Republic of Yemen

Ministry of Public Health And Population

Final National Action Plan to Combat Antimicrobial Resistance in Yemen approved by MOPHP

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ABX:	Antibiotics
ACC	Antimicrobial Coordination Committee
AMR:	Antimicrobial resistance
AUY :	Agriculture Universty Of Yemen
AMS:	Antimicrobial Stewardship
CERD:	Center for Educational Research and Development
CIAM:	Critically Important Antimicrobials
CME:	Continuous Medical Education
CIAM:	Critically Important Antimicrobials
DDD:	Defined Daily Dose
Dpt:	Department
EMRO:	Eastern Mediterranean Region Office
ESU:	Epidemiological Surveillance Unit
ESU:	Epidemiological Surveillance Unit
FAO:	Food and Agriculture Organization GAP: Global Action Plan
GLASS:	Global Antimicrobial Resistance Surveillance System
ID:	Infectious Diseases
IHR:	International Health Regulation
IPC:	Infection Prevention and Control IT: Information Technology
YARI:	Yemen Agricultural Research Institute Microbiology
DC&S:	Diseases Control & Surveillance in MOH
LTCF:	Long-Term Care Facilities
MOA:	Ministry of Agriculture
MOH:	Ministry of Health and population
MoA	Ministry of Agriculture and animal worth
MoE	Ministry of Education
MoI	Ministry of Information
NA:	Not Available
NAP:	National Action Plan
NGO:	Non-governmental Organization
NSC	National multi-sectoral steering Committee
OIE:	World organization for animal health
PHC:	Primary HealthCare
PHCC:	Primary Health Care Center
QC:	Quality Control
SOCs	Strategic Objectives Committees
SU:	Sana'a University
TOR:	Terms Of Reference
TV:	Television
UN:	United Nations
USD:	United States Dollars
WHO:	World Health Organization
WHONET:	World Health Organization soft wire program

ACKNOWLEDGEMENT

We wish to appreciate the world health organization for encouraging and providing the support and partnership in the development of this national action plan. We realize the valuable contributions of the ministry of health and population and disease control and surveillance for the development of this national action plan. We hope from world health organization representative for support and assistance on gaining these goals. The national action plan was made through cooperation between multi-sectoral ministries including of public health(infection control department, High Authority for Medicines, National Center of Public Health Laboratories …..and community (Higher Education and Researches Agriculture and Livestock …). Finally, we expect great effort of all technical working groups members and hope to give the best works and expertise.

1. الملخص التنفيذي

الرؤية:-

نحو يمن اكثر امنا من الأمراض المعدية المقاومة للمضادات الميكروبية

الرسالة:-

استمرار العلاج الناجع أطول فترة ممكنة من خلال الاحتفاظ بالقدرات الوطنية وتطويرها للوقاية من AMR والسيطرة عليه بإتباع مبدأ الصحة الواحدة لجميع القطاعات

الهدف الرئيسي :-

حماية سكان اليمن من الأمراض المعدية وتهديدات AMR من خلال ضمان واستمرارية استخدام أدوية فعالة وناجعة ومأمونة ومضمونة الجودة تُستعمل على نحو مسؤول متاحة لمن يحتاجها والترصد المستمر مقاومة مضادات الميكروبات والمساهمة في البحوث الإقليمية والعالمية.

المقدمة:

إن مقاومة المضادات الميكروبية (AMR) ارتفعت إلى مستويات خطيرة بأنحاء العالم كافة حالها حال الجمهورية اليمنية (Al-Shami& Al-Haimi;2018)

، وثمة آليات مقاومة جديدة آخذة في الظهور والانتشار على مستوى العالم وهي تهدد قدراتنا على علاج الأمراض المعدية الشائعة. (Al-Hammad& Al-Shamahy;2018) ويوجد قائمة متزايدة من عدوى العدوى مثل العدوى الرئوية والسل وتسمم الدم والسيلان التي أصبح علاجها أصعب بل مستحيل أحيانا ، بسبب تدني فاعلية المضادات الحيوية. نتيجة صرف المضادات من دون وصفة طبية لأغراض الاستعمال البشري أو الحيواني; كما انها تستخدم بشكل عشوائي في مجال الزراعة وتربية الحيوانات. ويتبيّن أيضاً في البلدان التي لا تطبق مبادئ توجيهية معيارية في مجال العلاج أن العاملين الصحيين والأطباء البيطريين غالباً ما يفرطون استخدام المضادات الحيوية التي كما هو موجود في اليمن . وإن لم نعجّل في اتخاذ الإجراءات فإننا مقدمون على عصر ما بعد المضادات الحيوية الذي يمكن أن تصبح فيه عدوى الالتهابات الشائعة والإصابات الطفيفة قاتلة مرة أخرى.

كما يعدّ علاج مقاومة المضادات الميكروبية أولوية قصوى بالنسبة إلى كل المنظمات المهتمة بالصحة العامة وأبرزها منظمة الصحة العالمية . وقد أقرت جمعية الصحة العالمية الثامنة والستون في أيار /مايو 2015بأهمية مشكلة الصحة العمومية التي تثيرها AMR وذلك عن طريق اعتمادها لخطة العمل العالمية بشأن AMR وتقترح هذه الخطة تنفيذ تدخلات لمكافحة مقاومتها هدفها ضمان الوقاية من الأمراض المعدية وعلاجها بأدوية مأمونة وناجعة **وهذة الخطة ترتكز على خمس محاور استراتيجية اساسية :**

1. زيادة الوعي بظاهرة AMR وكفالة فهمها بشكل أفضل من خلال الاتصال والتعليم والتدريب الفعال.
2. تعزيز المعارف وقاعدةً البينات من خلال الترصد وإجراء البحوث

3. خفض معدلات الإصابة بالعدوى من خلال التدابير الفعالة المتعلقة بالإصحاح والنظافة والوقاية من العدوى والسيطرة عليها
4. العمل على ضمان استخدام الأدوية المضادة للميكروبات على الوجه الأمثل في مجال صحة الإنسان والحيوان والزرعة
5. بيان المبررات الاقتصادية لضمان الاستثمار المستدام الذي يراعي احتياجات اليمن ، وزيادة الاستثمار في مجال مكافحة مقاومة مضادات الميكروبات والأدوية ووسائل التشخيص واللقاحات الجديدة وغيرها من التدخلات

وفي سبتمبر 2016 قطع معظم رؤساء الدول بما فيها اليمن التزاما في الجمعية العامة للأمم المتحدة بنيويورك بإتباع نهج واسع ومنسق ومشترك في معالجة الأسباب الجذرية التي تقف وراء AMR عبر قطاعات متعددة وخصوصا صحة الإنسان "الطب البشري "وصحة الحيوان "الطب البيطري" و في الجانب الزراعي اعتمدت جمعيتا منظمة الأمم المتحدة للأغذية والزراعة والمنظمة العالمية لصحة الحيوان في عام 2015 قرارات تؤيد خطة العمل العالمية (GAP)بشأن AMR في إطار اعترافهما بالحاجة الماسة إلى اتخاذ إجراءات مشتركة بين القطاعات للتصدي لمقاومتها ويوجد العديد من مضادات الميكروبات المُستعملة في الحيوانات المُنتِجة للغذاء مطابقة لتلك التي يستعملها ألإنسان أو ترتبط بها ارتباطاً وثيقاً، وكذلك الحال بالنسبة إلى معظم مضادات الميكروبات المُستعملة في إنتاج النباتات، ومنها نباتات البساتين.

و ايفاءا لالتزاماتنا الدولية ,سيتم وضع خطة عمل وطنية لمقاومة مضادات الميكروبات ترأسها وزارة الصحة العامة والسكان وبقية الجهات الأخرى وبدعم من مكتب منظمة الصحة العالمية باليمن وبإشراف لجنة واسعة من الخبراء و الاكاديميين من مختلف القطاعات ذات العلاقة . حيث ستشدد الخطة الوطنية على اهمية العمل بمفهوم الصحة الواحدة واهمية اشراك كافة القطاعات ذات العلاقة وتبنت الخطة الوطنية لمقاومة المضادات الحيوية الخطوط العريضة للاهداف **الاستراتيجية التي ترتكز عليها الخطة العالمية لمنظمة الصحة العالمية و تتكون الخظة الوطنية من الاتي:**

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

وسترتكز الخطة الوطنية اليمنية على (14) هدف فرعي تتمحور حول خمسة محاو استراتيجية المذكورة اعلاة ة وهذه **الأهداف كالتالي:**

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

2.Executive summary

Vision:-

Towards Yemen is safer than infectious diseases resistant to microbes

the message:-

Continuation of effective treatment as long as possible through the retention and development of national capacities to prevent and control AMR following the principle of single health for all sectors

The main objective :-

Protecting the population of Yemen from infectious diseases and AMR threats by ensuring the continued use of effective, safe and quality drugs that are responsibly used for those in need, continuous surveillance of antimicrobial resistance and contribution to regional and global research.

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.

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 Organization 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, Yemen will be initiated the drafting of its national action plan (NAP) and 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 Yemen. **The overall goal of the action plan** is to ensure, for as long as possible, continuity of the ability to treat and prevent infectious diseases with effective and safe medicines that are quality-assured, used in a responsible way, and accessible to all who need them.

3.OPERATIONAL FRAMEWORK

To achieve optimal collaborative actions by different stakeholders in association with developing partners and international organizations aiming to strength healthcare, veterinary medicine, food safety, agriculture and research. However, this work needs to be channeled into a structured plan whereby gaps are identified and tasks are dedicated to specific people who should execute them during a specific period of time. In addition, a tri-sides approach to the problem is needed to ensure a plan with the "One Health Approach". Last but not least, a budget needs to be dedicated for the execution of this plan. In 2015, the World Health Assembly adopted a Global Action Plan (GAP) on AMR, **which outlines five strategic objectives including** :

1. Improve awareness and understanding of antimicrobial resistance through effective communication, education and training;
2. Strengthen the knowledge and evidence base through surveillance and research
3. Reduce the incidence of infection through effective sanitation, hygiene and infection prevention and control measures
4. Optimizing the use of antimicrobial agents in health, animals and food; 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 research , innovations and other interventions

This commitment on the behalf of the World Health Organization (WHO) has been an opportunity for Yemen to organize its fight against AMR into a National Action Plan (NAP). A National multi-sectorial committee was created for the governance of the plan.

The national plan will emphasize the importance of public health work

• A strategic plan outlining objectives and priorities.

• An implementation plan that outlines the activities, mechanism and schedule

• Implementation plan and evaluation of performance and achievement indicators for all activities

4.COUNTRY RESPONSE

A national governance mechanism is far more likely to be effective if it has political support and authority to act, if it is accountable and if it has dedicated funds and an adequate secretariat to operate. A governance mechanism is essential for coordinating national efforts to combat AMR. in order to comprise a **National Steering Committee** (NSC), which will establish supporting technical working group as needed. As the AMR issue is multifaceted and requires multidimensional solutions and multi-sectoral cooperation, the following are examples of ministries, agencies, departments, experts, officials, academics and researchers in the areas of antimicrobial resistance.

