KINGDOM OF BAHRAIN

Ministry of Health

National Action Plan

On Antimicrobial Resistance

MARCH 2019

Version1

Antibiotic committee

Supreme Health Council

Foreword

The threat posed by antimicrobial resistance (AMR) to public health as well as global health security has been reiterated in numerous World Health Assembly (WHA) resolutions.

In May 2015, the sixty-eighth WHA endorsed the Global Action Plan on Antimicrobial Resistance (GAP-AMR) – including antibiotic resistance, the most urgent drug resistance trend. The WHA resolution 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.

The strategic objectives of NAP-AMR in the Kingdom of Bahrain are aligned with the global action plan based on national needs and priorities.

- Strategic priority 1 focuses on improving awareness and understanding of AMR through effective communication, education and training, and has two focus areas.
- Strategic priority 2 aims to strengthen knowledge and evidence through surveillance of AMR, with two focus areas – strengthening laboratories in human, animal, food and environment sectors, as well as ensuring surveillance of antimicrobial resistance in these sectors.
- Strategic priority 3 attempts to reduce the incidence of infection. This is through effective infection control in healthcare settings, in animals and food products, and in the community and environment to reduce the spread of AMR.
- Strategic priority 4 includes optimizing the use of antimicrobial agents in healthcare, and in animals and food. This is through strengthening regulations and, ensuring access and surveillance of antimicrobial use.

- Strategic priority 5 aims to promote investments for AMR activities, including 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 the containment of AMR.

Within each strategic priority and focus area, strategic interventions, key activities and outputs have been defined with tentative responsibility and timelines – short (within one year), medium (between one and three years) and long-term (between three and five years).

A committee comprised of relevant stakeholders was formed under the Supreme Council of Health in the Kingdom of Bahrain to addresses all aspects of the above priorities and objectives. The committee is concerned with establishing a unified approach which involves coordination among numerous national sectors, including human and veterinary medicine, agriculture, finance, environment, and the public sector.

Dr. Sheikh Mohamed Bin Abdulla Al Khalifa

Chairman – Supreme Council of Health

FOREWORD BY THE MINISTER OF HEALTH

ANTIMICROBIAL RESISTANT (AMR) HAS BEEN DESCRIBED BY THE WORLD HEALTH ORGANIZATION AS "A CRISIS THAT MUST BE MANAGED WITH THE UTMOST URGENCY.

ANTIBIOTICS HAVE BEEN A CRITICAL PUBLIC HEALTH TOOL SINCE THE DISCOVERY OF PENICILLIN IN 1928, SAVING THE LIVES OF MILLIONS OF PEOPLE AROUND THE WORLD.

ANTIMICROBIALS ARE AN ESSENTIAL TOOL AGAINST INFECTIONS IN BOTH HUMANS AND ANIMALS, BUT THEY ARE BECOMING LESS EFFECTIVE FASTER THAN THE PROCESS OF DEVELOPMENT OF NEW DRUGS OR OTHER TREATMENTS. THIS CHANGE HAS A SIGNIFICANT CONSEQUENCE FOR HUMAN HEALTH, ANIMAL HEALTH AND WELFARE, FOOD SAFETY, THE ENVIRONMENT AND THE ECONOMY.

ALL COUNTRIES ARE AFFECTED BY THE EFFECTS OF AMR. DRUG-RESISTANT ORGANISMS IN A SINGLE COUNTRY CAN QUICKLY SPREAD ACROSS BORDERS DUE TO MIGRATION, TRAVEL, MEDICAL TOURISM AND THE GLOBAL TRADE OF ANIMALS AND FOODS

AMR REQUIRES A COORDINATED AND WELL ESTABLISHED ONE HEALTH APPROACH ACROSS INTERNATIONAL COMMUNITIES THAT RESULTS IN SHARED SOLUTIONS FOR AN EFFECTIVE, COMPREHENSIVE RESPONSE. A ONE HEALTH APPROACH ADDRESSES THE INTERCONNECTION BETWEEN THE HEALTH OF HUMANS, ANIMALS AND THE ENVIRONMENT AND THE UTMOST NEED FOR COLLABORATIVE EFFORTS ACROSS ALL SECTORS TO IMPROVE HEALTH FOR ALL.

AT THE NATIONAL LEVEL, KINGDOM OF BAHRAIN NAP HAS BEEN DEVELOPED BY THE ANTIBIOTIC COMMITTEE UNDER THE SUPREME HEALTH COUNCIL WHICH INVOLVES ALL THE PRINCIPAL STAKEHOLDERS FROM THE HUMAN AND ANIMAL HEALTH SECTORS.

THIS PLAN SEEKS TO BUILD A FRAMEWORK TO OUTLINE THE ACTIONS TO BE TAKEN BY EACH SECTOR IN ORDER TO REDUCE THE OVERALL QUANTITIES OF ANTIBIOTICS BEING USED AND ULTIMATELY REDUCE THE THREAT OF THE ANTIBIOTIC RESISTANT . THIS CAN ONLY BE DONE BY ENSURING THE FULL COOPERATION OF ALL INVOLVED PARTIES IN THE KINGDOM .

THE PLAN AIMS TO REDUCE THE EMERGENCE AND PREVENT THE SPREAD OF DRUG-RESISTANT ORGANISMS THROUGH 5 CORE STRATEGIES:

- EDUCATION;
- SURVEILLANCE AND RISK ASSESSMENT;
- RESEARCH;
- PREVENTION AND CONTROL OF INFECTION; AND
- OPTIMISATION OF ANTIMICROBIAL USE

UNDER EACH OF THE FIVE STRATEGIES, INITIATIVES WILL HIGHLIGHT STRATEGIC AREAS REQUIRING ATTENTION. TO ACHIEVE THESE OBJECTIVES, A DETAILED PROGRAMMES WILL BE DEVELOPED FOR IMPLEMENTATION AND LONG-TERM SUSTAINABILITY.

THE THREAT OF ANTIBIOTIC RESISTANCE CANNOT BE ELIMINATED, BUT WE NEED TO PUT MECHANISMS IN PLACE TO MINIMIZE THE RISK THAT RESISTANCE WILL EMERGE, WHILE SETTING IN PLACE APPROACHES THAT WILL MINIMIZE THE HEALTH CONSEQUENCES OF RESISTANCE TO HUMANS AND ANIMALS.

FAEQA SAEED ALSALEH

MINISTER OF HEALTH

Message

Antimicrobial resistance (AMR) is a major threat to public health and has the potential to negatively impact us all. It is a serious and growing global health security risk, which needs to be prioritized at local and international levels.
A national response to AMR is required to complement the development of a global action plan, as advised by the WHO resolution: "Combating antimicrobial resistance including antibiotic resistance", adopted by the World Health Assembly in May 2014.

