with international parties. • Central public health centre has inadequate capacity for basic research. • Presence of electronic database for human health system is inadequate
Opportunities	**Threats**
• Global and national concern in AMR. • Political support for combating AMR. • WHO, FAO, OIE, or other international bodies' involvement in AMR. • Scientific communities are concerned and support research in AMR • Presence of global GHSA / JEE. • Health tourism requirement to prevent AMR and do research and provide opportunity to study AMR in other nationalities • Jordan has a priority for animal food production, thus it is important to keep it healthy and safe through research.	• Other demanding health issues such as refugees, cancer, NCDs • Change of political commitment. • Financial support might be affected by possible economic challenges. • Pharmaceuticals might not be interested any more in AMR. • Efflux of human power / turn over. • Global funding support sustainability is not guaranteed. • AMR might become larger problem before research projects finish. • Research might be misused and cause harm either through poorly implemented ethical strategy.

Chapter 2

Strategic Plan on Antimicrobial Resistance (2018-2022)

Vision
Reduction of mortality, morbidity and economic impact of AMR in Jordan

Mission
Establish policies and national multi-sectoral mechanisms which support an effective and sustained AMR management system

Goals
By the year 2022

1. 10% reduction in AMR morbidity
2. 20% reduction in antimicrobial consumption in humans
3. 30% reduction in antimicrobial consumption in animals
4. 30% reduction in diseases due to multidrug resistant organisms
4. 40% increase of public knowledge on AMR and awareness of appropriate use of antimicrobials

The national strategic action plan is aligned with the Global Action Plan. GAP-AMR has laid down five strategic objectives which form the basis for developing public health response to AMR globally.

Strategic Objectives

These strategic objectives are:

Objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training Objective 2: Strengthen the knowledge and evidence base through surveillance and research

Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures

Objective 4: Optimize the use of antimicrobial medicines in human and animal health

Objective 5: Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions

Guiding Principles for Implementation of Strategic Objectives

Additionally, the NAP AMR shall reflect the five principles based on which the GAP AMR strategies have been enunciated. These include:

1. Whole-of-society engagement including a One Health approach,
2. Prevention first,
3. Access,
4. Sustainability, and
5. Incremental targets for implementation

NAP Objectives, Strategic Interventions and Activities

NAP Objective 1:

Improve awareness and understanding of antimicrobial resistance through effective communication, education, training, advocacy and behaviour change programs

The NAP AMR has identified the need to raise awareness on AMR and promote behavioural change through public communication programmes that target different audiences in human health, animal health and agricultural practices as well as a wide range of consumers related to these sectors.

The NAP AMR has also focused on making AMR a core component of the professional education training, certification, continuing education and development in the health and veterinary sectors and agricultural practice. This approach is expected to foster proper understanding and awareness amongst professionals.

Jordan has not as yet carried out any systematic national campaigns to enhance awareness. There have been scattered activities by different groups. By 2019, Jordan will carry out nationwide, evidence-based awareness campaigns with regular M&E. The aim is also to revise curricula in undergraduate medical and veterinary education, food industry and agriculture teaching and Continuous Professional Development courses. Revised curricula will be implemented on a limited scale but with regular audits.

The Strategic Plan is as follows:

Strategic Objective No	Strategic Objective	Strategic Intervention
1.1	Improve awareness and change behaviours regarding hygiene and the appropriate use of antibiotics among public, animal and human health care providers, farmers, and students	Creation and implementation of a national awareness and change behaviour program for hygiene and appropriate use of antibiotics
		Understanding the needs of the stakeholders and partners with resistance to change and/or conflict of interest to encourage them to participate
1.2	Strengthening political commitment for AMR	Advocating for developing, revising and enforcing policies and legislations, and allocating resources for AMR
		Engaging media to influence political commitment and change social norms
1.3	Improve knowledge of AMR and related topics	Creation of a new generation equipped with the knowledge about the AMR and appropriate use of antibiotics
		Updating human and animal health care professionals and recent graduates of health schools about AMR and proper use of antibiotics

Activities for each strategic intervention have been described below.

NAP Objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education, training, advocacy and behaviour change programs.		
Strategic Objective 1.1	**Improve awareness and change behaviours regarding hygiene and the appropriate use of antibiotics among public, animal and human health care providers, farmers, and students**	
	Strategic interventions	**Activities**
	Creation and implementation of a national awareness and change behaviour program for hygiene and appropriate use of antibiotics	• Conducting mapping to identify the key relevant stakeholders and target groups and change behaviour experts • Conducting quantitative and qualitative studies to understand the current situation • Developing multisectorial awareness and change behaviour plan with the required resources and budget • Capacity building for the responsible individuals/agencies implementing the plan • Creation of motivation and supportive environment for raising awareness and change behaviour • Conducting mass awareness and community campaigns regarding hygiene and the appropriate use and disposal of antibiotics for both animal and human health fields • Conducting targeted behaviour change activities on antibiotic use and hygiene • Collaborating and communicating with the associations e.g. agriculture, medical, etc.

		• Conducting field orientation visits for farmers regarding the vaccination, biosecurity, feed additives, water purifications, antibiotic use, etc. • Developing accreditation and awarding systems with the legal bodies to recognize compliance • Conducting hospital-based interventions • Conducting activities by the community health committees targeting the public, students, mothers and youth • Monitoring the effectiveness of the conducted educational activities
	Understanding the needs of stakeholders and partners with resistance to change and/or conflict of interests to encourage them to participate	▪ Conducting situational analysis to understand the resistance ▪ Developing a strategy for engaging the conflict-of-interest parties ▪ Conducting involvement activities for the conflict-of-interest parties
Strategic Objective1.2	**Strengthening political commitment for AMR**	
	Strategic interventions	**Activities**
	Advocating for developing, revising and enforcing policies, legislations, and allocating resources for AMR	▪ Developing advocacy plan to support the implementation of laws and regulations ▪ Conducting meetings with regulators and decision makers. ▪ Producing evidence-based materials regularly e.g. newsletters
	Engaging the media to influence political commitment and change social norms	▪ Hosting workshops and informational meetings with the media

		▪ Capacity-building of media institutions through training ▪ Producing training modules for media on hygiene and antibiotics
Strategic Objective 1.3	**Improve knowledge of AMR and related topics**	
	Strategic interventions	**Activities**
	Creation of a new generation equipped with knowledge about AMR and appropriate use of antibiotics	▪ Conducting introductory meetings with the Ministry of Education and Higher Education leaders seeking their approvals on amending the curricula. ▪ Incorporating the AMR and appropriate use of antibiotics in school curricula. ▪ Incorporating the AMR and appropriate use of antibiotics in higher education curricula. ▪ Developing web-based learning modules for under- and post-graduate students
	Updating human and animal health care professionals and recent graduates of health schools about AMR and the proper use of antibiotics	▪ Developing continuous education programs for human and animal healthcare providers ▪ Issuing and publishing reports on websites for human and animal health care providers

NAP objective 2: Strengthen the knowledge and evidence base through surveillance and research

The NAP AMR identifies the need to establish an evidence-based surveillance for AMR in the nation, and identifies the following critical information/evidence gaps:

- Descriptive epidemiology of resistant organisms as they emerge
- Understanding how resistance develops and spreads
- The ability to rapidly characterise the emergent resistant organisms
- Understanding social sciences, behavioural and other research needed for holistic fulfilment of all five strategic objectives
- Treatment and prevention of infections, especially in low-resource settings
- Basic and translational research to support the development of new treatments, diagnostic tools, vaccines and other interventions
- Alternatives to non-therapeutic uses of antimicrobial agents in the context of agriculture, aquaculture and their use in crop protection
- Economic research

The process of surveillance of AMR in Jordan has commenced. It may take a slightly longer time because of limited human resources and therefore material resources capacity in the country. Limited testing of clinical isolates is carried out at few laboratories. AMR surveillance is mainly carried out in disease control programs such as TB.

By 2020, Jordan will have a nationwide AMR surveillance system in place. Resistance profiles of priority pathogens will be reported. These efforts will be supported by quality-assured national referral laboratories in human and animal health sectors and their network of surveillance laboratories. By 2020, a national early warning system will be in place to identify early the emergence of resistance in priority pathogens and to critical antimicrobials.