FIRST : National Antimicrobial Resistant Steering Committee (NSC) includes :

1. Minister of Public Health and Population Prof. Dr. Taha Ahmed Al-Mutawakel
2. Deputy or Deputy Minister of the Ministry of Public Health and Population for the Health Care Sector, Prof. Dr. Mohammed Al-Mansour
3. Deputy or Deputy Minister of the Ministry of Public Health and Population for the therapeutic medical sector a. Dr.. Ali Jahaf
4. Deputy or Undersecretary of the Ministry of Agriculture and Irrigation for the Agricultural Services Sector, Dr. Muhammad Al-Ghashem
5. Deputy or Deputy Minister of Higher Education and Research, Prof. Ghaleb Hamid Al-Qans
6. Deputy or Undersecretary of the Ministry of Information and culture Mr. Nasr Al-Din Zaid Ali Amer
7. Deputy or Undersecretary of the Ministry of Finance Mr. Mohammed Abdullah Ghaleb Amer
8. General Director of the Disease Control and Surveillance, Dr. Khaled Abdullah Al-Moayad
9. General Director of the National Center for Central Public Health Laboratories, Dr. Abdul Ilah Hussein Al Harazi
10. Head of the Supreme Commission for Medicines and Medical Appliances, Ministry of Public Health and Population, Dr. Mohammed Al Ghaili
11. A representative of the World Health Organization, Dr. Ahmed Qaed

SECOND: Antimicrobial Coordination Committee (ACC) includes :

1. National focal point and Director for the National Program of Combating Antimicrobial Resistance in the Department of Disease Surveillance and Control Dr. Huda Zaid Al-Shami (Chairman Head)

2. A representative of the Ministry of Agriculture and Livestock (Focal Point) Dr.. Aqeel Al-Mutawakel
3. A representative of the reference laboratory and its branches (National Center of Public Health Laboratories (NCPHL)) (Focal Point) Dr. Huda Zaid Al-Shami and Dr. Mona Mayad
4. 4. A representative of infection prevention and control in the National Center for Disease Control and Surveillance / Ministry of Public Health and Population (Focal Point Coordinator) Dr. Mohammed Abdullah Al-Dawla
5. A representative of the General Administration of Pharmacies (Focal Poin) Dr. Samir Muhammad Al-Sanbani
6. A representative of the Environment and Consumer Protection Authority (Focal Poin) Dr. Abdul Malik Hassan Ahmed Al-Ghazali
7. A representative of the Faculty of Medicine and Health Sciences - Sana'a University (Focal Point) Dr. Arwa Muhammad Othman
8. A representative of the Faculty of Pharmacy, Sana'a University, Dr. Khaled Al Shoba
9. A representative of the private sector (hospitals, pharmacies and laboratories) (Focal Point) Dr. Mohammed Saleh Al-Somali
10. 10. representative of the public sector (hospitals, pharmacies and laboratories) (Focal Point) Dr.-------
11. A representative of the Fculty of Veterinary Medicine, Prof. Abdul Raouf Mohammed Al Shawkani
12. A representative of the Council of Medical Specialties (Focal Point) Dr. Athmar Hassan Ali Al-Hasani
13. A representative of the drug supply program, Dr. Muhammad Al-Ghaili
14. A representative of the registration of companies, importers, medicines and medical supplies d. Najla Ahmed Al-Shami(Focal Point)
15. Representative of the Legislation and Legal Affairs Ministry of Public Health and Population (Focal Point)

The **Chairman** of each sub-committee (as focal point), which includes five sub-committees to implement the provisions of each axis) of the core objectives and activities of NAP for microbial resistance

The core objectives and activities to be executed in NAP in Yemen are as follows:

1- Antimicrobial Awareness Committee (head FP)
2- The Committee for Laboratory Surveillance of Antimicrobial Resistance (head FP)
3- The Infection Control Committee, (head FP)
4- The optimal use of antibiotics Committee (head FP)
5- The Committee on the Economics of Pharmaceutical Studies and Research on Antimicrobial Resistance. (head FP)

For each axis, the first activity is the assignment of a **focal person** and a **technical working group** (**plus Term Of References TOR**), which aims at organizing the responsibilities and executing tasks in a timely manner.

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

The main purpose of the National Steering Committee(NSC) Is To Oversee Activities.

1. **Political support**: As human health is the ultimate concern of activities to control AMR, the ministry of health lead the group, but joint leadership with Ministry of Agriculture and animal worth (MoA), Ministry of Education (MoE) and ministry of Information (MoI).
2. **Authority to act**: The NSC will have sufficient authority to ensure that the Antimicrobial coordination committee (ACC) recommendations and plans are implemented
3. **Dedicated funds**: the availability of dedicated funds will increase the operational effectiveness of the ACC. Seed funds from the government and external sources are often required initially, but government funds should be secured as early as possible to ensure political "ownership" and increase the likelihood of programme sustainability.

Terms of References of AMR coordination committee (ACC)

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

Roles and Responsibility:

1. **Accountability:**

The ACC should be lead facilitation or a senior executive function in the government and coordination of a national response to the threat of AMR. Its leadership should take the form of officially delegated authority, with more formal procedures and official monitoring, evaluation and reporting. Moreover making recommendations and progress reports and providing a platform for programme planning and implementation to NCC.

2. **Secretariat:**

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

3. **Information sharing**:

The ACC should provide a periodic progressing report for information for mutually reinforce activities among sectors to Disease Control and Surveillance (DC&S) and UN partners (WHO and International Office of Displaced people) which will be discussed at the regular meeting of NSC.

4. **Facilitation and coordination**:

ACC should facilitate and, when appropriate and agreed, coordinate efforts to contain and reduce the threat of AMR at sub national, national and supranational levels. Furthermore, ACC

should build a collaborative, cooperative, supportive environment for sharing knowledge, information and experience. Each participating party should understand the scope and limits of its own contributions and also its inter-dependence with other parties and with the whole system in order to meet the defined goals. The difficulty of achieving such an environment and building such a system should not be underestimated.

5. **External interactions**:

Collaboration with internal and external agencies and organizations is essential for many countries. WHO country office can support **Yemen** in identifying and facilitating relations with external partners. ACC will be invited, encouraged and supported to participate in any existing initiatives of the WHO country office, regional office or WHO headquarters.

6. **Internal interactions**:

A national AMR initiative must interact with the health system and public health and disease-specific programmes and general national plan. The nature of these internal interactions and the results will depend on ACC. As many agencies and programmes have responsibilities in areas affected by AMR, a guiding principle of the ACC is to find the most appropriate ways to facilitate and provide synergy with new or existing work so that the overall objectives of the programme are achieved. Furthermore, the ACC must be appropriately integrated and have clearly defined roles and responsibilities in existing health system, public health and disease-specific programmes, animal health and production, the food sector and environmental initiatives. The cross-cutting nature of the ACC should add value to these systems and programmes, not supplant them.

Membership of AMR coordination committee(ACC):

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

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

Meeting format and rules

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

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

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

The ACC should be supported by an appropriately resourced **secretariat** responsible for the logistics of meetings; minute-taking; preparation and circulation of documents (e.g. background papers, reports and advisory notes to NSC); and storage and archiving.
The committee should has a mechanism (with appropriate records) to ensure that its members have no conflicts of interests and that the work of the ACC in the interests of public health is transparent. Failure to ensure these elements could undermine the credibility and limit the effectiveness of the committee.

National AMR Focal Point

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

Scope, roles and responsibilities

The focal point should:

1. Build sustained partnerships and work nationally and internationally on containment of AMR;
2. Identify stakeholders and facilitate formation of an inclusive NSC and ACC.
3. Lead and coordinate drafting of a national action plan for containment of AMR.
4. Facilitate and oversee implementation, M&E of the plan through the ACC.
5. Ensure regular data collection and information sharing by instituting effective communication and coordination among all stakeholders, the members of ACC and their constituencies, sectors and disciplines.
6. Coordinate national activities for establishment of AMR surveillance systems.
7. Report on the prevalence of and trends in AMR to the global AMR surveillance system (GLASS).
8. The focal point will be the primary contact for all issues related to AMR in the country.

Technical working group

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

Scope, roles and responsibilities

The terms of reference (ToR) of the TWG shall be established by the ACC, providing specific scope, role and responsibilities. These will usually be task-specific, and focused on

areas which the coordinating group have determined to be of particular focus for the country. The TWG will remain a national group and shall interact with country representatives of the required sectors, as determined by the scope of work. The TWG remains a group mandated by the ACC. As such, reporting and communications with the ACC should be regular and will be defined in the TWG- TOR. Activities may include drafting technical advice and reports, contributing to country situation analyses or participating in national action plan development.

Membership

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

AMR Surveillance Unit (ASU):

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

Term of reference for the ASU:

1. Define AMR surveillance objectives within the national AMR strategy.
2. Facilitate linkages with AMR surveillance across human health, animal health and environmental sectors.
3. Develop or adapt national AMR surveillance standards, protocols and tools and coordinate their dissemination.
4. Provide guidance and information on data collection and reporting to the national reference laboratory and AMR surveillance sites.
5. Monitor and evaluate the AMR surveillance system on an ongoing basis.
6. Define strategy for participation in GLASS.
7. Assure data management structure and format and IT solutions.
8. Select and facilitate enrolment of surveillance sites.

9. Coordinate collection and compilation of national AMR data.

10. Conduct data analysis and quality assurance.

11. Analyze and feedback AMR surveillance results to AMR surveillance sites in collaboration with the national reference laboratory.

12. Aggregate and report national AMR data and data on implementation status of national AMR surveillance system to GLASS

5.SITUATIONAL ANALYSES AND ASSESSMENT

Resistance to antimicrobial drugs is a major health problem that affects the whole world. The problem is still worse in developing countries where lack of antimicrobial-resistance surveys and control policies are the norm. In Yemen, misuse of antimicrobial agents by the professional and public is widespread. As in many developing countries antimicrobials can be purchased from pharmacies without prescription in Yemen. Currently , prospective-(continuous/ longitudinal) study was carried out in six major hospitals in Yemen found overall incidence rate for nosocomial infection was 65.4 cases in every 100 and the overall antibiotics Resistant and multidrug Resistant parentages in table (1 to3) (Al-Shami & Al-Haimi; 2018).

Table 1: antibiotic resistant percentages for isolated bacteria from inpatients with nosocomial infections, in six major hospitals in Sana'a city and in some governorates in Yemen

Antibiotic name	Antibiotics /classes	Resistant		Total (n=300)
		No.	%	
Broad spectrum of Antibiotics				
Ampicillin	Penicillin/amino-penicillin	237	79.8	297
Ceftazidime	3rd Cephalosporins B-lactam	236	78.9	299
Cefdroxil	4th Cephalosporins B-lactam	232	77.9	298
Cefapime	4th Cephalosporins B-lactam	231	77.3	299
Cefurixime	2nd Cephalosporins B-lactam	224	74.9	299
Ceftizoxime	3rd Cephalosporins B-lactam	216	72.2	299
Cefaxime	4th Cephalosporins B-lactam	220	73.6	299
Cefotaxime	3rd Cephalosporins B-lactam	221	73.9	299
Cefoxtine	2nd Cephalosporins B-lactam	210	70	300
Cefazoline	1st Cephalosporins B-lactam	207	69.7	297
Cefatrixone	3rd Cephalosporins B-lactam	167	58	288
Nitrofuranatoin	Nitrofurans	207	69.7	297
Ciprofloxacin	Fluoroquinolones	179	68.6	261
Ofloxacin	Fluoroquinolones	47	37	127
Norfloxacin	Fluoroquinolones	31	24.4	127
Sulphamethoxazole/Trimethoprime	Folate pathway inhibitors	189	66.2	299
Azirhromycin	Macroloides	178	59.9	297
Doxycyclin	Tetracycline	169	59.5	284
Tetracycline-	Tetracycline	155	52	298
Ampicillin/Sulbactam	B-lactamase inhibitor combinations	177	59	300
Amoxicillin-Clavulanic Acid	B-lactamase inhibitor combinations	167	58	288
Pipracillin/Tazobactam	B-lactamase inhibitor combinations	147	49	297
Fosfomycin	Fosfomycin	48	57.1	84
Gentamicin	Aminogylcosides	153	51.2	299
Amikacin	Aminogylcosides	72	40.9	176
Chloramphenicol	Phenicols	64	52	123
Imipenem	Carbapenems	98	33	297
Narrow spectrum of antibiotics used For Gram-negative bacteria				
Pipracillin	Ureido- penicillin	105	63.3	166
Aztroneome	Monobactams	113	63.1	179
Mezlocillin	Ureido-penicillin	110	58.5	188
Colistin Sulphate	Poly-peptide	51	46.8	109
Nalidixic Acid	Quinolones	14	31.1	45
Narrow spectrum of antibiotics used For Gram-positive bacteria				
Methicillin	Penicillin–stable penicillin	60	85	70
Oxacillin	Penicillin -stable penicillin	71	63.9	111
Cloxacillin	Penicillin -stable penicillin	59	65.5	111
Erythromycin	Macroloides	50	45.1	111
Penicillin-	Penicillin	38	42.2	111
Clindamycin-	Lincosamides	28	25.2	111
Vancomycin	Glycopeptides	31	28	111
Linzolid	Oxazolidinones	13	12.2	111
Rifampicin	Ansamycins	8	7.2	111
Antifungal agents	**Antifungal classes**	**No.**	**%**	**Total n =36**
Fluconazole	Azoles-Triazole group	20	55.6	36
Nystatin	Polyenes group	11	30.6	36
Clotrimazole	Azoles-Imidazole group	10	27.8	36
Ketoconazole	Azoles-Imidazole group	7	19.4	36
Itraconazole	Azoles-Triazole group	6	16.7	36
Amphotericin -B	Polyenes group	2	5.6	36

Table 2: Multi-drug resistant (MDR) percentages for Gram-positive bacteria isolates from inpatients with nosocomial infections in six major hospitals in Sana'a city and in some governorates in Yemen