The development and implementation of a national AMR strategic plan in the Kingdom of Bahrain that complements international efforts is a major step towards the containment of the growing threat of AMR to the health of humans and animals alike. Regional and Global partnerships need to be strengthened as the responsibility of reducing resistance is a shared one.
The government has therefore highlighted this issue with a new national strategy to combat antibiotic resistance. The strategy will provide a framework for strong and coordinated efforts across sectors to combat antibiotic resistance. Targeted measures should be implemented to stop the increase of resistance, so that antibiotics can continue to be used to treat patients in hospitals and other facilities.

The establishment of an Antibiotic Committee under the Supreme Health Council in the Kingdom of Bahrain reflects our country's commitment to combat antibiotic resistant and to the 'One Health' approach in tackling AMR.

Implementing this plan will show that the Kingdom of Bahrain is standing up to play its part in tackling the global AMR threat and in helping to ensure better health outcomes for all.

Dr Jameela Al-Salman, MD , CIC , CMQ
Chairperson of the Antibiotic Committee
Supreme health Council
Kingdom of Bahrain

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Foreword

The threat posed by antimicrobial resistance (AMR) to public health as well as global health security has been reiterated in numerous World Health Assembly (WHA) resolutions.

In May 2015, the sixty-eighth World Health Assembly endorsed the Global Action Plan on Antimicrobial Resistance (GAP-AMR) – including antibiotic resistance, the most urgent drug resistance trend. The WHA resolution urges Member States to align their National Action Plan 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.

The strategic objectives of NAP-AMR are aligned with the global action plan based on national needs and priorities

Strategic priority 1 Focuses on improving awareness and understanding of AMR through effective communication, education and training, and has 2 focus areas – first is communications and information, education, communication resources to raise awareness amongst all stakeholders, and second focus area is education and training to improve the knowledge and behaviour of professionals in all sectors.

Strategic priority 2 Aims to strengthen knowledge and evidence through surveillance of AMR, with 2 focus areas – strengthening laboratories in human, animal, food and environment sectors, as well as ensuring surveillance of antimicrobial resistance in human, animal, food and environment sectors.

Strategic priority 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.

Strategic priority 4 Shall optimize the use of antimicrobial agents in 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.

Strategic priority 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.

Within each strategic priority and focus area, strategic interventions, key activities and outputs have been defined with tentative responsibility and timelines – short (within 1 year), medium (between 1 and 3 years) and long-term (between 3 and 5 years).

The antibiotic committee in the kingdom off Bahrain is following the same strategic objectives as outlines by the world health organization.

The committee put the plan combat antibiotic resistant over the next 5 years .

Executive summary

In the kingdom of Bahrain, the national antibiotic committee will set the framework for the national response to AMR, especially bacterial resistance to antibiotics. It will be aligned with the World Health Organization's (WHO) Global Action Plan on Antimicrobial Resistance, and with standards and guidelines from the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE).

The plan aims to reduce the emergence and prevent the spread of drug-resistant organisms through 5 core strategies:

- Education;
- Surveillance and Risk Assessment;
- Research;
- Prevention and Control of Infection; and
- Optimisation of Antimicrobial Use

Under each of the five strategies, initiatives will the highlight strategic areas requiring attention.

To achieve these objectives, a detailed programme will be developed for implementation and long-term sustainability.

For the Strategic Action Plan on AMR, the overarching strategies to address AMR are designed with a long-term perspective and the current time frame is for five years will be used for implementing the initial programmes and activities, with periodic review to ensure relevance, effectiveness and maintenance.

Under the following main core elements for antimicrobial resistant plan, we have the following objectives

Awareness

Objective 1 Increase national awareness of AMR

Education

Objective 2 Improve knowledge of AMR and related topics

Objective 3 Increase the number of research in the field of AMR

Strengthen the knowledge and evidence base through surveillance and research

Objective 4 Set up a national surveillance system for antimicrobial resistance

Objective 5 Improve laboratory capacity

Objective 6 Build laboratory capacity to produce high-quality microbiological data for patient management and support surveillance

Activities in both human and animal sectors.

Objective 7 Strengthening the research capacity in AMR

Objective 8 Identify operational research priorities for responsible use of antimicrobial agents and better practice in infection prevention in human and animal health

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

Objective 9 Establish national infection prevention and control programme

Objective 10 Introduce infection prevention and control programmes in veterinary settings and animal husbandry.

Objective 11 Limit the development and spread of AMR outside health settings by infection prevention and control.

Optimize the use of antimicrobial medicines in human and animal health

Objective 12 Ensure uninterrupted access to high-quality antimicrobial medicines.

Objective 13 Improve and measure appropriate use of antimicrobial agents in health care.

Objective 14 Ensure prudent use of antimicrobial agents in terrestrial and aquatic animals and agriculture.

Prepare the economic case for sustainable investment ... and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Objective 15 Prepare the economic case for sustainable investment in new medicines, diagnostic tools, vaccines and other interventions.

Background

Antimicrobial resistance (AMR) has been identified as a global health threat with serious health, political and economic implications. It has also been prioritized in numerous World Health Assembly (WHA) and Regional Committee resolutions.

The global commitment to combat AMR was further strengthened by the High Level Meeting on AMR at the United Nations General Assembly on 21 September 2016, in which global leaders reiterated their commitment to act on AMR through a political declaration that was adopted as a UN General Assembly resolution.

In May 2014, the World Health Assembly requested the development of a global action plan (GAP) on antimicrobial resistance, in resolution WHA67.25, reflecting a global consensus that antimicrobial resistance poses a profound threat to human health.

The WHO Secretariat led the development of the Global Action Plan on AMR (GAP-AMR) that takes into account the commitment, perspectives and roles of all relevant stakeholders, and in which everyone has clear and shared ownership and responsibilities. In May 2015, the sixty- eight World Health Assembly endorsed the GAP-AMR to tackle antimicrobial resistance – including antibiotic resistance, the most urgent drug resistance trend. The WHA resolution also requests Member States to align their national action plans with GAP-AMR by May 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

To achieve its goal, the global action plan sets out five strategic objectives, to:

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 in health, animal and food sectors; and
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.