The Strategic Plan is as follows:

Strategic Objective No	Strategic Objective	Strategic Intervention
2.1	Establishment of a national One Health surveillance system for AMR	Activating National Coordination Centre
2.2	Strengthening laboratory capacity	Establishing Leadership and Governance of Laboratories for each sector
		Strengthening the development of laboratory quality management system

The Plan with specific activities will be rolled out as below:

NAP Objective 2: Strengthen the knowledge and evidence base through surveillance and research		
Surveillance		
Strategic Objective 2.1 Establishment of a national One Health surveillance system for AMR		
	Strategic interventions	Activities
	Activate the National Coordination Centre	▪ Reviewing and modifying TORs of the National Coordination Centre ▪ Nominating representatives from all relevant sectors (One health approach (human, animals, food and agriculture and environment) ▪ Establishing a Technical Steering Committee from all relevant sectors

		▪ Establishing a national system for data collection, management, networking and dissemination of information in a real-time manner. ▪ Specifying the list of pathogens to be reported ▪ Designating surveillance sites for all sectors ▪ Promoting cross-sectional collaboration and integration among all partners ▪ Developing or adapting assessment tools for sites and labs ▪ Developing a notification system for priority pathogens ▪ Collaborating with National research fund to guide the research plan toward AMR priorities
Laboratory Capacity		
Objective 2.2	**Strengthening Laboratory Capacity**	
	Strategic interventions	**Activities**
	Establishing leadership and governance of laboratories for each sector	• Conducting situational analysis of the lab services across the country. • Unifying national laboratories standards and guidelines in accordance with international standards (CLSI, etc...) • Developing a laboratory networking system

		• Monitoring and evaluation of laboratory services • Developing a human resources policy for sustainable, sufficient and competent staff • Developing a system for attracting and retaining staff in laboratory services. • Developing and using appropriate training / competence development programs • Establishing or strengthening a nationwide integrated health laboratory network (informatics) • Strengthening external partnerships for technical and financial assistance • Providing epidemiological capacity for data analysis. • Participating in GLASS
	Strengthening the development of the laboratory quality management system	▪ Upgrading the capacity of national reference lab to oversee peripheral labs and to detect new emerging infectious diseases. ▪ Developing the capacity of peripherals lab to ensure proper delivery of service ▪ Continuing improvement for lab technicians capacities ▪ Ensuring sustainable procurement for lab supplies

		▪ Following international standards in referral shipping for panel of NEQAS ▪ Ensuring sustainable laboratory services through adequate funding ▪ Providing lab information management system and IT capacity ▪ Ensuring the implementation of an internal quality control system ▪ Promoting the participation of all labs in EQAS ▪ Developing a national EQA for One Health sectors

NAP Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures
Infection prevention and control, especially in the context of hospitals, is an extremely important aspect of a strategic plan to contain AMR. This is essentially because a clinical setting represents an ecosystem of high antimicrobial usage. Within such ecosystem, there are patients who may be immunologically impaired. These patients not only represent the population that is vulnerable to serious, life-threatening infections, but also they promote the emergence of resistance. On the other hand, better hygiene (WASH) and infection prevention control (IPC) represent methods to cut down on the spread of infections in ambulatory human and animal care facilities, in food production systems and in the community in general. Vaccination in humans and animals and biosecurity in food production systems are specific interventions that if implemented effectively, can result in better health outcomes and reduced risk of the emergence of AMR.

Jordan has made considerable progress in implementing IPC measures in health settings. Further activities can be carried out by strengthening the effective role of the existing infection control committee as a steering committee, formulating a technical committee, standardising the national guidelines and standardization and reporting of a national healthcare-associated infection surveillance program, in addition to improving education and training for infection control professionals.

Strengthening hygiene best practices in animal health, which can be achieved by promoting disease prevention in animals, and strengthening the monitoring system for AMU and AMR in the poultry sector are also planned.

To improve the hygiene in the community, Jordan will increase the level of public awareness and behaviour regarding proper hygienic procedures utilizing the widespread of media and social media, proper waste management in the community and improving the reporting of the communicable diseases in the ambulatory settings.

Improvement of infection prevention and control in healthcare shall be carried out through following strategic interventions leading to fulfilment of strategic objectives.

Strategic Objective No	Strategic Objective	Strategic Intervention
3.1.	Improving the National infection control program	▪ Reforming and activation of the national infection control program committee and developing infection control guidelines
		▪ National surveillance program
		▪ Improving training and education
3.2	Ensuring the availability of evidence-based best practices and nationality consistent standard for IPC in animal sector	▪ Strengthening hygiene best practices in animal health
		▪ Promoting disease prevention in animals
		▪ Strengthening the monitoring system for AMU and AMR in the poultry sector

3.3	Improving knowledge of AMR and related topics	• Promoting personal hygiene through social mobilization and behaviour change activities
		• Promoting medical waste disposal and management at the community level
		• Improving reporting systems in ambulatory settings

The specific activities for each intervention are given below:

Objective 3.1	**Improve the national infection control program**	
	Strategic interventions	**Activities**
	Reforming and activating the national infection control program committee and developing infection control guidelines	• Combining the different infection control guidelines of each sector (MOH , RMS, universities, private and Jordan hospital society, NGOs, UN) in one national guideline • Strengthening collaboration between health sectors • Empowering infection control workers • Ensuring the availability of infection control budgets for all sectors • Supervising the activities of outbreaks
	Establishing national surveillance program	• Establishing a national healthcare-associated infection surveillance • Developing surveillance guidelines

		• Enforcing all health sectors to report to the national heath surveillance centre
	Improving training and education	• Developing a curriculum for infection control professional training, applicable for all certification bodies • Creating a certification body for infection prevention and control professionals

Objective 3.2	**Ensure the availability of evidence-based best practices and nationality consistent standard for IPC in animal sector**	
	Strategic interventions	**Activities**
	Strengthening hygiene best practices in animal health	• Developing legislation and regulations for IPC • Reviewing recommendations for MDR • Developing national-wide IPC policy and procedure • Developing vet. IPC guideline • Developing vet. Biosecurity guidelines • Raising awareness for vets and farmers • Training courses for veterinarian hygiene practices • Improving hygiene practices in slaughterhouses • Developing hygiene curricula for veterinary practices, under and post graduated

		• Establishing control strategies for major animal diseases • Providing accreditation and quality assurance programs • Establishing a robust surveillance system for animal diseases
	Promoting disease prevention in animals	• Promoting vaccines for animal health • Increasing vaccination awareness among the farmers • Improving vaccine cold chain systems in animal health • Undertaking post-vaccination monitoring studies • Training of veterinary para-professionals on best practices of vaccinations • Studying vaccine efficacy and evaluation
	Strengthening the monitoring system for AMU and AMR in the poultry sector	Updating and developing legislations and regulations to establish an oversight role for the government to monitor and regulate antimicrobial usage in poultry sector • Developing a monitoring system for vaccination program • Establishing a surveillance system for AMR in poultry

Objective 3.3	**Raise the level of hygiene and sanitation in the community:**	
	Strategic interventions	**Activities**

	Promoting personal hygiene through social mobilization and behaviour change activities	▪ Enhancing community awareness on the importance of personal hygiene ▪ Utilizing the wide spread of media and social media
	Promoting medical waste disposal and management at community level	▪ Implementing appropriate segregation for waste at the community level ▪ Waste recycling
	Improving reporting systems in ambulatory settings	▪ Engaging ambulatory sittings in electronic reporting ▪ Enforcing the implementation of the law

NAP Objective 4: Optimize the use of Antimicrobial medicines in human and animal health
The use of antimicrobials in any form, even when rational and prudent, can precipitate resistance in target microbes. High antibiotic use may reflect over-prescription, easy access through over-the-counter sales, and more recently sales via the Internet which are widespread in many countries. The situation analysis reveals that Jordan has a functional National Regulatory Authority that is responsible for regulation and licensing; pharmacovigilance and market authorization. Post-licensing inspections, including those for retail pharmacies and OTC sales, are carried out on a limited scale. However, the country lacks important instruments and systems such as a National AMR containment policy, AMR stewardship programme for control of use of antimicrobials, and AMU surveillance including sales of antimicrobial agents. The animal health sector, however, lags on all of the above fronts. Jordan proposes to establish a robust system for regulation and surveillance of use of antimicrobial agents for the control of human and veterinary use of antimicrobial substances. Some of the measures taken will include a National AMR Containment and Use Policy and related strengthened regulatory frameworks, National Drug Regulatory Authority, revised essential

medicines list and standard treatment guidelines with special reference to the use of antimicrobial agents, evidence-based guidelines for National Antimicrobial Stewardship Programme in human and animal health care, ambulatory and community settings as well as aquaculture and an AMU monitoring programme in humans and food animals, including residue testing in food products.

All of the above systems aim to optimise the use of antimicrobials; however, they will be implemented on a limited scale during 2018-2020 and expanded thereafter.

Improvements to optimize the use of antibiotics across sectors shall be carried out through the following strategic interventions, leading to the fulfilment of strategic objectives:

Strategic Objective No	Strategic Objective	Strategic Intervention
4.1	Ensuring that tailored, evidence-based antibiotic prescribing guidelines are available for all sectors	▪ Adapting and harmonizing international treatment guidelines after modification in accordance to the existing local microbial resistance
		▪ Improving access to and use of the available resources in all human health settings where antibiotics are prescribed should be a standard practice.
		▪ Making available internationally accepted Antimicrobials prescribing guidelines for veterinary professionals
4.2	Ensuring the availability of evidence-based, best-practice and	• Implementing Antimicrobial Stewardship programmes in health care institutions for humans.

	nationally consistent approaches to AMS across human health and animal care settings	• Implementing Antimicrobial Stewardship programmes in health care institutions for animals.
		• Establishing approaches that support appropriate prescribing and supply of antimicrobials outside of hospitals.
		• Developing guidelines on how veterinarians should use antibiotics critical to human medicine
		• Initiating approaches that support appropriate prescribing and supply of antimicrobials outside hospitals.
4.3	Developing tailored, evidence-based resources to support the implementation of AMS programmes	• Applying a nationally harmonised electronic health system.
4.4	Reviewing existing health care providers' qualifications and health institutions' accreditation to ensure they appropriately support and encourage compliance with best-practice AMS approaches	• Developing and implement AMS programmes by local hospitals
		• Establishing a National Antimicrobial Stewardship Clinical Care Standard, which aims to ensure that a patient receives optimal treatment with antibiotics, including the selection of the right antibiotic to treat their condition, the right dose, by the right route, at the right time and for the right duration.