Isolated bacterial agents	MDR Rang No. (%)	Antibiotics resistant (ABR) percentages (%)																	
		MET	FOX*	AMP	OX	DA	CXM	P	CTX	CX	AMC	E	AZM	SAM	VA	GN	AK	LNZ	CPM
S. aureus (n=55)	30(55.2%)	93	68.5	77.8	74.1	38	74.1	75.9	68.5	66.7	74.1	63.3	59.3	51.9	33.3	40.7	38.9	26	72.2
Enterococcus spp (n=35)	21(63.6%)	N	42.9	85.7	73.5	53.3	79.4	48.6	76.5	79.7	65.7	63.6	55.9	57.9	8.8	52.9	38.9	12	82.4
S. epidermidis (n=14)	3(21.5%)	62	15.4	38.5	38.5	0	38.5	15.4	38.5	30.8	15.4	47	46.2	0	15.4	15.4	15.4	0	38.5
S. pyogenes (n=6)	2(33.3%)	N	25	33.3	33.4	33.3	66.7	50	50	50.5	0	50.7	50	50	16.7	50	50	17	66.7
S. saprophyticus (n=2)	1(61%)	100	100	100	100	0	100	0	100	100	100	0	0	0	100	0	0	0	100
Overall ABR percentages		85	50.4	67.1	63.9	24.9	71.7	38	66.7	65.5	51	44.9	42.3	32	34.8	31.8	28.6	11	72
Isolated bacterial agents	MDR Rang n (%)	CAZ	ZOX	CFR	CRO	CIP	SXT	C	DO	TE	IMP	FOS	FM	NOR	Nov	OFX	RF	CFM	CZ
S. aureus (n=55)	30(55%)	85.2	72.2	72.2	68.5	61.1	64.8	63	52.8	40.7	35.2	28.6	20	20	20.4	22.2	0	68.5	66.7
Enterococcus spp (n=35)	21(63.6%)	85.2	82.4	82.4	82.5	76.5	67.6	62.5	52.9	58.8	38.2	83.3	12.5	0	n	55.6	16	82.4	79.4
S. epidermidis (n=14)	3(21.5%)	53.8	38.5	30.8	38.5	23.1	15.4	18.2	0	7.7	7.7	0	0	0	0	0	0	38.5	15.4
St. pyogenes (n=6)	2(33.3%)	66.7	66.7	66.7	66.7	66.7	83.3	66.7	33.3	40	50	N	N	N	0	0	0	66.7	66.7
S. saprophyticus (n=2)	1(61%)	100	100	100	100	100	100	100	100	0	0	0	0	0	100	0	100	100	100
Overall ABR percentages		78.2	72	70.4	71.2	65.5	66.2	62.1	47.8	29.4	26.2	28	8.1	5	30.1	15.6	29	71.2	65.6
Overall MDR%	57(51.4%)																		

Kay words / CPM: Cefopdoxime N: not tested

VA	Vancomycin	NOV	Novabiocin	SAM	Ampicillin/ Sulbactam	CTX	Cefotaxime	CZ	Cefazolin	SXT	Trimethoprim /Sulphamethoxazole
MET	Methicillin	DA	Clindamycin	AMC	Amoxycillin /Clavlinc Acid	CRO	Ceftrixone	CT	Colistin Sulphat	C	Chloramphenicol
FOX	Cefoxtine	E	Erythromycin	RF	Rifampicin	CFM	Cefaxime	DO	Doxycycline	CIP	Ciprofloxacin
P	Penicillin	AZM	Azithromycin	AK	Amikacin	ZOX	Ceftazoxim	TE	Tetracycline	CFR	Cefadroxil
OX1	Oxacillin	CX	Cloxacillin	GN	Gentamycin	CAZ	Ceftazidime	FOS	Fosfomycin	NOR	Norfloxacin
LNZ	Linzolid	AMP	Ampicillin	CXM	Cefuroxime	CPM	Cefepime	IMP	Imipnme	OFX	Ofloxacin

Table 3: Multi-drug resistance percentages for Gram-negative bacteria isolates from inpatients with nosocomial infections in six major hospitals in Sana'a city and in some Governorates in Yemen

Isolated bacterial agents n=188	MDR rang No.(%)	Antibiotics resistant (ABR) %															
		ATM	AMP	AMC	AK	CFR	CRO	CFM	CAZ	CPM	CZ	CXM	CTX	GN	C	CT	CIP
K. pneumoniae (n=60)	38(63)	67.2	90	73.2	51.7	78.3	81.7	75	83.3	80	70	70	36.6	63.3	50	50	63.3
E. coli (n=45)	24(53.3)	61.9	81.4	73.2	30	74.4	65.1	65.1	67.4	74.4	60.5	76.7	63.4	34.1	65.7	43.8	60.5
Acinetobacter spp (n=33)	19(57.6)	46.7	93.5	100	63.3	90.3	77.4	83.9	83.9	87.1	51.6	58.1	54.8	74.2	58.1	30	45.2
P. aeruginosa (n=30)	21(70)	76.9	79.2	100	46.4	89.3	92.9	85.7	78.6	82.1	82.1	92.2	89.3	67.9	80	66.7	64.3
Enterobacter spp (n=8)	6(75)	87.5	100	100	90	90	70	70	70	90	90	70	90	80	70	75	60
P. mirabilis (n=5)	3(60)	71.4	85.7	83.3	57.1	85.7	85.7	100	100	100	85.7	100	100	57.1	100	100	71.4
Citrobacter spp (n=6)	3(50)	14.3	42.9	85.7	42.9	100	100	100	85.7	85.7	57.1	57.1	57.1	50	57.1	0	42.9
S. Paratyphi (B) (n=1)	1(100)	100	100	100	N	100	100	100	100	100	100	100	100	N	100	N	100
Overall ABR %		65.7	84.1	89.2	54.5	88.5	84.1	85	83.6	87.4	74.6	78	73.9	60.9	72.6	52.2	63.5
Isolated bacterial agents	MDR rang No.(%)	DO	FM	FOX	FOS	IPM	MEZ	NOR	NA	OFX	PRL	PTZ	SAM	SXT	TE	ZOX	AZM
K. pneumoniae (n=60)	38(63)	55	66.7	47.5	69.2	33.3	64.2	66.7	66.7	40	63.5	42.1	71.7	78.3	63.3	62.8	*30.8*
E. coli (n=45)	24(53.3)	61.9	31.8	55	21.1	24.4	41	24	24	34.6	58.3	35.1	85.1	65.1	44.2	62.8	*N*
Acinetobacter spp (n=33)	19(57.6)	35.3	100	84.6	86.7	35.3	37.9	0	0	33.3	65.5	35.7	54.8	83.9	36.7	64.5	*N*
P. aeruginosa (n=30)	21(70)	67.9	66.7	67.9	76.9	50	61.5	37.5	50	41.7	60	52	84	82.1	64.7	89.3	*N*
Enterobacter spp (n=8)	6(75)	50	50	100	66.7	40	77.8	25	33.3	100	71.4	71.4	100	100	60	90	*N*
P. mirabilis (n=5)	3(60)	58.7	0	66.7	75	14.3	57.1	0	0	0	85.7	28.6	57.1	71.4	71.4	100	*N*
Citrobacter spp (n=6)	3(50)	50	0	42.9	0	33.3	66.7	0	0	0	50	40	85.7	57.1	66.7	100	*N*
S. Paratyphi (B) (n=1)	1(100)	100	100	100	N	100	100	100	100	100	100	100	100	100	100	100	*N*
Overall ABR %		59.9	51.9	70.6	56.5	41.4	63.3	31.7	34.3	43.7	69.3	50.6	79.8	79.7	63.4	83.7	30.8
Overall MDR %	115(61%)																

Kay words:

CRO	Cefatrixone	CPM	Cefapime	FOX	Cefoxtine	CXM	Cefurixime	SAM	Ampicillin /Sulbactam	CTX	Cefotaxime
ATM	Aztreonam	CFM	Cefaxime	C	Chloramphenicol	FOS	Fosmycine	PRL	Pipracillin	GN	Gentamycin
AMP	Ampicillin	CAZ	Ceftazidime	CT	Colistin sulfite E	IPM	Imipenem	PTZ	Pipracillin/Tazobactam	DO	Doxycyclin
AMC	Amoxycillin/Clavulanic Acid	CZ	Cefazolin	CIP	Ciprofloxacin	MEZ	Mezlocillin	SXT	Trimethoprim /Sulphamethoxazole	NOR	Norfloxacin
AK	Amikacin	CFR	Cefadroxil	FM	Nitrofurantoin	ZOX	Ceftizoxime	TE	Tetracycline	N--not tested	

The prevalence of self- medication with antibiotic in children presented to the outpatient department at Sam hospital, Sana'a city Yemen found Of the 2000 patients interviewed, 1200(60%) had taken an antibiotic in the last 15 days without a medical prescription. Respiratory (80%) and gastrointestinal (13%) symptoms were most frequently reported. 312(26%) patients used the previous prescription paper to obtain antibiotics, while 888(74%) obtained antibiotics from pharmacies and drug stores without any prescription required (Mohanna, 2010).

Another current study about Antimicrobial Resistance of Urinary Tract Infections, Sana'a- Yemen in 2015 found Gram-negative bacteria constitute 73% of UTI and found to be highly resistance to Nalidixic acid (70%), Co-trimoxazole (64%), and Piperacillin (62%). Gram-positive bacteria that constitutes 27 % found to be highly resistant to Co-trimoxazole (81%), Norfoxacin (69%) and Amoxicillin (67%). E. coli was the most common pathogen (42%), followed by co-agulase negative Staphylococci (10%) and Klebsiella (8%). While E. coli found to be resistant to Co-trimoxazole (66%) and Nalidixic acid (71%), Klebsiella was resistant to Co-trimoxazole (88%) and Nalidixic acid (64%), and Coagulase Negative Staphylococci to Co-trimoxazole (88%) and Amoxicillin (75%) (Ghaleb *et al*., 2018). Moreover, Out of 32,528 TB patients diagnosed during 2014 -2016, 115 (4/1000) were DR-TB. The highest number was reported from Aden (40%) and lowest from Taiz 12%; 59% among males; and 67% among most productive years (24-45 years). Furthermore, 97% was among previously treated TB patients and 3% was positive for HIV. MDR-TB confirmed in 68% and Rifampicin Resistance (RR-TB) in 31%. The treatment success rate was 70% and death rates was 15%. Detection and enrollment rates were 27% and 80%. (Abdulmughni *et al*.,2018)

Several factors are associated with the increasing emergence and spread of MDR bacteria in Yemeni .It is evident that the unoptimized use of antibiotics is a major factor for AMR development as the overuse of antimicrobial agents from nosocomial patients was 80% , Lack of good administration, resources, maintenance of hospitals, well-trained healthcare workers, and surveillance of different diseases and support of biomedical research. The poor state of health undoubtedly aggravated the problem of antimicrobial resistance in the country.

Establishing monitoring systems based on routine testing of antimicrobial susceptibility and education of healthcare workers, pharmacists, and the community on the health risks associated with the problem and benefits of prudent use of antimicrobials are some of the steps that can be taken to tackle the problem in the future. Surveillance of antimicrobial consumption and use is desperately needed. Information from both surveillance programs will provide data required to direct policy on the cautious use of antimicrobials and to apprize and evaluate resistance

containment interventions at local and national levels. In addition, reducing the impact of hospital-acquired infection in our hospitals is urgently required. Such action will most likely reduce antimicrobial use in the hospital setting and may lead to a reduction in high rates of antimicrobial resistance reported from hospitals in Yemen. Programs dealing with control of nosocomial infections in the country should be strengthened and updated regularly. A major component of future policies for prevention and control of antimicrobial resistance in Yemen should be education of healthcare workers, pharmacists, students, and the general public.

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

Axis A: Awareness of AMR

A. Develop Awareness And Understanding Of Antimicrobial Resistance Through Effective Communication, Education, Behavior Changes, And Training among all relevant health and non-health sectors at all levels

A.1 .Organization of the responsibilities for the execution of the tasks

A.1.1 Nominate a focal person in charge of following up the activities of the objectives of this axis

A.1.2 Choose the members of the Awareness Technical Working Group (TWG)(Radio/TV Media, Social media expert, Technical, Pharmacist, ID, Microbiologist, Veterinarian, Agriculture, MOH representative, WHO) and nominate them

A.1.3 Put the terms of reference(TOR) of this TWG according to NAP

A.1.4 Slogan for AMR establishment

A.2. Improving AMR awareness among professionals in different fields (e.g. physicians, pharmacists, dentists, healthcare workers, veterinarians, farmers, ecologists, and media specialists) through CME, AMR periodic informational SMS, lectures, etc. offered by Orders/Syndicates, addition to creating an AMR webpage as part of the official websites of MOH and MOA;

A.2.1 Raising AMR awareness through syndicates, orders and scientific societies (CME, AMR periodic informational SMS, etc.)

A.2.1.1 **Diseases Control And Surveillance program** (DC&S) scheduled lectures in national conferences of the medical, laboratories

,pharmaceutical ,nursing, veterinary, agricultural and environmental fields across Yemen

A.2.1.2 Ask syndicates/orders (human and animal health and agriculture) that for CME credits to be given for any lecture involving ABX use, at least 2-3 slides should be put to increase awareness about AMR and the ways to prevent it including antimicrobial use

A.2.1.3 Ask orders of pharmacists, veterinarians, physicians, and dentists to send monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News.