Steps in development and implementation

1. Establish a governance mechanism
    a. Establish a functional multisectoral coordinating group (MCG)
    b. Establish technical working group(s).
    c. Ensure participation of national focal points on AMR in the human and animal health and agriculture sectors.
2. Conduct thorough situational analyses
    a. Collect data and available information
    b. Analyse data
    c. Assess capacities and identify gaps, opportunities and threats.
3. Planning
    a. Define strategic priorities
    b. Elaborate an operational plan and budget
    c. Prepare a plan for monitoring and evaluation (M&E).
4. Initiate implementation
    a. Submit core documents for validation by appropriate national authorities
    b. Conduct activities
5. Conduct periodic reviews, and incorporate lessons learnt

Situational analyses and assessment

The situation analysis:

A robust situational analysis involves assessment and analysis of information on:

1. Current AMR-related activities and structures in the country.
2. Capacity and structures to conduct surveillance of antimicrobial use and resistance.
3. Description of existing surveillance systems.
4. Known rates, such as:
   - AMR burden,
   - Rate of multi-drug-resistant tuberculosis.
5. Perceptions and behaviour related to known drivers of AMR, such as:
   - Limited knowledge of the risk for AMR;
   - Inappropriate use of antibiotics in humans, animals and plants, including over- prescribing and dispensing; and
   - Incomplete treatment courses (patients who do not finish a full treatment course);
6. Antimicrobial use in:
   - Human health (in communities, hospitals, other health care settings and for specific conditions such as sexually transmitted infections, HIV infection, tuberculosis and malaria)
   - Animal health (companion animals, livestock, aquaculture, veterinary practice)
   - Animal production
   - Plant production and health
   - Other environmental settings, and
   - Other situations;
7. The availability of alternatives to antimicrobials, including vaccines and others.
8. The status of known factors that promote the emergence of AMR.
9. Current capacity of country systems to regulate and enforce regulations on antimicrobial use, including for HIV infection, tuberculosis, malaria, in veterinary medicine and in crop production;

10. Existence and enforcement of policies and legal frameworks on the use of and resistance to antimicrobial agents in human health, animal health, plant production, environment, trade and commerce, such as:
    - National and subnational laws
    - Multinational or international agreements, including regional agreements for AMR interventions, the global action plan, OIE standards

11. Relevant stakeholders, including active donors and implementation partners.

The current situation in different sectors in the kingdom of Bahrain

Country response

Governance

Terms of reference for the national multisectoral coordinating group, and for a technical working group

Introduction

A governance mechanism is essential for coordinating national efforts to combat antimicrobial resistance (AMR). The governance mechanism should comprise a national multisectoral coordinating group (MCG), and/or technical working groups as needed.

Where in the kingdom of Bahrain now we have the national antibiotic committee under the umbrella of the Supreme council for health

Authority to act: The coordinating group should be given sufficient authority to ensure that its recommendations and plans are implemented.

Accountability: The group should be accountable to the lead minister or ministers or a senior executive function in the government.

Dedicated funds: The availability of dedicated funds will increase the operational effectiveness of the group. Seed funds from external sources are often required initially, but government funds should be secured as early as possible to ensure political "ownership" and increase the likelihood of programme sustainability.

Secretariat: Operational sustainability is more likely when sufficient dedicated personnel and funding are available to support administrative activities.

National multisectoral coordinating group

Purpose

The **purpose** of the national MCG is to oversee and, when necessary, to coordinate AMR-related activities in all sectors to ensure a systematic, comprehensive approach. It is recommended that the approach accord with defined AMR-related public health goals and with the global action plan for AMR.[1]

Scope

The MCG should address all AMR-related activities in country. The scope should be broad enough to address all five strategic objectives of the global action plan, prioritizing activities in a step-wise approach.

Role and responsibilities

Leadership

The MCG is expected to lead facilitation and, when appropriate, coordination of a national response to the threat of AMR. Its leadership could take the form of officially delegated authority, with more formal procedures and official monitoring, evaluation and reporting. Its role could be extended to making recommendations and progress reports and providing a platform for programme planning and implementation.

Information sharing

The MCG provides a structure for information-sharing to mutually reinforce activities among sectors.

Facilitation and coordination

The MCG should facilitate and, when appropriate and agreed, coordinate efforts to contain and reduce the threat of AMR at subnational, national and supranational levels.

It is recommended that the MCG build a collaborative, cooperative, supportive environment for sharing knowledge, information and experience. Each participating party should understand the scope and limits of its own contributions and also its inter-dependence with other parties and with

the whole system in order to meet the defined goals. The difficulty of achieving such an environment and building such a system should not be underestimated.

External interactions

Collaboration with internal and external agencies and organizations is essential for many countries.

Internal interactions

A national AMR initiative must interact with the health system and public health and disease-specific programmes. The nature of these internal interactions and the results will depend on the country. As many agencies and programmes have responsibilities in areas affected by AMR, a guiding principle of the MCG is to find the most appropriate ways to facilitate and provide synergy with new or existing work so that the overall objectives of the programme are achieved.

Membership

The national MCG should be composed of members representing the relevant sectors, notably human health, animal health and production and the food and environment sectors. Representatives should be given sufficient authority by their institutions to make decisions. While it is important to have sufficient representation of these key stakeholders, the MCG should remain small enough to be functional, striking a balance between full representation and the functionality of the coordinating group.

Meeting format and rules

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

The responsible minister(s) should select a ***chairperson*** on the basis of his or her expertise in leadership.

Members should be selected to ensure that all relevant stakeholders are equitably represented. The stakeholders may be invited to propose members, but the chairperson (with the support of the secretariat) should ensure that the proposed members have sufficient skills, knowledge, authority and influence and can collaborate. It is advisable to achieve a gender balance. Consideration should be given to the duration of membership, with the objectives of balancing knowledge and experience with new ideas and maintaining representativeness while maximizing overall effectiveness.

If the MCG becomes too large or is given tasks that require specific expertise or input, it is often efficient to form either ad hoc or standing subgroups. Any subgroup should have a clearly defined mandate and an appointed chairperson. In addition, technical working groups can be established and mandated for tasks that include providing technical input for MCG decision-making.

It is strongly recommended that the MCG be supported by an appropriately resourced *secretariat* responsible for the logistics of meetings; minute-taking; preparation and circulation of documents (e.g. background papers, reports and advisory notes to ministers); and storage and archiving.

It is recommended that the group have a mechanism (with appropriate records) to ensure that its members have no conflicts of interests and that the work of the MCG in the interests of public health is *transparent*. Failure to ensure these elements could undermine the credibility and limit the effectiveness of the group.

Strategic plan, operational plan, budget, M&E plan

Components of a NAP Summary of key components

1. Strategic plan

- Goals and objectives
- Priorities and interventions

2. Operational plan

- Activities, implementation arrangements, timetable, responsible entities
- Detailed budgeting and costing

The following information should be provided for each activity and sub-activity at the beginning of each cycle and subsequently on a regular basis:

- The dates or the period during which it will be implemented;
- The setting in which it will be implemented;
- The person, sector or institution that will be responsible for implementation;
- The cost of implementation as calculated in the budget plan;
- The source of funding to cover the cost; and
- The indicator(s), milestones and targets that will be used to monitor implementation of the activity or sub-activity.

The following information should be provided for each strategic intervention or activity:

- If technical assistance is required, brief terms of reference, including specification of deliverables and the expertise needed to conduct the activities;
- The entity responsible for implementation of the intervention or activity;
- The timetable;
- The estimated cost of technical assistance (including consultancy fee, travel, per diem) as calculated in the budget plan;
- Source of funding, if available; and
- The funding gap if there is no financial source to cover the cost of technical assistance.