		• Implementing accreditation or quality assurance programmes for veterinary practices in Jordan that have specific requirements for AMS.
4.5	Strengthening and modifying the existing regulations to better support appropriate and careful use of antimicrobials	• Optimising the use of AM by making improvements to existing arrangements for prescribing, dispensing and administering antibiotics.
		• Building national research capacity and one health concept implementation
		• Reviewing and revising existing regulations governing access to antibiotics to ensure they effectively support appropriate and careful use.
		• Reviewing and revising the prescribing and dispensing regulations in a way that provides access to essentially needed antimicrobials for all Jordanians without extra financial burden.

The specific activities for each intervention are given below:

Objective 4.1 Ensuring that tailored, evidence based antibiotic prescribing guidelines are available for all sectors		
	Strategic interventions	**Activities**
	Adapt the international treatment guidelines with modifications in accordance to the existing local microbial resistance	Establish a national committee from all involved sectors, to be formed by MOH and in collaboration with

		MOA, in order to revise the international and the local guidelines and protocols to establish the national ones. • Issuing a decree to enforce the implementation of local guidelines and protocols on a national level • Training the relevant HCP on the newly implemented guidelines
	Access to and use of the available resources in all human health settings where antibiotics are prescribed should be a standard practice.	• Implementing a national electronic health system
	Antimicrobials prescribing guidelines for veterinary practice need to be standardised and optimised to improve treatment outcomes and minimize resistance. An international guideline must be adapted and modified in accordance to what suite the country's best interests.	• Establishing a national committee from all involved sectors, to be formed by MOH and in collaboration with MOA
Objective 4.2 Ensuring the availability of evidence-based, best-practice and nationally consistent approaches to AMS across human health and animal care settings		
	Strategic interventions	**Activities**
	Implementing Antimicrobial Stewardship programmes in health care institutions for humans.	• Assigning a designated committee to perform this action. • Establishing a National AMS Advisory Committee to provide strategic advice to ensure work undertaken in this area occurs in a nationally coordinated way.

	Implementing Antimicrobial Stewardship programmes in health care institutions for vets.	• Participating in global health network AMS. • Performing regular training and qualification workshops for relevant health care professionals.
	Approaches that support appropriate prescribing and supply of antimicrobials outside hospitals.	▪ Categorizing antimicrobials in accordance to restricted antimicrobials and setting prescribing and dispensing limitations accordingly.
	Guiding on how veterinarians should, in a broad and a general sense, use antibiotics critical to human medicine	▪ Establishing detailed, species-specific guidelines to further support antimicrobial stewardship in animal health settings.
	A policy on safe disposal of un-used and expired antibiotics	▪ Training the relevant HCP ▪ Implementing public awareness programs ▪ Providing special environmentally safe hazards containers to pharmacies and fund for disposal
Objective 4.3 Develop tailored, evidence-based resources to support the implementation of AMS programmes		
	Strategic interventions	**Activities**
	Apply a nationally harmonised electronic health system.	• Utilizing the features of EHR software (Hakeem) • Establishing a national AMS database • Training on the database software • Adopting and establishing the database

National surveillance system for antimicrobial use & consumption

Objective 4.4 Review existing health care providers' qualifications and health institutions' accreditation to ensure the appropriately support and encourage compliance with best practice AMS approaches		
	Strategic interventions	**Activities**

	Developing and implementing AMS programmes by local hospitals	▪ Providing prescribers with the up-to-date antibiotic prescribing guidelines ▪ Monitoring antibiotic usage and take action to improve the effectiveness of AMS programmes.
	Establishing a National Antimicrobial Stewardship Clinical Care Standard which aims to ensure that a patient receives optimal treatment with antibiotics, including the selection of the right antibiotic to treat their condition, the right dose, by the right route, at the right time and for the right duration.	▪ Providing the patients / owners with adequate and proper counselling on how to use the antibiotic at the time of prescribing and dispensing
	Implementing accreditation or quality assurance programmes for veterinary practices in Jordan that have specific requirements for AMS.	▪ Enforcing the existing local laws and regulations for veterinarians related to veterinaries clinics, animal farms and slaughterhouses ▪ Training Veterinarians to be qualified to supervise slaughterhouses to inspect animals before and after slaughtering. Also to ensure that there is no random slaughtering for sick animals or animals that have not fulfilled the withdrawal period.
Objective 4.5 Strengthening and modifying the existing regulations to better support appropriate and careful use of antimicrobials		
	Strategic interventions	**Activities**
	Optimising the use of antimicrobials by making improvements to existing arrangements for the prescribing, dispensing and administering of antibiotics.	▪ Dispensing only the quantity of antibiotics prescribed; better targeting incentives for practice improvement.

	Reviewing existing regulations governing access to antibiotics to ensure they effectively support appropriate and careful use.	▪ Categorizing antibiotics in accordance with the local AMS. Certain categories or critical AMs must be only dispensed only after sensitivity testing.
	Reviewing and revising the prescribing and dispensing regulations in a way that provides access of essentially needed antimicrobials to all Jordanians without extra financial burden.	▪ Implementing a national health coverage that will cover the cost of doctors' visit in public and private sectors. ▪ Establishing a qualification program for physicians prescribing AMs
	Reviewing and revising existing regulations governing access to antibiotics to ensure they effectively support appropriate and careful use.	▪ Removing the selling rights of veterinary products from non-vets such as agricultural engineers (animal product specialists). ▪ Regulating and controlling organic food production facilities.

NAP Objective 5: Develop an economic case for sustainable development based on the country's needs, and increase investment in new vaccines, diagnostics and other interventions. Ensure sustainable investment in countering AMR

The NAP AMR posits that the economic case should reflect the need for capacity building and training in low-resource settings, while developing evidence-based interventions to reduce infections and combat AMR. The 2001 strategy for AMR containment could not achieve its goals; one of the reasons cited for the same is that there were economic assessments, which evaluated the cost of doing nothing versus the cost/benefits of action at the present.

The situation analysis in Jordan indicates that public health research in general and research on AMR has not been a priority for both policy makers and research community. Limited human resource and institutional capacity are the greatest challenge as is the competing priority of building a functional health system.

Currently, the Scientific Research Fund in Jordan is partly responsible for planning research priorities in Jordan. It is proposed to integrate on priority research in AMR in humans and animals, to expand capacity for research in AMR through funding, to encourage academia (universities) to undertake research in AMR and One health approach, to establish IRB for animal research, to establish a steering body for research in AMR.to help researchers in identifying funding agencies, to facilitate access to international and national research papers, to establish an indexing service so researchers can identify previous or current research works and to partner between different stockholders including academia, the government and industry sector for innovation and developing new antibiotics .

The Strategic Plan lays down a roadmap for establishing a strategic research agenda, with systematically prioritised research areas and knowledge gaps related to AMR that will feed into a national policy for research and innovation. By 2020, multi-stakeholder platforms and research consortia will be established that will generate program- and policy-relevant evidence on and compare cost effectiveness of AMR control strategies. The strategic plan also envisions collaborations with national and international agencies, for the implementation of the strategic research agenda. This will be the main strategy for Jordan, given its limited existing institutional capacity.

Implementation of this strategic objective shall be carried out through following strategic interventions leading to the fulfilment of strategic objectives:

Strategic Objective No	**Strategic Objective**	**Strategic Intervention**
5.1	Supporting research in AMR to assist policy setting in containing AMR	▪ Promoting research and international collaboration. ▪ National research capacity building enhancement and One Health concept implementation

		▪ Encouraging research development, maintenance, investment and sustainability.
5.2	Promoting economic studies of the AMR burden	▪ Encouraging studies on the economic burden of AMR.

The specific activities for each intervention are given below:

NAP Objective 5: Develop an economic case for sustainable development based on the country's needs, and increase investment in new vaccines, diagnostics and other interventions. Ensure sustainable investment in countering AMR		
Objective 5.1 Supporting research in AMR to assist policy setting in containing AMR		
	Strategic interventions	**Activities**
	Promoting research and international collaboration.	Establishing of an NAP/AMR research sub-committee for implementation and follow up. Communicating with national medical and agricultural journals' editorial boards to request upgrades in journals indexing. Establishing a reward for research projects in AMR/One Health Encouraging the private sector to participate in research Communicating with "Scientific Research Fund and other Funding Agencies" to put AMR/One Health research on their priority list.