A.2.1.4 Workshops on AMR awareness to media professionals

A.2.1.5 Do one workshop per governorate per year to laboratories, veterinarians and agriculture specialist (Train the trainer)$$$ Workshops on AMR awareness to media professionals

A.2.2 Raising AMR awareness through Internet

A.2.2.1 Create a webpage for AMR on the official websites of MOH and MOA

A.2.2.2 Use existing webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)

A.3-Preparation of broadcasting AMR awareness material to be diffused through the traditional media (radio and television) and social media (Facebook, Twitter, Instagram)

A.3.1 Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness

A.4. Raising and improving public awareness on AMR through periodic year-long advertisement and concentrated advertisement in and around the Global AMR Week in November using traditional media (radio, TV spots, interviews, talk shows), advertisement on social media networks and sending SMS periodically through national telecommunication companies;

A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisement

A.4.2 AMR to be periodically discussed in highly watched talk shows

A.4.3 Public figure(s) associated with AMR

A.4.4 Politician(s) involved in AMR week

A.4.5 SMS through national telecommunication companies sent four times per year and during the global AMR awareness

A.5 Raising/Improving AMR awareness in education curricula on the national leve guideline)$$$

A.5.1 Sensitization about AMR awareness and hygiene in education curricula nationwide (e.g School Curricula)

A.5.1.1 Prepare a checklist including basic information about AMR that should be curricula about AMR and hygiene in school

A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available..etc

A.5.2 Inclusion of AMR awareness modules in curricula of human health- related specialties in different levels in higher education programs depending on the major/specialty (medicine, laboratories ,dentistry, pharmacy, nursing, veterinary medicine, food chemistry/safety, agriculture, etc

A.5.2.1 Prepare checklists for **University Curricula** of these specialties each one separately Include AMR education Include AMR education

A.5.2.2 Check curricula of health specialties to include information on AMR

A.5.3 Inclusion of AMR awareness modules in curricula of Veterinary school

A.5.3.1 Prepare a checklist for the needed information on AMR for veterinary school curricula

A.5.3.2 Fill the gap in AMR information in veterinary school curricula

A.5.4. Inclusion of AMR awareness modules in curricula of agriculture school

A.5.4.1 Checklist for the needed information on AMR for agriculture school curricula

A.5.4.2 Fill the gap in AMR information in agriculture school curricula

A.6. Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness activities $$$$)

A.6.1 MOH and MOA should advise pharmaceutical companies (Human and Veterinary) to include in every presentation related to antimicrobial use at least 3 slides (5%) concerning AMR (Send one letter from each ministry)

A.6.2 Seek private funding from Pharmaceutical companies for awareness activities targeting public and professionals

A.6.2.1 Meeting with CEO s of main Pharmaceutical companies and working group and present the highlights of the AMR plan in general, awareness specifically and put plan of contribution to awareness activities

Axis B: Surveillance of AMR

B. Strengthen the knowledge evidence base through surveillance and Research

B.1 Organization of the responsibilities for the execution of the tasks

B.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis

B.1.1.1. Empower ESU director as focal person

B.1.2 Appointment of the members of the technical working group along with its TOR

B.2.Pursing reporting AMR data to the Global Antimicrobial Resistance Surveillance System (GLASS) thus optimizing AMR surveillance in humans through:

B.2.1Mapping of laboratories that can potentially provide microbiologically reliable and epidemiologically representative data. These labs start reporting their data to the (GLASS).

B.2.1.1Make a list of laboratories that will ultimately form an epidemiologic representation of the country and that will be sequentially entered into GLASS after capacity building

B.2.2.**Put a plan for capacity building for the labs that are chosen to be included in GLASS report in order to be epidemiologically representative based on an incremental plan**

B.2.2.1

Organize a nationwide workshop about GLASS and the plan of inclusion in GLASS and introduction to WHONE

B.2.2.2-Evaluate the quality of work in the selected laboratories and Standardizing laboratory work guidelines **(visit)**,

-Check 12 laboratories per year,

-Select the ones that can immediately report to GLASS,

-Put a plan for **4 laboratories** that will undergo improvement in their capacity during coming year, then repeat the same the following year, then the following years

B.2.2.3 Do a start up WHONET training workshops for the 12 laboratories that were chosen for the coming 2 years every 2 years

B.2.2.4 Do 6 laboratory visits for capacity building/year for 12 laboratories in different areas for building capacity and WHONET training

B.2.2.5 Do External Quality Control twice per year for the 12 laboratories chosen for the 2 years, then to add the ones the following 2 years, after the 2nd year

B.2.3 Data Entry in GLASS

B.2.3.1.Data collection from mature laboratories

B.2.3.2 Data cleaning and entry into GLASS

B.3. Periodic issuing of an epidemiologically representative national AMR surveillance report with stratification of data according to local needs of scientists, physicians, pharmacists, and researchers (e.g. blood stream infections data, community-acquired resistance, hospital-acquired AMR, healthcare-associated AMR, etc.), in addition to posting this report on AMR webpages (MOH and MOA websites).

B.3.1-This report is based on WHONET data, according to local needs of physicians, pharmacists and researchers (stratification of data based on the type of priority organisms, site/region of infection or acquisition, etc.)-This report is posted on AMR webpages (MOH and MOA websites)

B.4. Optimize AMR surveillance in the agricultural, food, veterinary, and environmental fields

B.4.1 Research project about AMR surveillance in the veterinary field

B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).

B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields

B.4.4 - Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Tripoli for the analysis of surveillance specimens in agricultural, food, veterinary, and environmental fields

- Suggestion of a plan of the microbiology work in this surveillance

B.4.5 - Report results of ABX use and resistance surveillance in agriculture and veterinary world

- Send a yearly report with recommendations to the animal drug registry about ABX purchasing in the country during the coming 2 years

B.4.5 -Report results of ABX use and resistance surveillance in agriculture and veterinary world

Send a yearly report with recommendations to the animal drug registry about ABX purchasing in the country during the coming 2years.

B.5 Create/Appoint AMR reference lab(s)

B.5.1 Define TOR of AMR reference lab

B.5.2 Map potential lab(s) across Yemen

B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr-----

B.5.4 Nominate the reference lab(s)

B.5.5 MOH to sign a contract with the lab(s)

B.6 Enhance research activities in AMR surveillance

B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobials

B.6.2 Build a platform for researchers to communicate expertise and subjects

B.6.3 A yearly or twice yearly meeting of AMR local researchers

B.6.4 Organize fund raising for AMR research

B.6.4 Provide help for writing proposals to bring national research funds for AMR

Axis C

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

C.1 Organization of the responsibilities for the execution of the tasks

C.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis

C.1.2 Appointment of the members of the technical group along with its TOR

C.2 Optimize IPC practices in (Hospitals, LTCFs and PHCC)

C.2.1 Improve IPC practices in Hospitals

C.2.1.1 To establish national IPC **guidelines**; guidelines to be all-inclusive including requirements and qualifications of IPC officer and physician and **checklist**

C.2.1.2 Inclusion of the checklist of the guidelines in accreditation standards

C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation

C.2.1.4 Syndicate of hospitals recommends periodic IPC **training** and **workshops** to employees hosted by scientific societies, universities, etc

C.2.2 Improve IPC practices in hospitals

C.2.2.1 **To review and update guidelines of IPC in long- term care facilities that are** available in Ministry of Social Affairs

C.2.2.2 Inclusion of IPC checklist in the MOH **licensing** criteria of these facilities**C.2.3 Improve IPC practices in HCC**

C.2.3 Improve IPC practices in HCC

C.2.3.1 Establish guidelines on IPC in the PHCC

C.2.3.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities

C.3 Enhance basic IPC education different majors

C.3.1 Include IPC-related educational modules in human-health related majors (physicians, nurses, LAB, midwives, physiotherapists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)

- Basic IPC practices, including standard isolation precautions, hand hygiene, etc.
- Make it mandatory and uniform in hospitals, LTCF, PHCC, (at differential level among employees).
- Make IPC training available in healthcare facilities, scientific societies, universities, etc.

C.3.2 Include IPC-related educational modules in **veterinary schools curricula**

C.3.2.1 Check the current situation of IPC in the ongoing veterinary curriculum

C.3.2.2 Review of IPC in regional and global veterinary curricula

C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement, if need be

C.3.3 IPC-related educational modules in curricula of three schools (Agriculture, Nutrition, Environment)

C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)

C.3.3.2 Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them

C.3.3.3 Include the recommended tricyclic AMR and IPC in curricula when not available

C.4 Providing Advanced IPC training for IPC professionals

C.4.1

-Put TOR for IPC professionals in different healthcare facilities.

-Put prerequisite training/experience of IPC physicians, officers, and nurses

C.4.1.1 Include in the national IPC Guidelines the TOR of the professionals

C.4.2 Make training available and affordable in universities and professional societies

C.4.2.1 MOH Sends letters to Ministry of Higher Education and to Order of physicians explaining the need and recommending training specialization opportunities and courses related to IPC

C.5 Establishing national key performance indicators (process indicators) in IPC through

C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process

C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, etc)

C.6 Evaluation/Surveillance of nosocomial infection in hospitals rates:

C.6.1 Conduct a point prevalence study on nosocomial infections in Yemen hospitals study in for the surveillance of nosocomial infections, based on the WHO project of global point prevalence surveys

C.7.1 Review the OIE biosafety recommendations in the veterinary

C.7.2 Check the availability in of these recommendations in local veterinary laws
C.7.3 Monitor the application of these laws
C.7.3.1 MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world

Axis D: Antibiotic use

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

D.1 Organization of the responsibilities for the execution of the tasks

D.1.1 Appointment of focal person n charge of following up the activities of the objectives of this axis
D.1.2 Appointment of the members of the technical working group along with its TOR

D.2 Improve ABX quality control

D.2.1 To support and include ABX as priority drugs in the pharmacovigilance project of the Yemeni University and the adverse drug event reporting program of the
Order of Pharmacists

D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans

D.3.1 Define CIAM by Putting a list of Clinically Important Antimicrobial Molecules (CIAM).
D.3.1.1 Literature search
D.3.1.2 Formulate the list of CIAM

D.4 Undergoing sentinel surveillance of ABX consumption in a network of hospitals and benchmark it with international data

D.4.1 Workshops on metrics for ABX use measurement
D.4.2. Compilation of data from hospitals
D.4.2.1 Determine the epidemiologically representative sample of hospitals for surveillance of ABX
D.4.2.2
-Validate the measurement of hospital consumption by DDD/1000 patient days in a batch of 4 hospitals per year
-Include the hospitals with adequate measurements in a sequential manner into the surveillance list and data
-Advice to hospitals that don't have adequate data
D.4.2.3 Surveillance of ABX use in Yemeni hospitals by auto reporting DDDs

D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs

D.5 Prepare hospitals and build their capacity for basic Antimicrobial training stewardship

D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to standardize the strategies of ABX use based on local epidemiology

D.5.2.1 Put a list of essential guidelines

D.5.2.2 Prepare the missing guidelines

D.5.2.3 Prepare and follow a schedule for the presentation of the guidelines in the respective scientific societies meeting and for the endorsement these guidelines with the respective societies

D.5.2.4. Post these guidelines on the AMR/AMS website

D.5.3 Inclusion of AMS programs among hospital accreditation standards

D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals

D.5.5 Development of AMS webpage in the MOH website

D.6. Organize the dispensing of antimicrobials in the community pharmacies

D.6.1Nominate a task group for the meeting between MOH including Dr. ------ and the Order of pharmacists

D.6.2 Meeting between a high-authority-level task force and the President of the Order of Pharmacists to agree over a plan to restrict dispensing of ABX

D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors

D.7.1 Banning importation and use of CIAM in the veterinary field Establishing Antimicrobial Stewardship (AMS) Programs in hospitals through

D.7.1.1 The CIAM list will be sent to the minister to ban their importation for veterinary use

D.7.1.2 The veterinary drug office will not import these agents

D.7.1.3 Restricting ABX dispensing in community pharmacies After Meeting between a high-authority-level task force and the President of the Order of Pharmacists to agree over a plan on this issue

D.7.2 Check if CIAM are used in agriculture and environment

D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture.
-Check if CIAM are included in this list

D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel

D.7.2.3 Get results of ABX residues in food items being done in Yemen

D.7.3 Surveillance of importation of regularly used ABX to Yemen

D.7.3.1 Form a registry of imported ABX in veterinary world

D.7.4 Research study about ABX consumption

D.7 4.1 Research project by one of Masters Student at Sana'a University (SU)

D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)

D.7.5 Research study about unofficial importation of ABX to Yemen

D.7.5 .1 Research project in Agriculture school

Axis E: Budget planning and fund attraction

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

E.0 Organization of the responsibilities for the execution of the tasks

E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis

E.0.2 Nominate members of the technical working group

E.1 AMR budget planning

E.1.1 Budget for each **activity** of the plan has been studied

E.1.1.1 Budget for every **sub- activity** is put in the NAP

E.1.2. Overall budget of the plan has been assessed

E.1.2.1 Meeting between Dr. Dr. - WHO and Dr. MOH finalize the budget

E.2 Looking for sources of funding for NAP

E.2.1 Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP

E.2.1.1 Financing from WHO discussed

E.2.1.2 Financing from MOH discussed

E.2.1.3 Financing from MOA discussed

E.2.1.4 Financing from NGO (FAO, Foundation Merieux) discussed

E.2.2 Look for other funding sources (agencies or bodies or countries)

E.2.2.1 Allocate a professional that will prepare proposals for funding

E.2.2.2 The allocated professional prepares the general proposal

E.2.2.3 Allocate a specialized person to do mapping of funders

E.2.2.4 Send proposals to agencies or organizations that are potential funders

E.2.3 Include private organizations interested in AMR into the NAP

E.2.3.1 Mapping of private organizations interested in AMR

E.2.3.2 Present collaboration proposals to these organizations

E.3 Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and Bio repositories as sources of new antimicrobial molecules

E.3.1 Mapping of international organizations/countries for potential collaboration in the investigation of natural sources of biodiversity and bio- repositories as sources of new antimicrobial molecules

E.3.1.1 Nominate the person who will be in charge of doing this mapping and having a list of these organizations

E.3.1.2 Do the mapping plus list

E.3.1.3 Approach these organizations through showing them the achieved research in Yemen as well as potential for benefit sharing with these organizations

E.3.2 Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules

E.3.2.1 Communication with WHO/MOH to organize a yearly meeting where researchers in Yemen expose and discuss their studies in the field of biodiversity for alternatives to ABX

E.3.2.2 Create a section of AMR Website where local studies, posters, articles, projects in biodiversity are posted

E.4 Establishing communication with public and private sector for collaboration to NAP

E.4.1 Establish a network of researchers in public and private sectors

E.4.1.1 DC&S to host yearly workshop for researchers to discuss AMR research

E.4.2 Mapping of potential private partners to encou rage research

E.4.2.1 Nominate the person who will do the mapping

E.4.2.2 Produce a list of potential partners

E.4.3 Establish communication and collaboration with private partners

E.4.3.1Preparation of specific proposals for collaboration with specific partners

E.4.3.2 Establish communication and collaboration with these private partners

The plan for economic sustainability will replace mainly by a plan for budget preparation and preparation of the ground for fund raising for the execution of the NAP.