3. Maintenance and evaluation plan

- Performance indicators
- Targets and timelines
- Data collection and reporting methods

For each indicator of achievement of a goal, objective, strategic intervention or activity, the following elements should be specified:

- The purpose of the indicator (input, output, outcome and impact);
- The procedure used for calculation (e.g. absolute figure, proportion, ratio, rate, index);
- The sources of information (for a rate, ratio or proportion, the sources of information for both the numerator and the denominator);
- The periodicity (and timeliness) of data collection; and
- The entity responsible for collecting the information.

The program for hospitals;

Summary of Core Elements of Hospital Antibiotic Stewardship Programs

Leadership Commitment: Dedicating necessary human, financial and information technology resources.

Accountability: Appointing a single leader responsible for program outcomes. Experience with successful programs show that a physician leader is effective.

Drug Expertise: Appointing a single pharmacist leader responsible for working to improve antibiotic use.

Action: Implementing at least one recommended action, such as systemic evaluation of on-going treatment need after a set period of initial treatment (i.e. "antibiotic time out" after 48 hours).

Tracking: Monitoring antibiotic prescribing and resistance patterns.

Reporting: Regular reporting information on antibiotic use and resistance to doctors, nurses and relevant staff.

Education: Educating clinicians about resistance and optimal prescribing.

Elements of Antimicrobial stewardship program in the hospitals;

I. An Antimicrobial Stewardship Management Team/Committee

The key roles of the AMS management team/committee are to:

- Ensure that evidence-based local antimicrobial guidelines are in place and reviewed regularly or when new evidence is published
- Ensure regular auditing of the guidelines, antimicrobial stewardship practice and quality assurance measures
- Report a regular formal review of the organisation's retrospective antibiotic consumption data
- Identify actions to address non-compliance with local guidelines, general antimicrobial stewardship issues and other prescribing issues.

II. **Evidence-based antimicrobial prescribing guidelines**

The local antimicrobial stewardship policy should contain:

1. A policy statement that outlines the need for clear clinical case definitions and associated evidence of infection to minimise unnecessary prescribing of antimicrobials
2. Emphasize on the urgent need to start treatment with effective antibiotic agents for severe sepsis or life-threatening infections
3. A reminder for prescribers to use antibiotic agent(s) with an adequate spectrum to cover only the expected pathogens for less severe infections. To highlight that broad-spectrum antibiotics are sometimes not as potent in vitro as their narrower-spectrum counterparts against certain pathogens
4. A reminder for prescribers to consider the risk of resistant pathogens such as MRSA or ESBL-producing organisms and offer alternative treatment regimens accordingly or encourage prescribers to seek expert advice
5. A description of the importance of confirming the allergy status of recommended antibiotic agents in patients as there may be a need to offer alternative treatment choices for those who are allergic.
6. An outline for prescribers to take appropriate specimens for culture and sensitivity testing prior to commencing antibiotic treatment. However they should not delay starting treatment in patients with severe sepsis or life-threatening infections.
7. a recommendation for intravenous (IV) administration only to patients who are severely ill, unable to tolerate oral treatment, or where oral therapy would not provide adequate coverage or tissue penetration.
8. an outline for prescribers to review microbiology results daily and to de-escalate to pathogen-directed narrow-spectrum treatment promptly where appropriate.
9. a recommendation for prescribers to document the next review date or stop date and switch to the oral route of administration promptly in accordance with local IV-to-oral switch guidance.

III. **Antimicrobial prescribing guidelines should be guided by evidence and local susceptibility data (eg by area team where available). Guidelines should include the following:**

1. Clinical diagnosis - to include: case definition, evidence of infection, severity assessment and relevant microbiology investigations
2. Recommendations for non-antimicrobial treatment (e.g. fluid resuscitation or surgery)
3. Empirical antimicrobial treatment recommendations: Initial antimicrobial therapy prior to availability of microbiology results or if a microbiological diagnosis is not going to be possible*

4. Directed antimicrobial treatment when microbiology results are known and advice to contact clinical microbiologists/infectious diseases specialists if required*
5. Oral switch guidance to highlight which oral agents to switch to and when
6. Duration of therapy for IV and oral agents
7. Specific guidance for exceptions and special cases if appropriate
8. Provide advice regarding monitoring and follow-up and contingency advice for treatment failure
9. Guidance for prophylaxis for surgery or procedures. These should also include:
   a. The aim of prophylaxis e.g. reduce surgical site infection,
   b. Where prophylaxis is required and where it is not,
   c. Distinction between risk groups e.g. patients colonised with multi-drug resistant organisms such as MRSA, ESBL and CRE,
   d. Alternatives where penicillin or other allergy exists and recommendation of single dose surgical prophylaxis regimens as appropriate and re-dosing frequency when more than one dose is required

IV. Quality Assurance Measures/Audits and Feedback

V. Education and Training

SUSTAINING AN EFFECTIVE ANTIMICROBIAL STEWARDSHIP PROGRAM AND THE QAULITY INDICATORS TO BE REPORTED

Process and outcomes measures to consider include:

Quality indicators for the strategic plan (for 5 years):

Clinical

All-cause mortality
Infection-related mortality
Duration of hospitalization
Rates of readmission
Clinical cure (with or without precise definitions)

Microbiologic

1. Percent of organisms resistant to certain antimicrobial
2. Percent of multi-drug resistant organisms
3. Number of infections due to specified organisms
4. Rate of isolation of resistant organisms

Usage

Quantity of total antimicrobial use (e.g., in defined daily doses, days of therapy, or grams)
Quantity of targeted antimicrobial use (e.g., in defined daily doses, days of therapy, or grams)
Duration of therapy
Percentage of oral vs. intravenous drug administration for agents with both oral and intravenous formulations
Antimicrobial drug expenditures (demonstrate cost savings/neutrality)
Compliance with surgical antibiotic prophylaxis
Number of trained staff /sessions./ workshops
Number of isolate suggested and their trend and patterns of resistance
Cost in animals for antibiotic
Rate for compliance with guidelines
Number and type of interventions and/or recommendations made by the ASP
Rates of clinician acceptance or implementation of ASP recommendations

In primary care / outpatients' clinics

Total consumption of antibiotic per covered population

In secondary care

Ddd/ 1000 bed days or 1000 admission per year
Dot per 100 bed days or 1000 admissions per year

In veterinary

Total weight of antibiotics sold to be used

Infectious disease Syndromes which there will be a national guidelines to measure the compliance with are the followings

Skin and soft tissue infections

Bacteremia / Candidemia

Urinary tract infection

Pneumonia (CAP/ HAP/VAP)

Sepsis / septic shock

Surgical prophylaxis

Diabetic foot

Endocarditis

Upper respiratory tract infection

Strategic plan:

Global action plan strategic objective 1: Improve awareness and understanding of antimicrobial resistance through effective communication, education and training.