		Raising public awareness on research (through social Media, brochures, national TV and broadcasting corporation, etc.)
	National research capacity building enhancement and one health concept implementation	Gathering previous national research data in AMR Undertaking laboratory and supportive research staff personal assessment in both MOH/MOA Seeking national/international funds for research capacity building Approaching MOA decision makers to establish a national electronic database system
	Encouraging research development, maintenance, investment and sustainability.	Approaching the Ministry of Agriculture (MOA) to establish ACUC for animal research Organizing training courses and workshops for AMR/One Health research design/methodology and international networking & funding opportunities. Supporting research finding marketing through participation in or organization of national/international conferences and symposia. Reactivation of the pre-existing vaccine production unit (MOH), and establishment of new ones to reduce the use of antimicrobials

		Approaching the Jordan Bio Industry Centre (JOVAC), the sole national veterinary vaccine manufacturer, to produce vaccines and reduce AMR.
Objective 5.2 Promoting economic studies on the AMR burden		
	Strategic interventions	**Activities**
	Encouraging studies on the economic burden of AMR	Identifying experts in this field and approaching them for collaboration. Encouraging the undertaking of small-scale studies in the beginning, and planning large-scale ones for the future. Encouraging these studies on the national level through MOH, MOA, Academia, and scientific Fund"

Chapter 3
Operational Plan

A well thought-of operational plan is key to the implementation of the national strategic action plan. Accordingly, all activities – as envisaged in the NAP have been planned out and will be undertaken in a very systematic way. A brief summary of the proposed operational plan in accordance with the suggested activities for each of the five objectives is given below.

NAP objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education, training, advocacy and behaviour-change programs.

Activity	Date/Period	Responsible entity

Conducting a mapping exercise to identify the key relevant stakeholders and target groups and behaviour-change experts	Q1-Q2 2018	AMR NC national committee
Conducting a quantitative and qualitative study to understand the current situation on awareness	Q2/2018	Outsourced NGO
Developing a multi-sectorial awareness and behaviour-change plan with the required resources and budget	Q2/2018	National Coordinator or Head of IEC Campaigns
Developing a national training programme for training on Objective 1	Q2/2018	
Capacity building for the individuals/agencies responsible for implementing the plan	2018-2019	National Coordinator or Head of IEC Campaigns
Creating a motivating and supportive environment for raising awareness and changing behaviours	2018-2019	National Coordinator or Head of IEC Campaigns
Conducting mass awareness and community campaigns regarding hygiene and the appropriate disposal of antibiotics for both animal and human health fields	4 national campaigns per year (2018-2022) 4x5=20	National Coordinator or Head of IEC Campaigns
Collaborating and communicating with associations e.g. agriculture, medical, environment through 3-6 meetings		National Coordinator or Head of IEC Campaigns
Conducting field orientation visits for farmers regarding vaccinations, biosecurity, feed additives, water purifications, antibiotic use etc…	2018-2022	National Coordinator or Head of IEC Campaigns
Developing accreditation and awarding systems with the legal bodies to recognize compliance	2018-2019	National Coordinator or Head of IEC Campaigns
Conducting activities by the community health committees targeting the public, students, mothers, youth	Ongoing activity of trained personnel	
Evaluating the effectiveness of the conducted educational activities	Q2-Q3 2018 At least one activity per month per defined area	National Coordinator or Head of IEC Campaigns
		National Coordinator or Head of IEC Campaigns

	and per targeted population till 2020	Through an independent external group of experts
Developing a strategy for engagement with partners Conducting involvement activities with partners	Q2/2018 Q3/2018	AMR national committee AMR National Committee
Developing advocacy plan to enforce implementation of laws and regulations Conducting meetings with regulators and decision makers Producing evidence based materials e.g. newsletters, presentations for various target groups	Q2-Q3/2018 Ongoing Ongoing	AMR national committee
Incorporate the AMR and appropriate use of antibiotics in the curriculums of school and universities (health schools for doctors, dentists, pharmacists, nurses).	2018-2019	Ministry of Education and Ministry of Higher Education
Publishing progress reports on websites for HCP	Ongoing	AMR National Committee

NAP Objective 2: Strengthen the knowledge and evidence base through surveillance and research

Activity	Timeline	Responsible entity
Establishing a high-level committee on One Health: Nominate representatives from all relevant sectors One health approach [human (private, Public, University and RMS), animals, food, agriculture and Environmental]	Q1/ 2018	Ministry of Health
Strengthening management of programme by expanding the existing office of the National Focal Point	Q1/2018	Ministry of Health
Reviewing and Modifying the TORs of the above-mentioned committee	Q2/2018	Ministry of Health
Establishing a national system for data collection, management, networking and dissemination of information in a real-time manner.	Q1-2/2018	Ministry of Health
Upgrading the existing surveillance system to accommodate global needs and to integrate other relevant sectors for data management.	Q1/ 2018	NCC
Training relevant sectors on data collection, entry and reporting on AMR	2018	NCC
Procurement for equipment and upgrade of informatics needed for the program subsequent to the needs assessment	Q1 and Q2/2018	NCC
Developing a notification system for priority pathogens	Q1-2/2018	NCC
Developing a renovation plan for all laboratories in the country depending upon their needs	2018	NCC
Specifying the list of pathogens to be reported country-wide	Q3/2018	Ministry of Health
Designating lab-based surveillance sites for all sectors (health, veterinary and environment)	Q3/2018	Ministry of Health, Agriculture and Environment
Developing or adapting assessment tools for sites and labs	Q2-Q3/2018	Ministry of Health, Agriculture and Environment
Collaborating with the national research fund to develop and guide research plans toward AMR priorities	Q2/ 2018	Ministry of Health, Agriculture and Environment
Activating and strengthening the national AMR laboratory Guidance Committee	Q2/2018	Laboratory Directorate - MOH

Conducting a situational analysis of the lab services across the country.	Q2-Q3/2018	National Reference Lab for all sectors
Unifying national laboratories' standards and guidelines in accordance with international standards (CLSI, etc...)	Q3/2018	Technical Committee (National Laboratory Group)
Developing a laboratory networking system	Q3/2018	National Laboratory Group
Monitoring and evaluation of laboratory service	Ongoing	National Laboratory Group
Developing a human resources policy for sustainable, sufficient and competent staff	Q2/ 2018	National Laboratory Group
Developing a strategic plan for the attraction and retention of staff in laboratory services.	Q2 2018	National Laboratory Group
Developing and using appropriate training / competence development programs	Q2/2018	All national reference Lab. Supervised by National Laboratory Group
Strengthening external partnerships for technical and financial assistance	Q3/2018	National Laboratory group
Providing epidemiological capacity for data analysis.	Q2-Q4/2018	Ministry of Health
Participating in GLASS	Ongoing	NCC
Upgrading the capacity of the national reference lab to oversee the peripheral lab and to detect new emerging infectious diseases, and Seeking accreditation	Ongoing	National and international accreditation bodies
Continuing quality improvement for lab technicians' capacities through training	2018-2019	National Laboratory Group
Ensuring sustainable procurement of lab supplies	Ongoing	National Laboratory Group
Promoting participation of all labs in EQAS	Ongoing	National Laboratory Group
Developing and/ or upgrading EQAS for One Health partners	2018	National Laboratory Group

NAP Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures

Activity	Date	Responsible entity
Reformulating and activating a new national infection control committee representing all health sectors	Q1/2018	MOH
Reformulating a national infection control technical committee	1 Q/2018	Steering Committee MOH
Ensuring the standardization of guidelines to all sectors.	4Q/2018	MOH National Committee
Forming task forces with specific terms of reference to audit the performance of each sector, including private and dental clinics, pharmacies and ambulatory centers.	1Q/2018	National Committee
Including infection control practitioners in the licensing programs	4Q/2018	MOH
Linking infection control workers with the general director of the health care facility	Q1/2018	National Committee Head
Specifying job descriptions that require specialized infection control training	Q1/2018	National Committee
Allocating a specific IPC budget for each hospital	Annual (2018-2022)	Health Care Facilities
Establishing a committee or subcommittee for the surveillance program	Q2/2018	National Committee MOH
Conducting training for all professionals on IPC in all sectors using standardized materials	Continuous	Infection Control Unit MOH
Developing legislation or regulations for mandating of reporting of health care associated infections	4th Qua/2018	MOH
Disseminating legislations Requesting each hospital to report at least monthly on health care associated infection	1st Q/2019	Surveillance centre

Activity	Date	Responsible entity
Developing a curriculum for infection control professional training, to be applicable for all certification bodies	3rd Qua/2018	National committee
Creating a certification body for infection prevention and control professionals	2019	MOH
Developing legislation and regulations for IPC	2019	Policy and legislation office, MOA
Establishing a national committee for hygiene practices in animals	Q2/2018	MOA
Reviewing and revising the existing policies regarding MDR, and developing new recommendations and guidelines to mitigate MDR	Q3/2018	MOA JAWA
Developing nation-wide IPC policy and procedures	Q4 /2018	MOA Animal Health division Quarantine division
Developing vet. IPC guideline	Q1/ 2019	MOH Poultry health Animal health division Quarantine division
Developing vet. biosecurity guidelines	Q1/2019	JUST, VSD, JVA
Raising awareness for vets and farmers	Q2/ 2019	MOA, JUST FVM, JNA
Training courses for vets hygiene practices	Q4 /2018 to Q2 of 2020	VSD, JUST JVA, OIE FAO, WHO
Improving hygiene practices in slaughterhouses and enforcing the uses of these houses.	Q2 /2019 onwards	MOA, GAM MOH, EUV