Budget Allocation:

- Calculation of the budget for the whole plan.
- Identify funding gaps.
- Put a strategic plan to attract funds into the NAP

The activities of different axes should be executed within the coming 5 years (2020 to 2024. One cannot deny the influence of the **political instability** in the country that might hinder the execution of the plan . AMR action plan underscores the need for effective "one health" approach involving coordination among numerous international sectors and actors, including human and veterinary medicine, agriculture, finance, environment, and well-informed consumers 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 such as WHO are major contributors to the hoped success of this NAP.

7.Yemen Strategic plan (2022 to 2026) --

Strategic plan

8. Axis A: Awareness of AMR

Global action plan strategic Objective (1) Develop awareness and understanding of antimicrobial resistance through effective communication, education, behavior changes, and training		
Potential measures of effectiveness: Extent of reduction in national human consumption of antibiotics (with allowance for the need for improved access in some settings), and reduction in the volume of antibiotic use in food production		
Strategic Objective 1 interventions	**Activity / Sub-activity**	**Milestone / Date**
A.1 Organization of the responsibilities for the execution of the tasks	A.1.1 Nominate a focal person in charge of following up the activities of the objectives **of this axis** A.1.2 Choose the members of the Awareness **Technical Working Group** (**TWG**)(Radio/TV Media, Social media expert, Technical, Pharmacist, Infectious Diseases physicians, dentists ecologists, Microbiologist, Veterinarian, Agriculture, MOH and WHO representative) A.1.3 Put the terms of reference(**TOR**) of this **TWG** according to NAP A.1.4 Slogan for AMR establishment	A.1.1 2022 time "zero" A.1.2 time "zero" A.1.3 three months from time "zero" A.1.4 three months from time "zero
A.2 Improving national AMR awareness among professionals from different sectors	A.2.1 Raising AMR awareness through syndicates, orders and **scientific societies (CME, AMR periodic informational SMS, etc.)** A.2.1.1 DC&S scheduled **Lectures** in national conferences of the medical, laboratories ,pharmaceutical ,nursing, veterinary, agricultural and environmental fields across Yemen A.2.1.2 Ask syndicates/orders (human and animal health and agriculture) that for CME credits to be given for any lecture involving ABX use, at least 2-3 slides should be put to increase awareness about AMR and the ways to prevent it including antimicrobial use. A.2.1.3 Ask orders of pharmacists, veterinarians, physicians, and dentists to send monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News A.2.1.4 Workshops on AMR awareness to media professionals	A.2 5 years **(2022-2026)** A.2.1.1 Three months from time "zero" A.2.1.2 Six months from time "zero 2022-2025 A.2.1.3 36 months from time zero A.2.1.4 2022-2025 Beginning of November each year over 5 years

Strategic Objective 1 interventions	Activity / Sub-activity	Milestone / Date
A.2 Improving national AMR awareness among professionals from different sectors	A.2.1.5 Do one workshop per governorate per year to laboratories, veterinarians and agriculture specialists (Train the trainer)	A.2.1.5 Six months from time zero
	A.2.2 Raising AMR awareness through Internet A.2.2.1 Create a webpage for AMR on the official websites of MOH and MOA A.2.2.2 Use existing webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)	A.2.2.1 Three months from time "zero" A.2.2.2 One year from time zero
A.3 Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness	A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/Social media spots	A.3 Six months from time zero A.3.1 Six months from time zero
A.4 Raising and improving public awareness using traditional media, social media and telecommunication companies	A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisement. A.4.2 AMR to be periodically discussed in highly watched talk shows A.4.3 Public figure(s) associated with AMR A.4.4 Politician(s) involved in AMR A.4.5 SMS through national telecommunication companies sent four times per year and during the global AMR awareness week	A.4 Two years from time zero A.4.1 Six months from time zero A.4.2 One year from time zero A.4.3 One year from time zero A.4.Two years from time zero A.4.5 Starting end of first year from time zero
A.5 Raising/Improving AMR awareness in education curricula on the national level (guideline)	A.5.1 Sensitization about AMR and hygiene in school curricula A.5.1.1 Prepare a checklist including basic information about AMR that should be included in school curricula A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available	A.5 9 months from time zero \A.5.1.1 Start 3 months from time zero,Ready at end of first year from time zero A.5.1.2 Start three months from time zero Ready at 6 months from time zero

Strategic Objective 1 interventions	Activity / Sub-activity	Milestone / Date
	A.5.2 Inclusion of AMR awareness modules in curricula of human health- related specialties (medicine, dentistry, pharmacy, nursing A.5.2.1 Prepare checklists for **university curricula** of these specialties each one separately A.5.2.2 Check curricula of **health specialties** to include information on AMR Include AMR education	A.5.2.1 & A.5.2.2 **2022** Start 3 months from time zero Finalized 9 months from time zero
	A.5.3 Inclusion of AMR awareness modules in curricula of veterinary school A.5.3.1 Prepare a checklist for the needed information on AMR for veterinary school curricula	A.5.3.1 **2022** Three months from time zero
	A.5.3.2 Fill the gap in AMR information in veterinary school curricula	A.5.3.2 **2022** Six months from time zero
	A.5.4.1. Inclusion of AMR awareness modules in curricula of agriculture school A.5.4.2Checklist for the needed information on AMR for agriculture school curricula A.5.4.2 Fill the gap in AMR information in agriculture school curricula	A.5.4.1**&** A.5.4.2 **2022** Six months from time zero \
A.6 Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness activities$$$$	A.6.1 MOH and MOA should advise pharmaceutical companies (Human and Veterinary) to include in every presentation related to antimicrobial use at least 3 slides (5%) concerning AMR (Send one letter from each ministry) A.6.2 Seek private funding from Pharmaceutical companies for awareness activities targeting public and professionals A.6.2.1 Meeting with CEO s of main Pharmaceutical companies and working group and present the highlights of the AMR plan in general, awareness specifically and put plan of contribution to awareness activities	A.6 **2022**1 year A.6.1 Starting end of first year from time zero A.6.2 **2022** 6 months

8.1. Operational plan and budget for axis A

Objective-1	Activity /Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.1 Organization of the **responsibilities** for the execution of the tasks	A.1.1 Nominate a focal person in charge of following up the activities of the objectives of this axis	A.1.1 Letter of appointment	A.1.1 One	A.1.1 time "zero"	A.1.1 MOH	A.1.1 -WHO- National Professional Officer (Dr. ----- -MOH- General Director (Dr. -------)	A.1.1 0.25 time employee (Secretarial functions) USD (incentive)	A.1.1 **MOH/WHO**	A.1.1 Focal person nominated (---------)
	A.1.2 Choose the members of the Awareness TWG (Radio/TV Media, Social media expert, Technical, Pharmacist, Infectious Diseases , **Microbiologist, Veterinarian**, Agriculture , MOH **representative** WHO) and nominate them	A.1.2 -One focal person -One technical group **Suggestions:** -Focal person: (Dr. -----) -TWG members: Dr. ---, Dr. ---, Dr.- Dr .---Dr. --- Dr. ---- Dr-----, WHO technical pers	A.1.2 -One focal person -One technical group	A.1.2 time "zero "	A.1.2 MOH WHO	A.1.2 -WHO- National Professional Officer (Dr. ------) -MOH- General Director (Dr. -----)	A.1.2 USD (incentive)	A.1.2 **MOH/WHO**	A.1.2 Technical group formed and posted on AMR website.

Objective-1	Activity /Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.1 Organization of the **responsibilities** for the execution of the tasks	A.1.3 Put the terms of TOR of this technical group according to NAP	A.1.3 Document	A.1.3 One	A.1.3 two months from time "zero"	A.1.3 -MOH -WHO -MOA	A.1.3 **-Focal person** -WHO-National Professional Officer (Dr------)	A.1.3 USD	A.1.3 WHO	A.1.3 TOR of technical group posted on website
	A.1.4 Slogan for AMR	A.1.4 Awareness technical working group (PAC)	A.1.4 One	A.1.4 three months from time "zero	A.1.4 -MOH -WHO	A.1.4 Awareness technical working group	A.1.4 USD	A.1.4 WHO	A.1.4 Slogan is posted on AMR website

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.2 Improving AMR awareness among professionals from different sectors	A.2.1 Raising AMR awareness through syndicates, orders and scientific societies (CME, AMR periodic Informational SMS, etc.) A.2.1.1 **DC&S**, University OF medicine scheduled lectures in national conferences of the medical, pharmaceut ical, nursing, veterinary, agricultural and environmen tal fields across Yemen	A.2.1.1 Schedule	A.2.1.1 One	A.2.1.1 two months from time "zero"	A.2.1.1 - **DC&S**, -MOH -WHO -MOA	A.2.1.1 -**DC&S**, president (Dr.-----) -Awareness technical working group	A.2.1.1 USD	A.2.1.1 WHO	A.2.1.1 Official schedule from **DC&S**,
	A.2.1.2 Ask syndicates/ orders (human and animal health and agriculture) that for CME credits to be given for any lecture involving ABX use, at least 2-3 slides should be put to increase awareness about AMR and the ways to prevent it including antimicrobial use.	A.2.1.2 Letters to syndicates/ orders	A.2.1.2 depending on number of syndicates/ orders	A.2.1.2 Six months from time "zero"	A.2.1.2 Order of physicians	A.2.1.2 - Focal person -DC&S president (Dr.) - President of the Order of physicians endorsed by the IHR technical committee	A.2.1.2 USD	A.2.1.2 WHO	A.2.1.2 Percentage of lectures involving ABX that contain the message in 2-3 slides

DC&S(Diseases Control &Surveillance)IN MOH

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.2 Improving AMR awareness among professionals from different sectors	A.2.1.3 Ask orders of pharmacists **Veterinarians,** physicians, and dentists to send monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News	A.2.1.3 Letters to orders from MOH/MOA to send SMS to health professionals	A.2.1.3 three	A.2.1.3 36 months from time zero	A.2.1.3 -Order of pharmacists -MOA	A.2.1.3 Focal person endorsed by a national multisectoral group	A.2.1.3 USD$	A.2.1.3 WHO / MOH	A.2.1.3 -Percentage compliance to this request of sending monthly SMS to health professiona ls. -Number of months where SMS were sent from each order/total number of months audited
	A.2.1.4 Workshops on AMR awareness to media professionals	A.2.1.4 Workshops	A.2.1.4 Once/ year 5/5 years	A.2.1.4 Beginning of November each year over 5 years	A.2.1.4 Hotel	A.2.1.4 -Focal person -MOH-Director of Public Relations & Health Education Dpts (DR--.---) -MOH-Public Health Officer (Ms. -----)	A.2.1.4 USD/year	A.2.1.4 AMR Fund WHO UNSAFE	A.2.1.4 Percentage of target media personnel whom attend these workshops.