Awareness-raising and risk communication

Objective 1	**Increase national awareness of AMR**	
	Strategic interventions	**Activities**
	1.1. Establish an evidence-based public communications programme targeting audiences in human health practice. ***Milestone:*** April 2018	1.1.1. Estimate awareness and knowledge through behavioural studies in different social and professional groups. To conduct researches in this field to study the awareness among public 1.1.2. Conduct antibiotic campaign in the week of November 2018 1.1.3. Prepare materials for the media 1.1.4. Prepare educational materials for the public 1.1.5. Prepare program for the universities and schools 1.1.6. Establish awards for the best media and public education materials 1.1.7. To establish a website 1.1.8 to establish a newsletter
	1.2. develop well-structured workshops for the health care workers	1.2.1. To set a whole educational program or a full year program for education for all health care workers 1.2.2. The program has to be tailored to all the subgroups
	1.3 develop educational session for the public	1.3.1. To prepare the materials for the public the suits , written , newspapers , TV , social media
	1.4 develop educational materials	1.4.1. Develop all educational materials for all sub categories

Education

Objective 2	**Improve knowledge of AMR and related topics**	
	Strategic interventions	**Activities**

	2.1. Include AMR and related topics as a core component of professional education, training, certification and development ***Milestone:*** The educational programmes revised and approved by June 2018	2.1.1. Include AMR and related topics in undergraduate curricula for human health professionals, animal health professionals and food industry and agriculture professionals 2.1.2. Prepare the materials for the undergraduate 2.1.3. Get a focal point in MOE 2.1.4. Prepare a structured and certified program for undergraduate and students 2.1.5. To establish a program for E-learning
Objective 3	**Increase the number of research in the field of AMR**	
Global action plan strategic objective 2: Strengthen the knowledge and evidence base through surveillance and research.		
Surveillance research	**3.1 to encourage members to conduct researches in the AMR**	**to establish a research agenda and train HCW to conduct**
Objective 4	**Set up a national surveillance system for antimicrobial resistance**	
	Strategic interventions	**Activities**
	4.1. Establish a national coordination structure for surveillance of AMR. ***Milestone:*** by March 2018	4.1.1. Write and approve terms of reference for a national coordinating centre for AMR surveillance with the mandate to oversee the AMR surveillance programme, including collecting, aggregating and sharing data.
Objective 5	**Improve laboratory capacity**	
	5.1 Prepare training for microbiology laboratories	5.1.1. To prepare workshop for training for microbiology, Regarding the Rapid diagnostic testing, diagnostic markers with rapid test result on which the rational prescribing decisions and

		appropriate measures for the prevention and control of infections are taken
Objective 6	**Build laboratory capacity to produce high-quality microbiological data for patient management and support surveillance activities in both human and animal sectors.**	
	Strategic interventions	**Activities**
	6.1. Designate a national reference laboratory for AMR surveillance. ***Milestone:*** March 2018	6.1.1. Write and approve terms of reference for a national reference laboratory with expertise in methods for confirming and characterizing specific pathogens and organizing quality assurance schemes. 6.1.2. Establish a reference lab for AMR in animals
	6.2. to prepare the list of the microorganisms that needs to be reported with all the resistant pattern	6.2.1. To prepare the list
	6.3. to establish a program to link all the hospitals for reporting or utilize the WHO-NET program	6.3.1. Communicate with WHO for training 6.3.2. To work on establishing our program
	6.4 to participate in GLASS program by WHO	6.4.1. To get training and starting the program in collaboration with WHO
Objective 7	Strengthening **the research capacity in AMR**	
Research and development		
7.1 to prepare a list of the gaps for research March 2018	7.1.1. Train and encourage HCW to conduct research in AMR	
Objective 8	**Identify operational research priorities for responsible use of antimicrobial agents and better practice in infection prevention in human and animal health**	
	Strategic interventions	**Activities**

	8.1. Prepare a national operational research agenda. ***Milestone:*** July 2018	8.1.1. Engage relevant experts to identify current gaps in knowledge and potential research topics. 8.1.2.Training HCW in conducting research 8.1.3.Prepare a list of the gaps for research opportunities
Global action plan strategic objective 3: Reduce the incidence of infection through effective sanitation, hygiene and prevention measures.		
Objective 9	**Establish a national infection prevention and control programme**	
	Strategic interventions	**Activities**
	9.1. ensure proper development and use of infection prevention and control policies and strategies through the focal points in the hospitals ***Milestone:*** June 2018	9.1.1. Ensure the presence of infection control teams in all hospitals. 9.1.2. Prepare training for all HCW 9.1.3. Monitor surveillance data for HAI
Objective 10	**Introduce infection prevention and control programmes in veterinary settings and animal husbandry.**	
	Strategic interventions	**Activities**
	10.1. establish program for infection control in animal health ***Milestone:*** June 2018	10.1.2. Provide training 10.1.3. Prepare core elements 10.1.4. Audit the progress and quality indicators
Objective 11	**Limit the development and spread of AMR outside health settings by infection prevention and control.**	
	Strategic interventions	**Activities**
	11.1. Promote personal hygiene by social mobilization and behavioural change activities. ***Milestone:*** March 2018	11.1.1. Estimate knowledge of personal hygiene in different social groups as a basis for the social mobilization campaigns. …
Objective 12	Global action plan strategic objective 4: Optimize the use of antimicrobial medicines in human and animal health **…**	

Global action plan strategic objective 4: Optimize the use of antimicrobial medicines in human and animal health.		
Regulated access to high-quality antimicrobial medicines		
Objective 12	**Ensure uninterrupted access to high-quality antimicrobial medicines.**	
	Strategic interventions	**Activities**
	12.1. Strengthen the pharmaceutical supply chain, including the procurement, supply and management system. ***Milestone:*** A quality management system introduced in all links of the supply chain by December 2018	12.1.1. Establish a quality management system for the supply of medicines, covering storage, transport, expiry date, distribution and disposal facilities with WHO standards. etc.
	12.2. Strengthen the supply of quality approved antimicrobials.	12.2.1. Ensure that the national testing laboratory has the capacity to test the quality of all antimicrobials used in humans. 12.2.2 Ensure that the national testing laboratory has the capacity to test the quality of all antimicrobials used in humans 12.2.3 Ensure that any adverse event or rejected batches after lab analysis will be reported based on pharmaco-vigilance systems.
Antimicrobial stewardship		
Objective 13	**Improve and measure appropriate use of antimicrobial agents in health care.**	
	Strategic interventions	**Activities**
	13.1. Create formal antimicrobial stewardship programmes in health care facilities. ***Milestone:*** Antimicrobial stewardship programmes established in 80% of acute care facilities by march 2018	13.1.1. Write generic terms of reference for antimicrobial stewardship multidisciplinary committees and teams. 13.1.2. Establish the program in all the hospitals. 13.1.3. To have all the core components of stewardship program in each hospital