Activity	Date	Responsible entity
Developing hygiene curricula for veterinary practices, under- and post-graduate	Q2/ 2019	JUST, FVM, JVA VSD, International consultancy
Establishing control strategies for major animal diseases	Q1/ 2019	VSD, JUST FAO, OIE
Establishing an accreditation and quality assurance program on IPC	Q1/ 2019 onwards	MOA, MOH JAM, JUST PRIVATE SECTOR JVA, JFDA WHO. FAO, OIE
Establishing a robust surveillance system for animal diseases	Q1/2019	VSD International, consultancy
Promoting vaccines for animal health	Q1/ 2018	VSD, JUST, JVA MOH, NCARE
Increasing animal vaccination awareness among farmers	Q4/2018	VSD, JUST, JVA MOH, NCARE
Improving vaccine cold chain system in animal health	Q1/2019	VSD, FAO, JUST, UJ
Undertaking post-vaccination monitoring studies	2018-2019	VSD, MOH
Training veterinary para professionals on best practices of vaccinations	Q2 2018	VSD WHO, FAO
Developing legislation and regulations to establish an oversight role for the government to monitor and regulate antimicrobial usage in the poultry sector	Q4/2018	VSD Private sector FAO, OIE
Developing a monitoring system for vaccination programs	Q4/ 2018	VSD, FAO, OIE Private poultry sectors
Establishing a surveillance system for AMR in poultry	Q4/ 2018	VSD

Activity	Date	Responsible entity
		FAO
Conducting community hygiene education on the importance of personal hygiene	Q2/2018	MOH, NGOs, MOE
Training school nurses on community hygiene	Q2/2018	MOE
Integrating community hygiene education into the school health program mobile teams	3rd Qua/2018	MOH
Utilizing the wide reach of media and social media for enhancing awareness	Ongoing	National Coordinator on IEC and awareness
Implementing the appropriated segregation of waste at the community level	Q1/ 2019	MOH, MOENV
Waste recycling	Q2/2018	Municipalities, MOENV
Engaging the ambulatory setting in the electronic reporting	Q3/2018	MOH
Enforcing the implementation of the law	Q3/ 2018	MOH

NAP Objective 4: **Optimize the use of antimicrobial medicines in human and animal health**

Activity	Date	Responsible entity
Establishing a national committee from all involved sectors, to be formed by MOH and in collaboration with MOA	Q2 2018	MOH, JFDA
Reviewing and revising international and local guidelines and protocols to establish a national protocol	Q3/ 2019	Committee

Activity	Date	Responsible entity
Issuing a decree to enforce implementation of the local guidelines and protocols on a national level	Q1/ 2020	MoH, JFDA
Training the relevant HCP on the newly implemented guidelines	2020-2022	NGOs and stakeholders, JFDA
Implementing the national electronic health system (one Jordanian One Health Record)	2022	MOH, stakeholders and NGOs, JFDA
Developing SOPs in place in compliance with the approved guidelines	Q1/2020	Local institutions
Establishing a National AMS Advisory Committee to provide strategic advice to ensure that work undertaken in this area occurs in a nationally coordinated way	2020	MOH, JFDA
Assigning a designated committee to perform AMS in each hospital	2018	Local institutions
Participating in the global health network AMS.	2019	AMR national focal point (MOH)
Performing regular training and qualification workshops for relevant health care professionals.	Ongoing start from 2019	Stakeholders, JFDA
Categorizing antimicrobials in accordancewith restricted antimicrobials and setting prescribing and dispensing limitations accordingly.	2019	JFDA and MOH
Establishingdetailed, species-specific guidelines to further support antimicrobial stewardship in animal health settings.	2018	MOA
Training the relevant HCP	2018	MOH & MOENV
Providing special environment hazard-safe containers to pharmacies and health institutions and fund for disposal	2018	NGOs & MOENV
Utilizing the features of EHR software (Hakeem) for AMS	2019	MOHJFDA
Establishing a national AMS database	2020	MOHJFDA
Training relevant staff on the database software	2020	Stakeholders, JFDA

Activity	Date	Responsible entity
Adopting and establishing the database.	2020	Stakeholders, JFDA
Monitoring antibiotic usage and take action to improve the effectiveness of AMS programmes.	2020	Local institutions
Providing patients / owners with adequate and proper counselling on how to use antibiotics at the time of prescribing and dispensing	2018	Local institutions
Enforcing the existing local laws and regulations for veterinarians related to veterinaries clinics, animal farms and slaughterhouses	2018	MOA
Training veterinarians to be qualified to supervise slaughterhouses to inspect animals before and after slaughtering, in order to ensure that there is no random slaughtering for sick animals or animals that have not fulfilled the withdrawal period	2019	JFDA and MOA
Ensuring dispensation of only the quantity of antibiotics prescribed by qualified veterinarian	2018	Self-monitoring
Categorizing antibiotics in accordance with the local AMS. Certain categories or critical antimicrobials must be only dispensed only after sensitivity testing.	2019	MOH
Implementing a national health coverage that will cover the cost of doctors' visits in public and private sectors.	2020	MoH
Establishing qualification programs for physicians prescribing AMs	2018	Stakeholders JFDA
Eliminating the selling right of veterinary products from non-vets such as agricultural engineers (animal product specialists)	2018	MoA
Regulating and controlling the organic food production facilities	2018	MOA, JFDA

NAP objective 5: Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions

Activity	Period	Responsible entity
Establishing AMR NAP research advisory committee	Q1 2018	NAP AMR committee
Meeting with the Ministry of Agriculture (MOA) to establish ACUC for animal research	Q1 & Q4 2018	AMR NAP research advisory committee
Developing a proposal to compile previous research work in AMR	Q1 2018 to Q4 2019	AMR NAP research advisory committee
Organizing meetings with local medical journals to get their journals indexed in pubmed or ISI	Q1-Q4 2018	AMR NAP research advisory committee
Organizing a meeting with Shouman, UJ, JUST, KHCC to arrange for a reward for best researcher	Q1-Q4 2018	AMR NAP research advisory committee
Developing an electronic database system for MOA	2018-2020	MOA and AMR NAP research advisory committee
Encouraging the private sector to participate in research	2018-2020	All non-private stakeholders
Organizing a meeting with the “Research Scientific Fund” to put research in AMR and one health concept on their priority and encourage funding	Q1-Q4 2018	AMR NAP research advisory committee
Encouraging academia to collaborate with the public sector (MOA, MOH, royal medical service) in research	Q1-Q4 2018	AMR NAP research advisory committee with academia research deans
Protecting research subjects and improving current IRBs through education	Q4 2018-Q4 2022	External fund
Collaborating with concerned societies, either national or international.	Q4 2019-Q4 2022	MOH
Improving public awareness in research in general	Q1-Q4/ 2018 ONGOING	MOH\, UJ,MOA, JUST, KHCC,MOHE, Social Media

Imparting research training for prospective and aspiring researchers through workshops and courses	Q1-Q4/2018 ONGOING	MOH, UJ, MOA,RMS
Organizing regular conferences on AMR/One health and including topics on research issues	EVERY TWO YEARS 2019	MOH, WHO, private sector
Participating in international meeting in conferences	ANNUALLY	EXTERNAL FUND
Utilizing unique labs' national capacity (enhanced BSL-2 (RMS), BSl-3 (MOH), NGS (JUST)	Q1-Q4 2018 ANNUALY	MOH, CPHL
Improving research facilities in CPHL to do work on AMR activities	Q1-Q42018	MoH, WHO

Chapter 4
Monitoring and Evaluation Plan

Monitoring and evaluation (M&E) are an integral part of any programme. These facilitate the efficient implementation of the planned activities and provide valuable information on the progress made. Jordan has developed the following M&E Plan in accordance with WHO template using SMART indicators. The progress made shall be periodically reviewed by the high level National Committee and necessary modifications, if any, shall be carried out. Following are the salient features of Jordan M&E Plan:

NAP objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education, training, advocacy and behaviour change programs

Planning element	Indicator	Type and purpose	Value (calculation)	Data source	Method	Target

Objective one : Improve awareness and change behaviours regarding the hygiene and appropriate use of antibiotics among public, animal and human health care providers, farmers, and students	% of target groups have their awareness increased on the appropriate use of antibiotics	Outcome	Percentage	Survey	Survey	>90% people and communities all over the country made aware of the impact of AMR and possible preventive and containment measures >50% people demonstrated change in their behaviour favouring rational use of antibiotics
	% of target groups have their behaviour changed positively					
	% of community have their awareness increased on hygiene					
Strategic interventions Creation and implementation of a national awareness and behaviour change program for hygiene and appropriate use of antibiotics	Endorsement of the program by the official entities	Output	Yes/NO	Official documents	Official documents	National Programme for awareness and change in behaviour for rational use of antibiotics developed and implemented
Activities: Conducting a mapping exercise to identify the key relevant stakeholders and	Mapping report generated	Output	Yes/no	Report	Meetings, key and expert interviews	Mapping report generated

target groups and behaviour change experts						
Conducting a quantitative and qualitative study to understand the current situation	Study conducted, communication objectives drafted	Output	Yes/no	Study Report with findings Document	Surveys and studies Expert communication team	Current situation through various studies assessed
Develop multi-sectoral awareness and behaviour change plan with the required resources and budget	Awareness plan developed	Output	Yes/no	Awareness plan	Expert group	Plan developed for awareness and change in behaviour
Development of a behaviour change communication and awareness raising strategy	Strategy developed for behavioural change					Strategy developed for behavioural change
Capacity building for the responsible individuals/agencies implementing the plan	No. of trainings conducted No of trainees attended All trainees have their knowledge and skills increased	Input Input Outcome	Number Number Percentage	Attendance sheet	Training report (focal point individual)	Capacity built for 200 stakeholders to be engaged to implement the plan through 10 training courses