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
	A.2.1.5 Do one workshop Per governorate per year to veterinarians and agriculture specialists(Train the trainer)	A.2.1.5 Workshops	A.2.1.5 12 per year	A.2.1.5 Six months from time zero	A.2.1.5 MOA	A.2.1.5 -MOA- Head of Animal Health Service (Dr. ----) -MOA- Head of Poultry Husbandry Dpt (Eng	A.2.1.5 USD per year TOTAL: USDX12X5 = USD $$	A.2.1.5 -AMR Fund/WHO -MOA	A.2.1.5 Number of workshops per governorate per year
	A.2.2 Raising AMR awareness through Internet A.2.2.1 Create a webpage for AMR on the official websites of MOH and MOA	A.2.2.1 AMR blog present on websites of MOH and MOA	A.2.2.1 One	A.2.2.1 Three months from time "zero"	A.2.2.1 -MOH -MOA	A.2.2.1 -Focal Person -MOH- Director of Public Relations & Health Education Dpts (Dr. -----) -MOH- Head of DC&S Dpts (Dr. -- -MOH-IT specialist	A.2.2.1 USD -WHO MOH	A.2.2.1 AMR fund	A.2.2.1 AMR section is put on MOH/ MOA websites

(MOA) Ministry Of Agriculture

Objective-1	Activity / Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
	A.2.2.2 Use existing Webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter,Instagram)	A.2.2.2 Webpages	A.2.2.2 Four	A.2.2.2 One year from time zero	A.2.2.2 MOH	A.2.2.2 -Webpage designer Out sourcing call for citations at WHO -MOH- National E-Health Program Director (Mrs. ---)	A.2.2.2 USD	A.2.2.2 WHO	A.2.2.2 Webpages available
A.3 Involving traditional (TV, radio) media and social media(Facebook, Instagram) in raising AMR awareness	A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/ Social media spots	A.3.1 Broadcasting material for Radio/TV/ Social media spots	A.3.1 One set of material	A.3.1 Six months from time zero	A.3.1 WHO	A.3.1 All broadcasting messages will be prepared and supported by WHO	A.3.1 USD	A.3.1 WHO	A.3.1 Broadcasting material available, they are tricyclic

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.4 Raising and improving public awareness using traditional media, social media and tele-commu nication companies	A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisem ent.	A.4.1 Schedule	A.4.1 One	A.4.1 Six months from time zero	A.4.1 MOH	A.4.1 - MOH- Director of Public Relations & Health Education Dpts (Dr. ---)	A.4.1 USD per year TOTAL: USD	A.4.1 WHO	A.4.1 Schedules put and spots
	A.4.2 AMR to be periodically discussed in highly watched talk shows	A.4.2 Talk shows	A.4.2 Multiple	A.4.2 One year from time zero	A.4.2 MOH	A.4.2 -Focal person -AMR Committee members.	A.4.2 USD	A.4.2 WHO	A.4.2 Number of talk shows that discuss AMR per trimester
	A.4.3 Public figure(s) associated with AMR	A.4.3 Person	A.4.3 One or more	A.4.3 One year from time zero	A.4.3 MOH MOA	A.4.3 -DC&S president (Dr. ---) MOH- -Director of Public Relations & Health Education Dpts (Dr. --	A.4.3 USD	A.4.3 WHO	A.4.3 Number of appearances in media/ public to discuss the subject

Objective -1	Activity / Sub-activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.4 Raising and improving public awareness using traditional media, social media and tele-commu nication companies	A.4.4 Politician(s) involved in AMR	A.4.4 Politicians public statements on **TV, radio or social media**	A.4.4 Three from three different political sides	A.4.4 Two years from time zero	A.4.4 TV, Radio, social media	A.4.4 -Focal person -MOH -WHO	A.4.4 USD	A.4.4 WHO	A.4.4 Number of appearance s in media/publ ic to discuss the subject
	A.4.5 SMS through national telecommu nication companies sent **four times per year** and during the global AMR awareness week	A.4.5 SMS	A.4.5 four per year	A.4.5 Starting end of first year from time zero	A.4.5 -National telecommu nication -MOH -MOA	A.4.5 -MOH -Ministry of Communic ation -MOH-General Director (Dr. ---)	A.4.5 USD /year Total USD	A.4.5 -MOH/ -Ministry of Communic ation/ MOA -WHO	A.4.5 SMS sent
A.5 Raising/ Improving AMR awareness in education curricula on the national level	A.5.1 Sensitization about AMR and hygiene in School curricula A.5.1.1 Prepare a checklist guidelines Including basic Information about AMR that should be included in school curricula	A.5.1.1 Documents Basic for schools (Based on One Health /E-health)	A.5.1.1 One	A.5.1.1 Start 3 months from time zero, Ready at end of first year from time zero	A.5.1.1 -Ministry of education -MOA -MOH	A.5.1.1 -Focal person-WHO-National Professional Officer (Dr. ---) -MOA-Head of Poultry Husbandry Dpt (Eng. -Private sector, WHO consultant (Dr. ---)	A.5.1.1 USD	A.5.1.1 Ministry of education/ WHO	A.5.1 Percentage of school curricula that include the message

CERD: Center for Educational Research and Development

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.5 Raising/ Improving AMR awareness in education curricula on the national level	A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available	A.5.1.2 Report and letter	A.5.1.2 Three	A.5.1.2 Start three months from time zero Ready at 6 months from time zero	A.5.1.2 -Ministry of education -MOA -MOH	A.5.1.2 -WHO- National Professional Officer (Dr. ----) Ms ---- (private sector -CERD	A.5.1.2 USD	A.5.1.2 WHO	
	A.5.2 Inclusion of AMR awareness modules in in curricula of human health- related specialties (medicine, NCPHLs dentistry, pharmacy, nursing) A.5.2.1 Prepare checklists for university curricula of these specialties each one separately	A.5.2.1 Checklists for different curricula of health specialties	A.5.2.1 Number of curricula of health specialties	A.5.2.1 Start 3 months from time zero Finalized 9 months from time zero	A.5.2.1 Universitie s WHO	A.5.2.1 Privae secto, WHO consultant, former DC&S president (Dr. --)	A.5.2.1 USD	A.5.2.1 AMR fund WHO	A.5.2 Percentage of curricula of health specialties that include chapters about AMR/IPC according to checklist

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.5 Raising/ Improving AMR awareness in education curricula on the national level	A.5.2.2 Check curricula of health specialties to include information on AMR Include AMR tricyclic education	A.5.2.2 Report and detailed list of objectives that are to be included and are missing in each health curriculum	A.5.2.2 One	A.5.2.2 Start 3 months from time zero Finalized 9 months from time zero	A.5.2.2 Universities	A.5.2.2 Private sector, WHO consultant, former DC&S president (Dr. ----)	A.5.2.2 USD*10= USD	A.5.2.2 AMR fund WHO	
	A.5.3 Inclusion of AMR awareness modules in curricula of veterinary school A.5.3.1 Prepare a checklist for the needed information on AMR for veterinary school curricula	A.5.3.1 Checklist	A.5.3.1 One	A.5.3.1 Three months from time zero	A.5.3.1 MOA	A.8.1 -MOA- Head of Animal Health Service (Dr. B Bazzal)	A.5.3.1 USD	A.5.3.1 AMR fund WHO	A.5.3 Veterinary school curricula include chapters about AMR/IPC
	A.5.3.2 Fill the gap in AMR information in veterinary school curricula	A.5.3.2 Report to Yemeni University veterinary school	A.5.3.2 One	A.5.3.2 Six months from time zero	A.5.3.2 Veterinary School- Yemen University	A.5.3.2 -MOA- Head of Animal Health Service (Dr. ---)	A.5.3.2 USD	A.5.3.2 AMR fund WHO	

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.5 Raising/ Improving AMR awareness in education curricula on the national level	A.5.4 Inclusion of AMR awareness modules in curricula of agriculture school A.5.4.1 Checklist for the needed information on AMR for agriculture school curricula	A.5.4.1 Checklist	A.5.4.1 One	A.5.4.1 Six months from time zero	A.5.4.1 -MOA - Universit ies	A.5.4.1 MOA-Head of Poultry Husbandry Dpt (Eng. A Sirawan)	A.5.4.1 USD	A.5.4.1 AMR fund WHO	A.5.4.1 Agriculture school curricula include chapters about AMR/IPC
	A.5.4.2 Fill the gap in AMR information in agriculture school curricula	A.5.4.2 Letter from the Ministries of Health, Education and Agriculture toagricultur e schools	A.5.4.2 One	A.5.4.2 Six months from time zero	A.5.4.2 -MOA Universitie s	A.5.4. MOA-Head of Poultry Husbandry Dpt (Eng. ------)2	A.5.4.2 USD	A.5.4.2 AMR fund WHO	
A.6 Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness	A.6.1 MOH and MOA should advice pharmaceutical companies (Human& Veterinary) to include in every presentation related to antimicrobial use at least 3 slides (5%) concerning AMR(Send one letter from each ministry)	A.6.1 Letters to Ministries of Health and Agriculture	A.6.1 Four	A.6.1 Starting end of first year from time zero	A.6.1 MO H MO A	A.6.1 -MOH- Director of Public Relations & Health Education Dpts (Dr. -- -MOA- Head of Animal Health Service (Dr.) -MOA- Head of Poultry Husbandry Dpt (Eng.)	A.6.1 USD	A.6.1 MOH WHO	A.6.1 Percentage of pharmaceut ical companies presentatio ns that include the message about AMR

Objective-1	Activity / Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
A.6 Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness	A.6.2 Seek private funding from Pharmaceut ical companies for awareness activities targeting public and professiona ls A.6.2.1 Meeting with CEO s of main Pharmaceut ical companies and working group and present the highlights of the AMR plan in general, awareness specifically and put plan of contribution to awareness activities	A.6.2.1 Meeting	A.6.2.1 Three	A.6.2.1 6 months	A.6.2.1 MOH	A.6.2.1 Technical working group	A.6.2.1 USD	A.6.2.1 AMR Fund WHO	