	13.2 Established the national guidelines for antibiotic use in human and animals. 13.3 Establish a well-structured and approved educational program for health care workers and workers in animal sector. 13.4 Develop the quality indicators. 13.5 Unify the calculation methodology for antibiotic usage in the health system. 13.6 To be part of the accreditation process and licensing of all hospitals through NHRA 13.7 Include the antibiotic stewardship training in all health sub speciality training e.g. physicians , nurses 13.8 Antibiotic stewardship research. 13.9 Develop syndromic guidelines for most common disease to be used as a quality indicator.	13.2.1.To approve and disseminate these guidelines (e.g. antibiotic surgical prophylaxis) 13.3.1. To develop a well-structured program for the stewardship 13.4.1. To develop the quality indicators for process ,outcomes and results 13.5.1. To utilize the DDD/1000 PATIETNS DAYS / DOT PER 1000 Patients days 13.6.1. To work with NHRA for the process of accreditation 13.7.1. To develop the program 13..8.1. To be part of point prevalence studies 13.8.2. To conduct other studies 13.9.1. Develop the guidelines and to be used with indicators

Use of antimicrobial agents in animal health and agriculture

Objective 14	**Ensure prudent use of antimicrobial agents in terrestrial and aquatic animals and agriculture.**	
	Strategic interventions	**Activities**
	14.1. Establish national policies on use of antimicrobial agents in terrestrial and aquatic animals and agriculture. ***Milestone:*** June 2018	14.1.1. Establish policies on the use of critically important antibiotics. 14.1.2. Get all the date about antibiotic use in animal sectors and monitor the amount and indications

Global action plan strategic objective 5: Prepare the economic case for sustainable investment, ... and increase investment in new medicines, diagnostic tools, vaccines and other interventions.

Objective 15	**Prepare the economic case for sustainable investment in new medicines, diagnostic tools, vaccines and other interventions.**

Strategic interventions	Activities
15.1. Prepare a plan to secure and use financing for implementation of the AMR NAP. ***Milestone:*** Assessment results available by May 2018	15.1.1. Assess investment requirements for implementation of the NAP.

Operational plan and budget

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Strategic intervention 1.1. Prepare an evidence-based public communication programme for people in human health practice.								
Activity 1.1.1. Estimate awareness and knowledge through behavioural studies of different social and professional groups.								
Sub-activity 1.1.1.1 Measure AMR awareness in health care workers in the public sector.	Awareness survey	2	April 2018	Nationwide	National antibiotic committee	1000	Supreme Health Council	Baseline awareness Post-intervention awareness
Sub –activity 1. 1..1.3. prepare materials for the media	Number of the educational materials	5	April 2018	Nationwide	National antibiotic committee	5000	Supreme Health Council	Number done and published
Sub-activity 1.1.1.4 prepare educational	Number of the educational	5	April 2018	Nationwide	National antibiotic		Supreme Health	Number done and

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
materials for the public	materials				committee		Council	published
Sub-activity 1.1.1.5 prepare program for the universities and schools	Number to be prepared	1	April 2018	Nationwide	National antibiotic committee		Supreme Health Council	Number done and published
Sub-activity 1.1.1.6 establish awards for the best media and public education materials	Design awards	1	April 2018	Nationwide	National antibiotic committee	1000	Supreme Health Council	
Sub-activity 1.1.1.7 to establish a website	Design a website	1	April 2018	Nationwide	National antibiotic committee		Supreme Health Council	Number of times the website used
Sub-activity 1.1.1.8 to establish a newsletter	Design a newsletter	1	April 2018	Nationwide	National antibiotic committee		Supreme Health Council	Number of newsletter issued
1.2. develop well-structured workshops for the health care workers								
Sub-activity 1.1.2.1. to set a whole educational program or a full year program for education for all health care workers	to set a whole educational program	1	April 2018	Nationwide	National antibiotic committee	1000	Supreme Health Council	Number of attendees
Sub-activity 1.1.2.2 the program has to be tailored to all the subgroups	to set a whole educational program	1	April 2018	Nationwide	National antibiotic committee		Supreme Health Council	Number of attendees
1.3 develop educational session for the public								
Sub-activity 1.1.3.1	Number of the	1	April 2018	Nationwide	National		Supreme	Number

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
to prepare the materials for the public the suits , written , newspapers , TV , social media	educational materials				antibiotic committee		Health Council	
1.4 develop educational materials								
Sub-activity 1.1.4.1 develop all educational materials for all sub categories	Number of the educational materials	1	April 2018	Nationwide	National antibiotic committee	…	Supreme Health Council	

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

Activity 2.1.1. Include AMR and related topics in undergraduate curricula for human health professionals, animal health professionals and food industry and agriculture professionals.								
Sub-activity 2.1.1.1 Revise undergraduate curriculum for medical doctors and nursing to incorporate AMR and related issues.	Prepare and include it in the curriculum	1	June 2018	Nationwide	The national committee MOE	-	Supreme Health Council	Revised curriculum introduced
Sub-activity 2.1.1.2.	…	…	…	…	…	…	…	…
Sub-activity 2.1.1.4 develop all educational materials for all sub categories	Number of the educational materials	1	June 2018	Nationwide	National antibiotic committee	…	Supreme Health Council	Number
Sub-activity 2.1.1.5	to establish a	1	June	Nationwid	National	…	Supreme	Utilization

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
to establish a program for electronic learning	program for electronic learning		2018	e	antibiotic committee		Health Council	of the program

Strategic intervention 3.1 Increase the number of research in the field of AMR

Global action plan strategic objective 2: Strengthen the knowledge and evidence base through surveillance and research.								
Sub-activity 3.1 to encourage members to conduct researches	Researches to be done	1	…	Nationwide	National antibiotic committee	10000	Supreme health council	Number of researches
to establish a research agenda and train HCW to conduct research in the AMR	Put the plan for research	1	…	Nationwide	National antibiotic committee	…	Supreme health council	Number of researches

Strategic intervention 4.1. Establish a national coordination structure for surveillance of AMR.

Activity 4.1.1. Write and approve terms of reference for a national coordinating centre for AMR surveillance with the mandate to oversee the AMR surveillance programme, including collecting, aggregating and sharing data.								
Sub-activity 4.1.1.1. Prepare terms of reference for a national coordinating centre for AMR surveillance.	National coordinating centre terms of reference	1	March 2018	nationwide	National committee		Supreme health council	National coordinating centre terms of reference ready for approval
Sub-activity 4.1.1.2.	…	…	…	…	…	…	…	…

Strategic intervention 5.1 Improve laboratory capacity

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Activity 5.1 Prepare training for microbiology								
Sub-activity 5.1.1 To prepare workshop for training for microbiology	Worksop for microbiology	1	…	Nationwide	National antibiotic committee	5000	Supreme health council	Number of trained personal

Strategic intervention 6.1. Designate a national reference laboratory for AMR surveillance.