Creation of a motivating and supportive environment for raising awareness and change behaviour	No. of people reached during campaigns No. of campaigns conducted	Input	Yes/No	Observation/ interviews		>90% of people reached for awareness and change in behaviour through appropriate number of campaigns.
Conducting mass awareness and community campaigns regarding hygiene and the appropriate use and disposal of antibiotics for both animal and human health fields Number of campaigns per year	No. of people reached during campaigns No. of campaigns conducted	Input	Yes/No	Observation/ interviews		Mass annual campaigns conducted to raise awareness
Collaborating and communicating with the associations e.g. agriculture, medical	No of meetings conducted	Input	No of meetings	Official records	Reports	Formal collaboration mechanism established with different stakeholders
Conducting field orientation visits for farmers regarding the vaccination, biosecurity, feed additives, water purifications, antibiotic use, etc…	No. of farmers reached No. of field visits	Input	No of visits	Official records	Reports	>90% of farmers oriented on vaccination, biosecurity, feed additives etc.
Developing accreditation and awarding systems with the legal bodies to recognize the compliance	Accreditation system developed	Input	Operational accreditation system	Official announcement	Report	Accreditation process developed

Conducting hospital-based interventions	No. of hospital-based interventions made	input	No of interventions	Official records	Reports	Interventions undertaken in >90% hospitals
Conducting activities by the community health committees targeting the public, students, mothers, youth	No. of activities conducted by the community health committees No. of target groups reached	Input	Number of activities	Records	Reports	>90% of target groups reached through community health committees
Monitoring the effectiveness of the conducted educational activities	Monitoring reports submitted	Input	Proforma	Assessment	Reports	Report generated on monitoring

NAP Objective 2: **Strengthen the knowledge and evidence base through surveillance and research**

Planning element	Indicator	Type and purpose	Value (calculation)	Data source	Method	Target
Establishment of a national committee of One Health Nominate representatives from all relevant sectors One health approach [human (private, public, Universities and RMS), animals, food ,agriculture and environmental]	Committee established	Supervision	First Quarter of 2018	Official notification	Report	National multi-sectoral committee established

Reviewing and modify TORs	ToR Modified	Defining work	First Quarter of 2018 to be reviewed every 2 years	Official notification	Report	TORs of National Committee developed and disseminated
Establishing a Technical Advisory Group from all relevant sectors to promote collaboration and integration of all relevant sectors	TAG established	Guidance and oversight	First Quarter of 2018	Official notification	Report	Technical Advisory Group established
Establishing a national system for data collection, management, networking and dissemination of information in a real time manner.	National system developed	Surveillanc e inputs	2018	Official notification	Report	A Process document developed for data management
Upgrading the existing surveillance system to accommodate global needs for data collection and reporting and (suggest including the antimicrobial surveillance report with the existing MOH surveillance report).	Development of process document	Surveillanc e inputs	2018 last quarter	Official notification	Report	Existing surveillance system updated
Developing a notification system for priority pathogens	Development of a notification system for priority pathogens established	Inputs	2018 second quarter	Official notification	Report	Notification system for priority pathogens established

Designating surveillance sites for all sectors	Number of sites designated	Sites	Ongoing	Official notification	Official list	20 sites for each sector identified for surveillance
Developing or adapting assessment tools for sites and labs	Assessment tool developed	Tool	Ongoing	Tools availability	Document	Updated tool developed and approved
Activating and strengthening the national laboratory group	Activation of national lab group	Quarterly – continuous	2018	Official notification	Report	National Lab Group activated
Conducting situational analysis of the lab services across the country.	Situation analysis on labs for AMR	1	One year 2018	Lab status	Report	Situation analysis conducted
Unifying national laboratories standards and Guidelines in accordance with international standards (CLSI, etc...)	National Lab Standards available	Input	Three months	Global info	Guidelines	National Standards and guidelines available
Developing laboratory networking system	National lab network established	Input	One month	Official notification	Document	National laboratory system developed
Monitoring and evaluation of laboratory service	M&E Tool developed	Input	Ongoing	Official notification	Guidelines	M&E tool developed
Developing human resources policy for sustainable, sufficient and competent staff	HR Policy developed	Input	First Quarter 2018	Official notification	Report	Policy developed and approved
Developing a Strategic Plan for the attraction and retention of staff in laboratory services.	HR Plan developed	Input	First Quarter 2018	Official notification	Report	Strategic plan developed and approved

Developing and using appropriate training / competence development program	Training module developed	Input	Ongoing	Official notification	Report	Training programme developed and approved
Strengthening external partnerships for technical and financial assistance	Twinning projects forged	Input	Ongoing	Official notification	Report	External partnership forged
Participating in GLASS	Participation in GLASS	Input	Ongoing	Official notification	Process	Participation in GLASS continued
Upgrading the capacity of the national reference lab to oversee the peripheral lab and to detect new emerging infectious disease. Seeking accreditation	Accreditation process		2019	Official notification	Accreditation certificate	National Ref Lab accredited
Continuing improvement for lab technicians capacities	Mechanism for improving capacity of lab technicians	Ongoing	2019	Notification	Report	Training for all lab technicians conducted
Sustainable procurement for lab supplies	Procurement Plan	Ongoing		Notification	Report	Mechanism for sustainable S&E procurement developed
Follow international standard in referral shipping for Panel of NEQAS	Referral shipping	Input	2019	Notification	Report	Instructions for international shipment of material disseminated

Ensure participation of all labs in EQAS	No of labs participating in NEQAS	Input	2019	Notification	Report	All labs participating in NEQAS
Nominating representatives from all relevant sectors for One Health approach [human (private, Public, University and RMS), animals, food, agriculture and environmental]	Establishment of National committee on one health	Input	Functional	National Coordination Centre	Official letter	National committee on One Health established
Establish a Technical Advisory Group from all relevant sectors to promote collaboration and integration of all relevant sectors	To establish TAG	Output	Yes/no	National Coordination Centre	Official letter	Technical Advisory Group established
Provide epidemiological capacity for data analysis.	No. of trained FETP	Process	Percentage of trained FETP	Technical advisory group	FETP program	Trained FETP personnel
Participation in GLASS – WHONET	No of labs trained on WHONET and reported to GLASS	Process	No of labs	National lab group	Reports	>20 labs trained on WHONET
Upgrade the capacity of the national reference lab to oversee the peripheral lab and to detect new emerging infectious diseases. Seeking accreditation	Number of accredited national reference labs	Output	Percentage of accredited labs	National Accreditation body	Auditing	All labs in national lab network accredited

Continuous improvement of lab technicians' capacities	Number of trained lab technicians	Process output	Percentage of trained lab technicians	National Laboratory Group and National Reference lab	Documents	>100 lab technicians trained
Monitor the implementation of international standard in referral shipping for the panel of NEQAS	Compliance with international standards	Process	Yes \ no	National Reference labs	Receipt reporting	Compliance with international standards ensured
Provide lab information management system and IT capacity Training and Procurement	No of trained personnel	Process	Percentage	National Laboratory Group	Auditing	>100 persons trained

Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and infection prevention measures

Planning element	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Target
Implementing the infection control program	Percentage of hospitals implementing the advanced infection control program through an evidence-based surveillance program	Output	Quantitative	Yearly	Reports	Survey	>90% hospitals implementing advanced infection control program with evidence-based

							surveillance program
Implementing infection control program	Percentage of decrease in the rates of healthcare-associated infection at the national level	Outcome	Quantitative	Biannual	Survey	Survey	>50% decrease in the rates of healthcare-associated infection at the national level
Implementing the antimicrobial stewardship program	Percentage of decrease in the rate of multiple drug resistance organisms at the national level	Outcome	Quantitative	Biannual	Survey	Survey	>50% Decrease in the rate of multiple drug resistance organisms at the national level
Reforming the national committee	Reforming the Steering committee	Input	Qualitative	Every two years	MOH informative	Review of decision	Steering committee reformed
Establishing a licensing program	Percentage of licensed practitioners	Process	Quantitative	Yearly	Informative from Licensing body	Survey	>90% of practitioners licensed
Establishing a national healthcare-associated	% of sites from where surveillance data form the surveillance centre available	Output	Quantitative	Yearly	Reports	Review reports	>90% of sites from where surveillance data form the

infection surveillance centre							surveillance centre available
Understanding the pattern of resistance of microorganisms	Percentage of resistance for microbiologically important bacteria	Output	Quantitative	Yearly	Reports	Review reports	>90% resistance patterns for microbiologically important bacteria analyzed
Training school nurses on the prevention of community diseases	Percentage of trained nurses	Process	Quantitative	Yearly	Reports	Review reports	>80% of nurses trained

NAP Objective 4: Optimize the use of antimicrobial medicines in human and animal health