8.2. Monitoring and evaluation plan for axis A

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.1 Organization of the responsibilities for the execution of the tasks	A.1.1 Nominate a focal person in charge of following up the activities of the objectives of this axis	A.1.1 Focal person nominated	A.1.1, A.1.2 Organize and follow up the tasks in the plan	A.1.1, A.1.2 Yes/No	A.1.1, A.1.2 Once/5 years	A.1.1, A.1.2 MOH WHO	A.1.1, A.1.2 Appointment	A.1.1, A.1.2 NA
	A.1.2 Choose the members of the technical working group (Radio/TV Media, Social media expert, Technical, Pharmacist, ID, Microbiologi st, Veterinarian, Agriculture, MOH representativ e, WHO) and nominate them	A.1.2 Awareness technical working group formed and posted on AMR website.						
	A.1.3 Put the terms of reference of Awareness technical working group according to NAP	A.1.3 TOR of technical working group posted on website	A.1.3 Specify its activities	A.1.3 Yes/No	A.1.3 Once/5 years	A.1.3 MOH WHO		
	A.1.4 Slogan for AMR	A.1.4 Slogan is posted on AMR website	A.1.4 not applicable	A.1.4 Yes/No	A.1.4 Once/5 years	A.1.4 MOH WHO	A.1.4 Slogan	A.1.4 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.2 Improving AMR awareness among professionals from different sectors	A.2.1 Raising AMR awareness through syndicates, orders and scientific societies (CME, AMR periodic informationa l SMS, etc.) A.2.1.1 DC&S scheduled lectures in national conferences of the medical pharmaceuti cal, nursing, veterinary, agricultural& environment al fields across Yemen	A.2.1.1 Official schedule from DC&S	A.2.1.1 Having the commitment from DC&S in giving these lectures.	A.2.1.1 Number of lectures given per governorate per year	A.2.1.1 every 6 months	A.2.1.1 DC&S	A.2.1.1 Document	A.2.1.1 No schedule available, talks concentrated in Yemen area, not to all professionals
	A.2.1.2 Ask syndicates/ orders (human and animal health and agriculture) that for CME credits to be given for any lecture involving ABX use, at least 2-3 slides should be put to increase awareness about AMR and the ways to prevent it including antimicrobial use. monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News	A.2.1.2 Percentage of lectures involving ABX that contain the message in 2-3 slides	A.2.1.2 Reminder of AMR in all ABX lectures.	A.2.1.2 Number of lectures with the message/ number of lectures audited*100	A.2.1.2 every year	A.2.1.2 NAP audit of lectures given	A.2.1.2 Audit	A.2.1.2 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.2 Improving AMR awareness among professionals from different sectors	A.2.1.3 Ask Orders of pharmacists, veterinarians, physicians, and dentists to send monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News.	A.2.1.3 -Percentage compliance to this request of Sending monthly SMS to health professionals -Number of months where SMS were sent from each Order/total number of months audited	A.2.1.3 Permanent reminding	A.2.1.3 Number of months where SMS were sent from each Order/total	A.2.1.3 every six months	A.2.1.3 Orders	A.2.1.3 Report from Orders	A.2.1.3 NA
	A.2.1.4 Workshops on AMR awareness to media professionals	A.2.1.4 Percentage of target media personnel whom attend these workshops.	A.2.1.4 Sensitize the media to propagate the message and gain their interest in bringing it up in their programs, sites, and newspapers	A.2.1.4 Number of attendees /number of target media personnel	A.2.1.4 Once per year	A.2.1.4 Awarene ss technical working group	A.2.1.4 Data collec tion	A.2.1.4 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.2 Improving AMR awareness among professionals from different sectors	A.2.1.5 Do one workshop per governorate per year to veterinarians and agriculture specialists (Train the trainer	A.2.1.5 Number of workshops per governorate per year	A.2.1.5 Raise post-graduate AMR awareness among professionals	A.2.1.5 Number of workshops per governorate per year	A.2.1.5 Once/year	A.2.1.5 MOA WHO	A.2.1.5 Workshop	A.2.1.5 NA
	A.2.2 Raising AMR awareness through Internet A.2.2.1 Create a webpage for AMR on the official websites of MOH andMOA	A.2.2.1 AMR section is put on MOH/MOA websites	A.2.2.1 Increase visibility	A.2.2.1 Yes/No	A.2.2.1 Once/5 years	A.2.2.1 MOH MOA	A.2.2.1 Section on website	A.2.2.1 NA
	A.2.2.2 Use existing webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)	A.2.2.2 Webpages available	A.2.2.2 Reach the young population and broaden the spectrum of people receiving the message	A.2.2.2 Yes/No Presence of webpages	A.2.2.2 Every three months	A.2.2.2 Awarene ss technical working group	A.2.2.2 Webpage	A.2.2.2 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.3 Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness	A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/Social media spots	A.3.1 Broadcasting material available,	A.3.1 Percentage of media type for which they are tricyclec	A.3.1 Yes/No For each type of media broadasting messages have been prepared	A.3.1 every three months	A.3.1 Awareness technical working group	A.3.1 Counting	A.3.1 Few TV spots available regarding human health, not tricyclic
A.4 Raising and improving public awareness using traditional media, social media and telecommuni cation companies	A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisements	A.4.1 Schedules put and spots	A.4.1 Emphasize the importance of the subject	A.4.1 Number of talk shows per 3 months that discuss AMR	A.4.1 every three months	A.4.1 Awareness technical working group	A.4.1 Schedule	A.4.1 Erratic, in few morning shows
	A.4.2 AMR to be periodically discussed in highly watched talk shows	A.4.2 Number of talk shows that discuss AMR per trimester	A.4.2 Reach more people	A.4.2 Number of activities per trimester per governorate	A.4.2 every three months over 5 years	A.4.2 Awareness technical working group	A.4.2 Talk show	A.4.2 NA
	A.4.3 Public figure(s) associated with AMR	A.4.3 Number of appearances in media/public to discuss the subject	A.4.3 Reach more people	A.4.3 Number of appearances	A.4.3 every three months over 5 years	A.4.3 Awareness technical working group	A.4.3 Statement	A.4.3 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.4 Raising and improving public awareness using traditional media, social media and telecommunication companies	A.4.4 Politician(s) involved in AMR	A.4.4 Number of appearances in media/ public to discuss the subject	A.4.4 Reach more people	A.4.4 Number of appearances	A.4.4 every three months over 5 years	A.4.4 Awareness technical working group	A.4.4 Statement	A.4.4 NA
	A.4.5 SMS through national telecommuni cation companies sent four times per year and during the global AMR awareness week	A.4.5 SMS sent	A.4.5 Reach more people	A.4.5 Number of messages sent	A.4.5 every three months over 5 years	A.4.5 Awareness technical working group	A.4.5 Message	A.4.5 NA
A.5 Raising/Improving AMR awareness in education curricula on the national level	A.5.1 Sensitization about AMR and hygiene in school curricula A.5.1.1 Prepare a checklist including basic information about AMR that should be included in school Curricula A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available		A.5.1 Percentage of school curricula that include the message	A.5.1 Include AMR-related information in school curricula	A.5.1 number of curricula that included the message/ total number of curricula * 100	A.5.1 Once/5 years	A.5.1 -Ministry of education -WHO	A.5.1 Checking and filling the gaps

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.5 Raising/Improving AMR awareness in education curricula on the national level	A.5.2 Inclusion of AMR awareness modules in in curricula of human health-related specialties (medicine, dentistry, pharmacy,nnursing) A.5.2.1 Prepare checklists for university curricula of these specialties each one separately A.5.2.2 Check curricula of health specialties to include information on AMR Include AMR tricyclic education	A.5.2 Percentage of curricula of health specialties that include chapters about AMR according to checklist	A.5.2 Include AMR modules in curricula of health sciences specialties	A.5.2 number of curricula that included the message/ total number of curricula * 100	A.5.2 Once/5 years	A.5.2 - Ministry of education -Universities -MOH -WHO	A.5.2 Checking and filling the gaps	A.5.2 Partially available
	A.5.3 Inclusion of AMR awareness modules in curricula of veterinary school A.5.3.1 Prepare a checklist for the needed information on AMR for veterinary school curricula A.5.3.2 Fill the gap in AMR information in veterinary school curricula	A.5.3 Veterinary school curricula include chapters about AMR	A.5.3 Include AMR modules in curricula of veterinary school	A.5.3 number of curricula that included the message	A.5.3 Once/5 years	A.5.3 -Ministry of education -Universities -WHO	A.5.3 Checking and filling the gaps	A.5.3 NA

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.5 Raising/Improving AMR awareness in education curricula on the national level	A.5.4 Inclusion of AMR awareness modules in curricula of agriculture school A.5.4.1 Checklist for the needed information on AMR for agriculture school Curricula A.5.4.2Fill the gap in AMR information in agriculture school curricula	A.5.4.1 Agriculture school curricula include chapters about AMR/IPC	A.5.4 Include AMR/IPC modules in curricula of agriculture school	A.5.4 number of curricula that included the message	A.5.4 Once/5 years	A.5.4 -Ministry of education -Universities -MOA -WHO	A.5.4 Checking and filling the gaps	A.5.4 NA
A.6 Involvement of pharmaceuticals companies in raising AMR awareness and provide finding for awareness activities	A.6.1 MOH and MOA should advice pharmaceutical companies (Human and Veterinary) to include in every presentation related to antimicrobial use at least 3 slides (5%) concerning AMR (Send one letter from each ministry)	A.6.1 Percentage of pharmaceuticals companies presentations that include the message about AMR	A.6.1 involving pharmaceuticals companies in raising AMR awareness among professionals in all health fields	A.6.1 number of presentations including message/ total number of presentations *100	A.6.1 Once/5 years	A.6.1 MOH MOA	A.6.1 Letter	A.6.1 Sporadic

Objective-1	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
A.6 Involvement of pharmaceuti cal companies in raising AMR awareness and provide finding for awareness activities	A.6.2 Seek private funding from Pharmaceutical companies for awareness activities targeting public and professionals A.6.2.1 Meeting with CEO s of main Pharmaceutical companies and working group and present the highlights of the AMR plan in general, awareness specifically and put plan of contribution to awareness activities	A.6.2.1 Percentage of pharmaceuti cal companies that promote antimicrobial s that are contributing into the budget of the awareness campaign	A.6.2.1 Involving pharmaceuti cal companies in raising AMR awareness among professionals in all health fields	A.6.2.1 Number of companies contributing to the project/total number of companies promoting ABX	A.6.2.1 Once or more/5 years	A.6.2.1 MOH MOA	A.6.2.1 Meeting(s)	A.6.2.1 NA

9.Axis B: Surveillance

Strategic Plan

ESU: Epidemiological Surveillance Unit

Global action plan Strategic Objective 2: Strengthen the knowledge evidence base through surveillance and Research			
Potential measure of effectiveness: extent of reduction in the prevalence of antimicrobial resistance, based on data collected through integrated programmes for surveillance of antimicrobial resistance in Yemen			
Strategic Objective interventions	**Activity**	**Sub-activity**	**Date /Milestone**
B.1 Organization of the responsibilities for the execution of the tasks	B.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis B.1.1.1 Empower **ESU** director as focal person		B.1.1.1 three months from time zero B.1 2022 three months from time zero
	B.1.2 Appointment of the members of the technical working group along with its TOR		B.1.2 three months from time zero 2022
B.2 Reporting of AMR data to GLASS thus optimizing AMR surveillance in humans through:	B.2.1 Mapping of labs that can potentially provide microbiologically reliable and epidemiologically representative data. These labs start reporting their data to the (GLASS). B.2.1.1 Make a list of laboratories that will ultimately form an epidemiologic representation of the country and that will be sequentially entered into GLASS after capacity building		B.2.1.1 Three months from time zero 2022 B.2 5 years 2022-**2026**
	B.2.2 Put a plan for capacity building for the labs that are chosen to be included in GLASS report in order to be epidemiologically representative based on an incremental plan B.2.2.1 Organize a nationwide **workshop** about GLASS and the plan of inclusion in GLASS and introduction to **WHONET**		B.2.2.1 Three months from time zero 2022

Strategic Objective interventions	Activity / Sub-activity	Date from operational plan	Milestone
B.2 Reporting of AMR data to GLASS thus optimizing AMR surveillance in humans through:	B.2.2.2 -Evaluate the quality of work in the selected laboratories (visit), -**Check 12 laboratories per year**, -Select the ones that can immediately report to GLASS, -Put a plan **for 4 laboratories** that will undergo improvement in their capacity during coming year, then repeat the same the following year, then the following years	B.2.2.2 End of first year from time zero: 5 laboratories Second year from time zero: 5 laboratories Each year 5 laboratories	2022
	B.2.2.3 Do a start up **WHONET** training for the 12 laboratories that were chosen for the coming 2 years every 2 years	B.2.2.3 Three months from time zero	
	B.2.2.4 **Do 6 laboratory** visits for capacity building/year for **12 laboratories** in different areas for building capacity and **WHONET** training	B.2.2.4 Three visits per lab each year for 6 laboratories starting year 1	2025-2026
	B.2.2.5 External Quality Control **twice per year** for the 12 laboratories chosen for the 2 years, then to add the ones of the following 2 years, after the 2nd year.	B.2.2.5 Six months from time zero 2022	
	B.2.3 Data Entry in GLASS B.2.3.1 Data collection from mature laboratories	B.2.3.1 Start end of 1st year from time zero 2022	
	B.2.3.2 Data cleaning and entry into GLASS	B.2.3.2 Start end of 1st year from time zero 2022	

Strategic Objective interventions	Activity / Sub-activity	Date /Milestone
B.3 Periodic issuing of an epidemiologically representative national AMR surveillance report in **humans**	B.3.1 -This report is based on **WHONET** data, according to local needs of physicians, pharmacists and researchers (stratification of data based on the type of priority organisms, site/region of infection or acquisition, etc.) -This report is posted on AMR webpages (MOH and MOA websites)	B.3.1 Once/year starting end of 1st year B.3 1 year
B.4 Optimize AMR surveillance in the **agricultural, foodveterinary**, and **environmental** fields	B.4.1 Research project about AMR surveillance in the veterinary field.	B.4.1 6 months from time zero B.4 2 years
	B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).	B.4.2 9 months from time zero
	B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields	B.4.3 6 months from time zero
	B.4.4 -Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Tripoli for the analysis of surveillance specimens in agricultural, food, veterinary, and environmental fields -Suggestion of a plan of the microbiology work in this surveillance	B.4.4 Six months from time zero and completed nine months from time zero
	B.4.5 -Report results of ABX use **and resistance surveillance** in **agriculture** and **veterinary** world -Send a yearly report with recommendations to the animal drug registry about ABX purchasing in the country during the coming 2 years	B.4.5 First report should be ready at end of year 2 from time zero

Strategic Objective interventions	Activity / Sub-activity	Date / Milestone
B.5 Create/Appoint AMR reference lab (s)	B.5.1 Define TOR of AMR reference lab	B.5 9 months from B.5.1 3 months from time zero time zero
	Map potential lab(s) across Yemen	Start at time zero Mapping finalized 3 months from time zero
	B.5.2 Map potential lab(s) across Yemen	B.5.2 Start at time zero Mapping finalized 3 months from time zero
	B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr-------	B.5.3 5 months from time zero
	B.5.4 Nominate the reference lab(s)	B.5.4 6 months from time zero
	B.5.5 MOH to sign a contract with the lab(s)	B.5.5 9 months from time zero
B.6 Enhance research activities in AMR surveillance	B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobials.	B.6 1.5 years from time zero B.6.1 1st agenda sent 1.5s year from time zero

9.1. Operational Plan budget for Axis B

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.1 Organization of the responsibilities for the execution of the tasks	B.1.1 Appointme nt of focal person n charge of following up the activities of the objectives of this axis B.1.1.1 Empower ESU director as focal person.	B.1.1.1 Appointmen t	B.1.1.1 One	B.1.1.1 three months from time zero	B.1.1.1 MOH ESU	B.1.1.1 -WHO- National Professiona l Officer (Dr. -MOH- General Director (Dr. ---)	B.1.1.1 ½ time extra employee for ESU USD	B.1.1.1 WHO	B.1.1.1 Focal person nominated
	B.1.2 Appointment of the members of the **Technical Working Group** along with its TOR	B.1.2 Appointmen t	B.1.2 One	B.1.2 three months from time zero	B.1.2 MOH ESU	B.1.2 -WHO- National Professiona l Officer (Dr. __ -MOH- General Director (Dr---)	B.1.2 ½ time extra employee for ESU USD	B.1.2 MOH	B.1.2 Technical working group assigned