Activity 6.1.1. Write and approve terms of reference for a national reference laboratory with expertise in methods for confirming and characterizing specific pathogens and organizing quality assurance schemes.								
Sub-activity 6.1.1.1. Develop terms of reference for a national reference laboratory.	National reference laboratory terms of reference	1	June 2018	nationwide	The national committee		Ministries of health and of agriculture	National reference laboratory terms of reference ready for approval
Sub-activity 6.1.1.2.	…	…	…	…	…	…	…	…
Activity 6.2. to prepare the list of the microorganisms that needs to be followed								
Sub-activity 2.2.1 To prepare the list	To prepare the list	1	March 2018	Nationwide	The National Committee	-	Supreme health council	The list
Activity 6.3. to establish a program to link all the hospitalized for reporting or utilize the WHO-NET program								
Sub-activity 6.3.1 communicate with WHO for training	Training through WHO	1	March 2018	Nationwide	The national committee	5000	Supreme Health Council	Number of staff trained
Sub-activity 6.3.2 to work on establishing our program	Establish a program to train all the	1	March 2018	Nationwide	The national committee		Supreme Health Council	Number of staff trained

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
	hospitals							
Activity 6.4 to participate in GLASS program by WHO								
Sub-activity 6.4.1 to get training and starting the program in collaboration with WHO	Training through WHO	1	March 2018	Nationwide	The national committee	…	Supreme Health Council	Number of staff trained

Strategic plan 7.1 Improve the research capacity in AMR

Activity 7.1 to prepare a list of the gaps for research								
Sub-Activity 7.1.1 train and encourage HCW to conduct research in AMR march 2018	Number of researches	1	March 2018	Nationwide	The national committee	As above	Supreme Health Council	Number of researches

Strategic intervention 8.1. Prepare a national operational research agenda.

Activity 8.1.1. Engage relevant stakeholders to identify the current gaps in knowledge and potential research topics.								
Sub-activity 8.1.1.1. prepare a list of the gaps that could be covered by research	Research committees in different locations	1	May 2018	nationwide	The national committee		Ministry of health, public–private partnership	Draft research agenda developed

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Sub-activity 8.1.2. training HCW in conducting research	Research committees in different locations	1	July 2018	Nationwide	The national committee	-	Supreme Health Council	Number of researches
Sub-activity 8.1.3. prepare a list of the gaps for research opportunities	Research committees in different locations	1	July 2018	Nationwide	The national committee	-	Supreme Health Council	Number of researches
Sub-activity 8.1.1.2.	…	…	…	…	…	…	…	…

Strategic intervention 9.1 Establish a national infection prevention and control programme

Activity 9.1. ensure proper development and use of infection prevention and control policies and strategies through the focal points in the hospitals Milestone: June 2018								
Sub-activity 9.1.1 ensure the presence of infection control teams in all hospitals	Infection control team	1	June 2018	Nationwide	The national committee	…	Supreme Health Council	Number of staff
Sub-activity 9.1.2 prepare training for all HCW	Training in Infection control	1	June 2018	Nationwide	The national committee	…	Supreme Health Council	Number of staff to be trained
Sub-activity 9.1.3. monitor surveillance data for HAI	Surveillance data for HAI	1	June 2018	Nationwide	The national committee	…	Supreme Health Council	Surveillance data for HAI

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Strategic intervention 10.1. Create a formal organizational structure at national level to ensure proper development and management of infection prevention and control policies and strategies.								
Activity 10.1.1. Write and approve terms of reference for a national infection prevention and control coordinating unit with authority delegated by a relevant administrative or political jurisdiction and an identified budget.								
Sub-activity 10.1.1.1. Prepare terms of reference for a national infection prevention and control main components .	Terms of reference for an infection prevention and control unit	1	May 2018	Nationwide	The national committee	-	Supreme Health Council	Infection prevention and control unit terms of reference ready for approval
Sub-activity 10.1.1.2 provide training	Provide training	1	June 2018	Nationwide	The national committee	5000	Supreme Health Council	Infection control training
Sub-activity 10.1.1.3 prepare core elements	Implement the core elements	1	June 2018	Nationwide	The national committee	-	Supreme Health Council	Infection control training
Sub-activity 10.1.1.4 audit the progress and quality indicators	Audit	1	June 2018	Nationwide	The national committee	-	Supreme Health Council	Compliance rate
Sub-activity 10.2	…	…	…	…	…	…	…	…
Strategic intervention 11.1 Limit the development and spread of AMR outside health settings by infection prevention and control								
Activity 11.1. Promote personal hygiene by social mobilization and behavioural change activities.								

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Sub-activity 11.1.1. Estimate knowledge of personal hygiene in different social groups as a basis for the social mobilization campaigns	Infection control in public	1	March 2018	Nationwide	The national committee	1000	Supreme Health Council	Survey

Strategic intervention 12.1. Include hygiene and infection prevention and control unit as core (mandatory) content in training and education of veterinary professionals.

Activity 12 Ensure uninterrupted access to high-quality antimicrobial medicines.								
Sub-activity 12.1.1. Establish a quality management system for the supply of medicines, covering storage, transport, expiry date, etc.	a quality management system for the supply of medicines	1	Dec 2018	Nationwide	The national committee		Supreme Health Council	The program compliance

Strategic intervention 13.1 Improve and measure appropriate use of antimicrobial agents in health care.

Activity 13.1.1 Create formal antimicrobial stewardship programmes in health care facilities. Milestone: Antimicrobial stewardship programmes established in 80% of acute care facilities by march 2018								
Sub –activity 13.1.1.1 Write generic terms of reference for antimicrobial stewardship multidisciplinary committees and teams.	antimicrobial stewardship multidisciplinary committees and teams.	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	Number if teams in all hospitals
Sub-activity 13.1.1.2. establish the program in all the hospitals	antimicrobial stewardship multidisciplinary committees	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	antimicrobial stewardship

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
	and teams.							multidisciplinary committees and teams.
Sub-activity 13.1.1.3. to have all the core components of stewardship program in each hospital	Develop the core elements	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	The disseminate the core elements
Activity 13.2 established the national guidelines for antibiotic use in human and animals.								
Sub-activity 13.2.1 To approve and disseminate these guidelines (e.g. antibiotic surgical prophylaxis)	The national antibiotic guidelines	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	The national antibiotic guidelines dissemination and implementation
Activity 13.3 establish a well-structured and approved educational program for health care workers and workers in animal sector								
Sub-activity 13.3.1 to develop a well-structured program for the stewardship	antimicrobial stewardship multidisciplinary committees and teams.	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	
Activity 13.4 develop the quality indicators.								