Planning element	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Target
Revising international and local guidelines and protocols to establish national ones.	Establishment of national guidelines	INPUT	One	Once	Guidelines	Guidelines	National guidelines developed through revising international

							guidelines and protocols
Issuing a decree to enforce the implementation of local guidelines and protocols on a national level	Formal decree issued	Output	One	Once	Formal decree	Decree	Formal decree issued
Training the relevant HCP on the newly implemented guidelines	% of HCP trained	Output	Percentage	Yearly	Attendants list	MOH and stakeholders JFDA	>95% of HCP trained on new guidelines
Implementing the national electronic health system (one Jordanian One Health Record)	% of Jordanians in national electronic health system	Output	Percentage	Yearly	MOH and stakeholders	Review of system reports	>50% Jordanians in national electronic system
Establishing a National AMS Advisory Committee to provide strategic advice to ensure that work undertaken in this area occurs in a nationally coordinated way	Formation of the National AMS Advisory Committee	INPUT	One	Once	Formal letter	MOH	National AMS advisory committee formed
Participating in global health network AMS.	Participation in global health network of AMS	Input	Once	Once	MOH	MOH records	Participation in global health network

Performing regular training and qualification workshops for relevant health care professionals.	% of HCP trained	Output	Percentage	Once yearly	Stakeholders	Attendance list	>90% HCP trained
Categorizing antimicrobials in accordance with restricted antimicrobials and setting prescribing and dispensing limitations accordingly.	% of categorized AMs	Input	Percentage	Yearly	JFDA	JFDA records	All antimicrobials categorized
Establishing a detailed, species-specific guidelines to further support antimicrobial stewardship in animal health settings.	Available guidelines	Input	One	Once	MOA	Document	Guidelines developed
Training the relevant HCP on ASP	% of trained HCP	Output	Percentage	Yearly	Stakeholders	Attendants list	>90% HCP trained on ASP
Providing special environment hazards safe containers to pharmacies and health institutions and fund for disposal	% of covered HC units	Input	Percentage	Yearly	MOH & MOENV,	HC units list	>80% pharmacies and health institutions provided with environment hazard safe containers

Utilizing the features of EHR software (Hakeem)	% of health institutions utilizing Hakeem	Input	Percentage	Yearly	Software provider	Report generation	>80% health institutions utilized Hakeem
Establishing a national AMS database	Development of a software for national database on AMS	Output	One	Once	MOH & stakeholders	Generating report	Software for national database on AMS developed
Training on the database software	% of trained personnel	Input	Percentage	Once	Stakeholders	Attendants list	>90% of persons trained in use of software
Adopting and establish the database.	% of health institutions adopting database	Input	Percentage	Once	Stakeholders	Compliant Institution	>90% of health institutions adopting database
Monitoring antibiotic usage and taking action to improve the effectiveness of AMS programmes.	% of institutions complied	Output	Percentage	Once	MOH and MOA	MOH & MOA records	>90% of institutions complied with AMS programme
Providing patients/ owners with adequate and proper counselling on how to use antibiotics at the time of prescribing and dispensing	% of patients counselled	Output	Percentage	Once	Stakeholders	Survey	>90% of patients counselled on the rational use of antibiotics
Enforcing the existing local laws and regulations for veterinarians related to veterinaries clinics,	Enforcing a formal decree on professionals	Output	One	Once	Formal decree	MOA	Formal decree enforcement implemented on professionals

animal farms and slaughterhouses							
Training veterinarians to be qualified to supervise slaughterhouses to inspect animals before and after slaughtering. Also to ensure that there is no random slaughtering for sick animals or animals that have not fulfilled the withdrawal period.	% of veterinarians trained	Output	Percentage	Yearly	Attendants list	MOA and stakeholders	>95% of veterinarians trained on supervising slaughterhouses
Ensuring dispensation only the quantity of antibiotics prescribe	% of compliance with dispensing of antimicrobials	Output	Percentages	Yearly	Compliant HC institutions	JFDA and MOA	>95% compliance on dispensing of antimicrobials
Establishing a qualification program for physicians prescribing AMs	% of HCP trained	Input	One	Percentages	MOH	Attendants list	>80% HCP trained in prescribing antimicrobials
Removing the selling rights of veterinary products from non-vets such as agricultural engineers (animal product specialists)	Formal decree	Input	One	Once	MOA	Decree issuance	Formal decree issued

Regulating and controlling organic food production facilities	% of facilities regulated	Input	Percentages	Once	MOA	Instructions	>90% of organic food production facilities regulated

NAP Objective 5: Develop the economic case for sustainable investment that takes account of the needs of all countries, and increase investment in new medicines, diagnostic tools, vaccines and other interventions

Planning element	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Target
Supporting research in AMR to assist policy setting in containing AMR	AMR research outcome policy changed	Outcome	Qualitative Y/N	Every 2 y	Policy makers & researchers	Survey and interviews	AMR Research Policy developed

Developing AMR NAP research advisory subcommittee	Committee established	Input	Qualitative Y/N	Q1 2018	NAP committee	Decision & TOR	AMR Research Advisory Subcommittee established
Organizing meeting with Ministry of Agriculture (MOA) to Establish IRB &ACOC for animal research	IRB establishment at MOA	Input	Qualitative Y/N	Q1 2018	MOA FP	Decision & TOR	IRB established at MoA
Writing a proposal to collect previous research work in AMR	Previous research work database	Input	Qualitative Y/N	Annually	NAP AMR subcommittee	Final project data	Database of previous research in Jordan compiled
Meeting with Shouman, UJ, JUST, KHCC to arrange for a reward for best researcher	Establish reward for best researcher	Input	Quantitative	Every 6 months	NAP AMR subcommittee	Meeting	Reward for best researchers established
Encouraging the private sector to participate in AMR research	Private sector engagement in research subcommittee proposed	Input	Qualitative Y/N	Q1 2018	NAP AMR subcommittee	Meeting & TOR	Private sector engagement in research subcommittee formalized

Organizing a meeting with “Research Scientific Fund” to put research in AMR and one health concept on their priority & encourage funding	Identifying AMR research priorities and fund	Input	Qualitative Y/N	Q3 2018	RSF FP & NAP AMR subcommittee	Meeting & decision	AMR research priorities and fund identified
Encouraging academia to collaborate with public sector (MOA, MOH, royal medical service) in research	Promote Inter-sectoral collaboration	Output	Qualitative Y/N	Q2 2018	FOs & NAP AMR subcommittee	Meeting & decision, scientific activities	Inter-sectoral collaboration promoted (Yes/No)
Organizing research training for prospective and aspiring researchers through workshops and courses	Provide research training for prospective and aspiring researchers provided	Output	Quantitative	Q1-q4 2018	NAP AMR subcommittee	Workshops and courses	Research training for prospective and aspiring researchers provided
Organizing regular conferences on AMR/ One health including topics on research issues	Organize regular national conferences on AMR including	Input	Quantitative	Annually	NAP AMR subcommittee	Conferences include topics on research issues	Regular national conferences on AMR including research

	research issues organized						issues organized
Encourage participation in international meetings and conferences	Encourage participation international meeting and conferences	Input	Quantitative	Annually	NAP AMR subcommittee	Conferences	Participation in international meetings and conferences encouraged
Improving facilities in CPHL to do work on AMR activities	Improve facilities in CPHL	Output	Qualitative Y/N	Annually	NAP AMR subcommittee	Meeting & decision	Facilities in CPHL improved

Chapter 5

Costing (estimated budgets in USD)

Budgetary support to the national action plan has been estimated with the objective of utilizing the existing infrastructure as far as possible. Limited human resources cost has been reflected in it to coordinate the objective of specific action plans. The majority of funds are proposed towards building national capacity and augmenting awareness in accordance with the NAP. A summary of the annual budgetary requirements is shown in the Table below.

No	Strategic Objectives	Year1	Year2	Year3	Year4	Year5	Total
1	1	158150	170450	181900	64900	67400	642800
2	2	159600	120200	113700	101700	104200	599400
3	3	814600	875300	842100	745100	674600	3951700
4	4	**633100**	456300	423100	326100	270100	2108700
5	5	81600	61300	49400	49400	50400	292100
	Total	**1847050**	**1683550**	**1610200**	**1287200**	**1166700**	**7594700**

Total USD: 7,594,700

Total JD: 5,424,785 (5.4 million)

Annex 1
High Level Committee
Composition

No	Name	Designation
1	DR. Lail Alfayez	Secretary General Ministry of Health/ Head of Committee

2	DR. Ayoub Alseaedah	Director of Primary Health Care Administration
3	DR.Hekmat Abo Alfoul	Director of Hospital Administration
4	DR. Mohammad Albdallat	Communicable Diseases Dir.
5	DR. Asia Aldwan	Lab Directorate
6	DR. Wafaa Alkhateeb	Clinical Pharmacy Dir.
7	Ibrahim Badwan	Chest Diseases & Immigrants Health Dir.
8	DR. Heyam Mokhtash	IHR Focal Point
9	DR. Majed Alhowsheh	Ministry of Agriculture
10	DR. Souad Aqel	Ministry of Agriculture
11	DR. Basema Alzoubi	AMR Focal Point for Animal Health Ministry of Agriculture
12	DR. Osama Abo Atta	Jordan Medical Association
13	Ismail Alssadi	Jordan Pharmaceutical Association
14	DR. Mahdi Alaqrabawi	Jordan VET. Association
15	DR. Wael Hyagnieh	King Abdullah University Hospital
16	DR. Faris Albakri	Jordan University Hospital
17	DR. Montaseer Albalbisi	Private Hospital Association
18	Neda Boaresh	FDA
19	Amani Abo Roman	Jordan Hospital Association
20	DR. Rami Khasawneh	Royal Medical Service
21	DR. Zaienab Alshawabkeh	Ministry of Education
22	DR. Maram Albasti	Procurement and Supply Directorate

Terms of Reference

1. To coordinate comprehensive national efforts in combating antimicrobial resistance
2. To draft a national action plan against AMR in alignment with the global action plan
3. To coordinate, supervise and guide subsequent implementation of national action plan
4. To establish various technical advisory and subgroups to develop national activities for implementation of NAP
5. To periodically review the progress made in implementation of NAP and suggest course corrections, if needed
6. Supervising the preparation of the manual on antibiotics
7. Continuous follow up.

Annex 2
Contributors
In addition to High Level Committee members, all experts who attended the November meeting should be named

	Name	Designation
1	Dr.Hikmat Abu Alfoul	Director Of Hospital Administration
2	Dr.Ayoob Al Sayaedeh	Director Of Primary Health Care Administration
3	Dr. Mohammed Al-Abdalat	Communicable Diseases Dir.
4	Prof. Nathir Obeidat	Dean Of The Faculty Of Medicine/ JU
5	Dr. Hussein Shalan	RMS
6	Prof. Wail Al.Hayajneh	Dean Of The Faculty Of Medicine/ Just
7	Dr. Falah Shidaifat	Dean Of The Faculty Of Veterinary Medicine/Just
8	Dr. Manar Nabolsi	Dean Of Faculty Of Nursing/ JU
9	Prof. Khalil Yousef	JU
10	Prof. Amer Hasanien	JU
11	Prof. Mohammad Almadadha	JUH
12	Dr. Faris Albakree	JU
13	DR. Osama Abo Atta	Jordan Medical Association
	Eng. Salah Alhyari	Dir. Of Environmental health Dir.
14	Dr. Alaa bin Taref	Amr national focal point /MOH
15	Dr. Basema Zoubi	Amr national focal point /MOA
16	DR. Wafaa Alkhateeb	Clinical Pharmacy Dir.
17	DR. Ibrahim Badwan	Chest Diseases & Immigrants Health Dir.
18	DR. Majed Alhowasheh	Ministry of Agriculture
19	DR. Rami Khasawneh	Royal Medical Service
20	DR. Maram Albasti	Procurement and Supply Directorate

21	Dr. Sameeh Abu Tarbush	JUST
22	Dr. Ziad Al Nasser	KAUH
23	Dr. Mohammad Khalifah	JUST
24	Dr. Hamed Alzoubi	JU
25	Dr. Mohammad Abu Lubad	Mutah University
26	Dr. Amin Aqel	Mutah University
27	Dr. Nabil Awni Nimer	Philadelphia U
28	Dr. Sameer Naji	MOH
29	Dr. Eqbal Qatanani	MOA
30	Dr. Anas Al- Nabulsi	JUST
31	Dr. Ahmed Al- Rusasi	JPA
32	Dr .Khaled Najjar	Private
33	Dr. Shaher Abudalbouh	JVA
34	Dr. Saeda Salah	MOA
35	Dr. Rabie M. Noqa	UNRWA
36	Dr .Feda Barjes Saleh	MOH
37	Dr. Khalid Albohti	Zarqa MOH
38	Dr. Bassam Shadfan	MOH
39	Dr. Osama Kittaneh	MOH
40	Dr. Alia Alkhlaifat	RMS
41	Dr. Emad Azzam Odeh	MOH
42	Dr. Motasem Alsenjlawi	JFDA
43	Dr. Sarab Alabbadi	JFDA
44	Enas Bataineh	KAUH
45	Malik Al Fararjeh	JFDH
46	Sawsan Al Mubarak	CHC
47	Ilham Abu Kader	EMPHNET

48	Suzan Kouteh	Basheer Hospital
49	Jansait Nasser	RMS
50	Ali BaniIssa	KAUH
51	Fatima Abdulaziz	Zarqa Hospital
52	Zakaria Abdelrahim	J.U.H
53	Muna Hatem	JMOH
54	Rola Ali Ghanem	CPHL
55	Dr. Mahmoud Algazo	CPHL
56	Mohammed Hawamdeh	Private
57	Eng .Maeda Al-Azzeh	MOH
58	Asma Ararawi	Jerash Hospital
59	Mayor Hatokai	MOH
60	Mohanad Alazzeh	Private
61	Aya Nabil Ramahi	Specialty Hospital
62	Alqahira Al Kalabani	J.U.H
63	Maram Hadadeen	JFDA
64	Raja Abu Trabeh	PHH
65	Iyad Ibrahim Almheirat	Basheer Hospital
66	Amani Roman	JU
67	NouraH.Alshraa	MOE
68	Ammar Sweiti	MOH
70	Omer Jamal Ateyh	MOH
71	Amani Roman	Amman Hospital
72	Lama Bobali	Amman Hospital
73	Majdoleen Masandeh	MO Finance
74	Ruba Alomari	NCARE
75	Ghaya Al-Wahdani	CPHL

76	Alia Alkhlaifat	RMS
77	Dr. Heyam Mukatesh	IHR focal point
78	Omaima Nassar	HCAC
79	Bayan Awwad	MOH
80	Sultan Elbana	Basheer Hospital
81	Dr. Randa Bagaeen	MOH
82	Dr. Yousef Alqdemat	MOH
84	Mayes Alahmad	Specialty Hospital
85	Dr .Naser Amin	MOH
86	Bushra Al Harahsheh	JMOH
87	Dr. Marwan Alzoqol	Private
88	Dawood Yusef	KAVH
89	Maeda al – Azzeh	MOH
90	Alaa Omer Bader	Specialty Hospital
91	Dr. Rakan Ahmad	MOH
92	Dr. Kariman Al- Zain	MOH
93	Ibrahim Jamal	MOH
94	Suzanne Atef	MOH
95	Rima Al-Jabari	MOH
96	Aliaa Odeh	MOH
97	Naheel Haloub	Specialty Hospital
98	Nedaa Bawaresh	JFDA
99	Dr. Ibrahim Almashayek	MOH
100	Dr. Mahmoud Qaissieh	MOH
101	DR.SOUAD AQEL	MINISTRY OF AGRICULTURE
102	Ahmed Alqaryouti	MOH/ Zarqa
103	Abeer Melhem	PHH

104	Shatha Al Bsoul	Specialty Hospital
105	Dr. Mahmoud Kayed	MOH
106	Dr. Nizar Maswadi	MOH
107	Maisa Alkhateeb	USAID
108	Prof.Nawja Quri	Jordan university hospital
109	John Alawneh	FAO
110	Dr Rajesh Bhatia	Who expert

Annex 3:

Partial details of budgetary estimates

Objective 1

No	Activity Group	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Assessment	21750	11750	0	0	0	33500
2	Supplies and technical material	60000	90000	120000	15000	15000	300000
3	Trainings	54600	46000	29900	29900	29900	190300
4	Meetings	3800	4700	12000	0	0	20500
5	Field Surveys	20000	20000	25000	25000	10000	100000
6	Additional dedicated human resource cost	18000	18000	20000	20000	22500	98500
21	**#VALUE!**	**158150**	**170450**	**181900**	**64900**	**67400**	**642800**

Objective 2

No	Activity Group	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Campaigns	92400	77400	77400	77400	77400	402000
2	Advocacy material drafting and mass production	8000	500	500	500	500	10000
3	Trainings	25800	15800	0	0	0	41600
4	Meetings	1600	4700	12000	0	0	18300
5	Field Surveys	13800	3800	3800	3800	3800	29000
6	Additional dedicated human resource cost	18000	18000	20000	20000	22500	98500
21	**#VALUE!**	**159600**	**120200**	**113700**	**101700**	**104200**	**599400**

Objective 3

No	Activity Group	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Guidelines	16500	6500	0	0	0	23000
2	Supplies and technical material	500000	500000	500000	500000	500000	2500000
3	Trainings	239100	305800	275100	185100	125100	1130200
4	Meetings	16000	20000	22000	25000	17000	100000
5	Waste care	25000	25000	25000	15000	10000	100000
6	Additional dedicated human resource cost	18000	18000	20000	20000	22500	98500
21	**#VALUE!**	**814600**	**875300**	**842100**	**745100**	**674600**	**3951700**

Objective 4

No	Activity Group	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Guidelines	23000	6500	0	0	0	29500
2	Supplies and technical material	60000	60000	60000	60000	60000	300000
3	Trainings	353100	332800	302100	212100	167100	1367200
4	Meetings	160000	20000	22000	25000	17000	100000
5	Waste care	25000	25000	25000	15000	10000	100000
6	Additional dedicated human resource cost	12000	12000	14000	14000	16000	68000
21	**#VALUE!**	**633100**	**456300**	**423100**	**326100**	**270100**	**2108700**

Objective 5

No	Activity Group	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1	Guidelines	4500	0	0	0	0	9000
2	Research grants	20000	20000	20000	20000	20000	100000
3	Trainings	21200	11200	11200	11200	11200	66000
4	Meetings and Nat Conferences	29900	24100	11200	11200	11200	87600
6	Additional dedicated human resource cost	6000	6000	7000	7000	8000	34000
#REF!	**#VALUE!**	**81600**	**61300**	**49400**	**49400**	**50400**	**296600**