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Sub-activity 13.4.1 to develop the quality indicators for process ,outcomes and results	To develop the quality indicators	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	Compliance with the indicators
Activity 13.5 unify the calculation methodology for antibiotic usage in the health system								
Sub-activity 13.5.1 to utilize the DDD/1000 PATIETNS DAYS/ DOT PER 1000 Patients days	to utilize the DDD/1000 PATIETNS DAYS / DOT PER 1000 Patients days	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	Compliance with the DDD/1000 PATIETNS DAYS / DOT PER 1000 Patients days
Activity 13.6 to be part of the accreditation process and licensing of all hospitals through NHRA								
Sub-activity 13.6.1 to work with NHRA for the process of accreditation	Develop a plan with NHRA for accreditation requirements	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	The plan
Activity 13.7 include the antibiotic stewardship training in all health sub speciality training eg physicians , nurses								
Sub-activity 13.7.1 to develop the program	Develop a plan with NHRA for accreditation requirements	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	The plan
Activity 13.8 antibiotic stewardship research								

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Sub-activity 13..8.1 to be part of point prevalence studies	to be part of point prevalence studies	1	March 2018	Nationwide	The national committee	-	Supreme Health Council	Number of hospitals in point prevalence studies
Sub-activity 13.8.2 to conduct other studies	Number of studies	1	March 2018	Nationwide	The national committee		Supreme Health Council	Number of studies
Activity 13.9 develop syndromic guidelines for most common disease to be used as a quality indicators								
Sub-activity 13.9 develop the guidelines and to be used with indicators	develop the guidelines and to be used with indicators	1	March 2018	Nationwide	The national committee		Supreme Health Council	Compliance rate with guidelines and reporting

Strategic intervention 14.1. Promote personal hygiene by social mobilization and behavioural change activities.

Activity 14.1.1. Estimate knowledge of personal hygiene in different social groups as a basis for social mobilization campaigns.								
Sub-activity 14.1.1.1. Estimate knowledge of schoolchildren about personal hygiene.	Knowledge survey	2	June 2018 June 2019	Nationwide	The national committee	2000	Supreme Health Council	Baseline data Post-intervention data

Strategic intervention 15.1 Prepare the economic case for sustainable investment in new medicines, diagnostic tools, vaccines and other interventions.

Activity 15.1.1 Prepare a plan to secure and use financing for implementation of the AMR NAP.

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
Sub-activity 15.1.1.1 Assess investment requirements for implementation of the NAP.	Baselines assessment	1	May 2018	Nationwide	The national committee	…	Supreme Health Council	Follow up

Strategic intervention 16.1. Create formal antimicrobial stewardship programmes in health care facilities.

Activity 16.1.1. Prepare generic terms of reference for multidisciplinary antimicrobial stewardship committees and teams								
Sub-activity 16.1.1.1. Prepare generic terms of reference for multidisciplinary antimicrobial stewardship committees.	Terms of reference	1	January 2018	nationwide	The national committee		Supreme health council	Terms of reference ready for approval
16.1.1. Write generic terms of reference for antibiotic stewardship program 16.2 established the national guidelines for antibiotic use in human and animals. 16.3 establish a well-structured and approved educational program for	Establish the antibiotics stewardship program with all its elements	1	March 2018	nationwide	The national committee		Supreme health council	The compliance with the program and the follow up of the indicators

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
health care workers and workers in animal sector 16.4 develop the quality indicators 16.5 unify the calculation methodology for antibiotic usage in the health system 16.6 to be part of the accreditation process and licensing of all hospitals through NHRA 16.7 include the antibiotic stewardship training in all health sub speciality training eg physicians , nurses 16.8 antibiotic stewardship research 16.9 develop syndromic guidelines for most common disease to be used as a quality indicators antimicrobial stewardship								

Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost (currency)	Source of funding	Indicator
multidisciplinary committees and teams. 16.10.establish the program in all the hospitals 16.11. to have all the core components of stewardship program in each hospital								
Activity 17.1. Assess investment required for implementation of the national action plan.								
Sub-activity 17 .1.1.. Assess the investment required, and identify gaps for implementation of the NAP.	Assessment report	1	May 2016	Capital	The national committee		Ministry of finance	Assessment report available

Monitoring and evaluation plan

Sample format with examples of indicators

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
1.1.1. Measure awareness and knowledge in different social and professional	Level of awareness by	Assessment, baseline survey,	Awareness scores stratified by target group	Baseline, according to schedule of	Baseline survey report, post-	Awareness survey	Measured in baseline

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
groups.	target group	monitoring and evaluation of outcome	(composite indicator)	awareness-raising campaigns (biannual)	intervention survey reports		survey
2.1.1. Include AMR and related topics in undergraduate curricula for professionals in human and animal health, the food industry and agriculture.	Revised curricula available for target professional groups	M&E of input	Yes/No No. of curricula / No. of professional groups to target	Annually	Key informant at ministry of the education	Key informant interview	No curricula with AMR and related topics
4.1.1. Write and approve terms of reference for a national coordinating centre for AMR surveillance.	National coordinating centre terms of reference written and approved	M&E of input	Yes/No	Annually	Key informant at ministry of health	AMR surveillance programme implementation report	No terms of reference for national coordinating centre
6.1.1. Write and approve terms of reference for a national reference laboratory.	National reference laboratory terms of reference written and approved	M&E of input	Yes/No	Annually	Key informant at ministry of health	AMR surveillance programme implementation report	No terms of reference for national reference laboratory
8.1.1. Engage relevant experts to identify current gaps in knowledge and	Draft research agenda prepared	M&E of input	Yes/No	Annually	Key informant at ministry of	Key informant interview	No research agenda

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
potential research topics.					health		
10.1.1. Write and approve terms of reference for a national infection prevention and control coordinating unit.	Infection prevention and control unit terms of reference written and approved	M&E of input	Yes/No	Annually	Key informant at ministry of health	Infection prevention and control programme implementation report	No terms of reference for infection prevention and control unit
12.1.1. Include hygiene and infection prevention and control in undergraduate curricula for animal health professionals.	Revised curricula available for target professional groups	M&E of input	Yes/No No. of curricula / No. of professional groups targeted	Annually	Key informant at ministry of agriculture	Key informant interview	No curricula with hygiene and infection prevention and control
14.1.1. Estimate knowledge of personal hygiene in different social groups.	Level of knowledge of target groups	Assessment, baseline survey M&E of outcome	Knowledge scores stratified by target groups (composite indicator)	Baseline Biannually	Baseline survey report Post-intervention survey reports	Knowledge survey	Measured by baseline survey
16.1.1. Establish a quality management system for the medicines supply chain.	Quality management system established and introduced	M&E of input	Yes/No	Annually	Key informant at drug regulation agency	Key informant interview	No quality management system

Planning element (activity linked to the strategic plan)	Indicator	Type and purpose	Value (calculation)	Frequency of data collection	Data source	Method	Baseline
18.1.1. Write generic terms of reference for multidisciplinary antimicrobial stewardship committees and teams.	Antimicrobial stewardship committees terms of reference written and approved	M&E of input	Yes/No	Annually	Key informant at ministry of health	Key informant interview	No terms of reference for antimicrobial stewardship committees
20.1.1. Prepare policies on use of critically important antibiotics.	Policies prepared and introduced	M&E of input	Yes/No	Annually	Key informant at ministry of agriculture	Key informant interview	No policies
22.1.1. Assess investment required for implementation of the NAP.	Investment assessment available	M&E of input	Yes/No	Annually	Key informant at ministry of finance	Investment needs assessment report	No assessment

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