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.2 Reporting of AMR data to GLASS	B.2.1 Mapping of labs that can potentially provide microbiologically reliable and epidemiologically representative data. These labs start reporting their data to the (GLASS). B.2.1.1Make a list of laboratories that will ultimately form an epidemiologic representation of the country and that will be sequentially entered into GLASSafter capacity building	B.2.1.1 List	B.2.1.1 One	B.2.1.1 Three months from time zero	B.2.1 MOH ESU	B.2.1.1 Focal person -	B.2.1.1 USD	B.2.1.1 WHO	B.2.1.1 List available to technical working group
	B.2.2 Put a plan for capacity building for the labs that are chosen to be included in GLASS report in order to be epidemiologically representative based on an incremental plan B.2.2.1 Organize a nationwide workshop about GLASS and the plan of inclusion in GLASS and introduction to WHONET repeat the same the following year, then the following years	B.2.2.1 Workshop	B.2.2.1 one every 5 years	B.2.2.1 Three months from time zero	B.2.2.1 WHO	B.2.2.1 -Technical working group -Focal Person	B.2.2.1 USD *5 = USD per workshop	B.2.2.1 AMR Fund WHO	B.2.2.1 Workshop given

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.2 Reporting of AMR data to GLASS	B.2.2.3 Do a start up WHONET training for the 12 laboratories that were chosen for the coming 2 years every 2 years	B.2.2.3 Workshop	B.2.2.3 One every two years	B.2.2.3 Three months from time zero	B.2.2.3 WHO	B.2.2.3 -Private sector, WHO consultant (Dr. ---) -Private sector (Dr. - Technician s	B.2.2.3 USD *2= USD/ year	B.2.2.3 AMR Fund WHO	B.2.2.3 Workshop is done
	B.2.2.4 Do 3 laboratory visits for capacity building/year for 12 laboratories in different areas for building capacity and WHONET Training workshop	B.2.2.4 Laboratory visits	B.2.2.4 Two visits per lab each year for 12 laboratories	B.2.2.4 starting year 1	B.2.2.4 The chosen laboratories	B.2.2.4 Technical working group	B.2.2.4 Two capacity building workshops per year 5 years: 10 workshop USD per workshop = USD	B.2.2.4 AMR Fund	B.2.2.4 Number of laboratories that are passing the external QC / Total external QC tests sent*100 USD

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.2 Reporting of AMR data to GLASS	B.2.2.5 External quality control twice per year for the 12 laboratories chosen for the 2 years, then to add the ones of the following 2 years, after the 2nd year.	B.2.2.5 Send the quality control specimens and collect them	B.2.2.5 Years 1 &2 = 50sample /year *4 years 120 samples	B.2.2.5 Six months from time zero	B.2.2.5 Reference laboratory (ies)	B.2.2.5 Technical working group	B.2.2.5 100 USD /specimen (24*12* 100)*4 years = 120*100 144000 USD/ for 4 years	B.2.2.5 AMR Fund WHO	B.2.2.5 Number of laboratories having external QC
	B.2.3 Data Entry in GLASS B.2.3.1 Data collection from mature laboratories	B.2.3.1 Data collection	B.2.3.1 Once/year	B.2.3.1 Start end of 1st year from time zero	B.2.3.1 ESU	B.2.3.1 ESU	B.2.3.1 USD *12= USD *5year Total USD USD	B.2.3.1 WHO/MOH	B.2.3 Number of laboratories reporting to GLASS
	B.2.3.2 Data cleaning and entry into GLASS	B.2.3.2 Data cleaning and entry	B.2.3.2 Once/year	B.2.3.2 Start end of 1st year from time zero	B.2.3.2 ESU	B.2.3.2 -ESU MOH- Head of Epidemiological Surveillance Program (Dr. ----)	B.2.3.2 ½ time Extra employee	B.2.3.2 MOH/ WHO	

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.3 Periodic issuing of an epidemiologically representative national AMR surveillance report in **humans**	B.3.1 -This report is based on WHONET data, according to local needs of physicians, pharmacists and researchers (stratification of data based on the type of priority organisms, site/region of infection or acquisition, etc.) -This report is posted on AMR webpages (MOH and MOA websites	B.3.1 Report	B.3.1 Once/year starting end of 1st year	B.3.1 Once/year starting end of 1st year	B.3.1 University hospitals DC&S	B.3.1 Technical working group or interested researchers assigned by technical working group	B.3.1 USD	B.3.1 WHO	B.3.1 Epidemiologic report posted on AMR website yearly
B.4 Optimize AMR surveillance in the **agricultural, food, veterinary, and environmental fields**	B.4.1 Research project about AMR surveillance in the veterinary field.	B.4.1 Project	B.4.1 One	B.4.1 6 months from time zero	B.4.1 MOA Department of agriculture (AUY)	B.4.1 -AUY-Dpt of Agriculture (Dr. ----)-MOA-Head of Animal Health Service (Dr. ---) -MOA-Head of Poultry Husbandry Dpt (Eng. ----- -MOH-Head of Epidemiolo Surveillance Program (Dr. -	B.4.1 USD	B.4.1 WHO	B.4.1 Surveillance report every 2 years

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.4 Optimize AMR surveillanc e in the **agricultural , food, veterinary, and environmen tal fields**	B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).	B.4.2 Organizatio n project	B.4.2 one	B.4.2 9 months from time zero	B.4.2 MOA	B.4.2 - MOA-Head of Animal Health Service (Dr. ---) -MOA- Head of Poultry Husbandry Dpt (Eng.	B.4.2 USD	B.4.2 AMR fund	B.4.2 None
	B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields	B.4.3 List	B.4.3 One	B.4.3 6 months from time zero	B.4.3 - MOA -MOH -WHO	B.4.3 - MOA-Head of Animal Health Service (Dr. ---) -Technical working group	B.4.3 USD	B.4.3 AMR fund	B.4.3 None

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsibe Entity	Cost	Source Of Funding	Indicator
B.4 Optimize AMR surveillanc e in the **agricultural , food, veterinary, and environmen tal fields**	B.4.4 -Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Sana'a for the analysis of surveillance e specimens in agricultural , food, veterinary, and environmental fields -Suggestion of a plan of the microbiology work in this surveillance	B.4.4 Visits to three laboratories with audit result	B.4.4 Three	B.4.4 Six months from time zero and completed nine months from time zero	B.4.4 -YARI -Sana'a chamber of manufactur ing and commerce -AUY laboratory	B.4.4- Technical working group -YARI - Sana'a chamber of manufactur ing and commerce - AUY laboratory	B.4.4 USD per visit Total: 3 visits USD	B.4.4 AMR Fund	B.4.4 Report about the capacity of these laboratories to do AMR surveillanc e in the veterinary world
	B.4.5 -Report results of ABX use And resistance surveillance in **agriculture and veterinary** world -Send a yearly report with Recommendations to the **animal drug registry** about ABX purchasing in the country during the coming 2 years	B. 4.5 Report	B.4.5 Once every 2 years	B.4.5 First report should be ready at end of year 2 from time zero	B.4.5 MOA	B.4.5- MOA- Head of Animal Health Service (Dr. --) -Technical working group	B.4.5 USD/report (Every 2 years) Total USD years	B.4.5 AMR Fund	B.4.5 Quantity of purchased ABX that are listed in the "restricted use list" in the veterinary world

Objective	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
B.5 Create/ Appoint AMR reference lab(s)	B.5.1 Define TOR of AMR reference lab	B.5.1 Document	B.5. 1 ONE	B.5.1 3 months from time zero	B.5.1 ESU MOH	B.5.1 Technical working group	B.5.1 USD	B.5.1 WHO	B.5 Reference laboratory/ laboratories appointed and
	B.5.2 Map potential lab(s) across Yemen	B.5.2 List	B.5.2 One	B.5.2 Start at time zero Mapping finalized 3 months from time zero	B.5.2 ESU MOH Potential laboratories	B.5.2 Technical working group	B.5.2 USD	B.5.2 WHO	
	B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr ----	B.5.3 Visit done by EMRO consultant	B.5.3 one to each potential reference laboratory	B.5.3 5 months from time zero	B.5.3 Potential laboratories	B.5.3 EMRO	B.5.3 USD	B.5.3 EMRO	
	B.5.4 Nominate the reference lab(s)	B.5.4 Nominaticn	B.5.4 One nominatio n of one or more laboratories	B.5.4 6 months from time zero	B.5.4 EMRO WHO MOH	B.5.4 EMRO WHO MOH	B.5.4 USD	B.5.4 WHO	

Objective-2	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
	B.5.5 MOH to sign a contract with the lab(s)	B.5.5 Contract	B.5.5 one or more depending on number of chosen reference laboratories	B.5.5 9 months from time zero	B.5.5 MOH	B.5.5 - MOH- General Director Dr.	B.5.5 USD	B.5.5 WHO	
B.6 Enhance research activities in AMR surveillance	B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobials.	B.6.1 Agenda	B.6.1 One/2 years	B.6.1 1st agenda sent 1.5 years from time zero	B.6.1 MOH WHO ESU Universities	B.6.1 Technical working group ESU	B.6.1 USD	B.6.1 WHO	B.6.1 Research agenda listed on AMR website

9.2. Monitoring and evaluation plan

Objective2	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	baseline
B.1 Organization of the responsibilities for the execution of the tasks	B.1.1 Appointment of focal person charge of following up the activities of the objectives of this axis B.1.1.1 Empower ESU director as focal person	B.1.1.1 Focal person Onominated	B.1.1.1 Follow up on the activities of this axis	B.1.1.1 Yes/No	B.1.1.1 Once/5 years	B.1.1.1 MOH WHO	B.1.1.1 Letter	B.1.1.1 Partially, unofficially
	B.1.2 Appointment of the members of the technical working group along with its TOR	B.1.2 Technical working group assigned	B.1.2 Execution of most of the activities of the axis	B.1.2 Yes/No	B.1.2 Once/5 years	B.1.2 MOH WHO	B.1.2 Letter	B.1.2 NA
B.2 Reporting of AMR data to GLASS	B.2.1 Mapping of labs that can potentially provide microbiologically reliable and epidemiologically B.2.1.1 Make a list of laboratories that will ultimately form an epidemiologic representation of the representative data. These labs start reporting their data to the (GLASS).	B.2.1.1 List available to technical working group country and that will be sequentially entered into GLASS after capacity building	B.2.1.1 Mapping of potential laboratories and in order to have an epidemiologi cally representati v e sample	B.2.1.1 Yes/No	B.2.1.1 Once/4 years	B.2.1.1 ESU MOH	B.2.1.1 Listing	B.2.1.1 NA

Objective2	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	baseline
B.2 Reporting of AMR data to GLASS	B.2.2 Put a plan for capacity building for the labs that are chosen to be included in GLASS report in order to be epidemiologi cally representativ e based on an incremental plan B.2.2.1 Organize a nationwide workshop about GLASS and the plan of inclusion in GLASS and introduction to WHONET	B.2.2.1 Workshop given	B.2.2.1 Introduction to GLASS and the plan, mainly because recruitment of the laboratories is based on voluntary enrollment into the project	B.2.2.1 Yes/No	B.2.2.1 Once/5 years	B.2.2.1 WHO MOH	B.2.2.1 workshop	B.2.2.1 Done partially
	B.2.2.2 -Evaluate the quality of work in the selected laboratories (visit), Check 12 laboratories per year, -Select the ones that can immediately report to GLASS, -Put a plan for 6 laboratories that will undergo improvement in their capacity during coming year, then repeat the same the following year, then the following years	B.2.2.2 -List of laboratories that will immediately report is listed on website -Schedule for other laboratories is put	B.2.2.2 Organization of the work and a 4 year schedule	B.2.2.2 Schedule is put. Yes/No	B.2.2.2 Once/year	B.2.2.2 -WHO -Chosen laboratories	B.2.2.2 Laboratory visits	B.2.2.2 NA

Objective2	activity sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
B.2 Reporting of AMR data to GLASS	B.2.2.3 Do a start up WHONET training for the 12 laboratories that were	B.2.2.3 Workshop is done chosen for the coming 2 years every 2 years	B.1.1.4 WHONET training for laboratories that will report to GLASS	B.2.2.3 Yes/No	B.2.2.3 Once every two years	B.2.2.3 WHO MOH	B.2.2.3 Workshop	B.2.2.3 Once done not focused to laboratories that will enter GLASS
	B.2.2.4 Do 3 laboratory visits for capacity building/year for 6 laboratories in different areas for building capacity and WHONET training	B.2.2.4 Number of laboratories that are passing the external QC / Total external QC tests sent*100	B.2.2.4 Recommend ation for GLASS entry	B.2.2.4 Number of laboratories that are passing the external QC / Total external QC tests sent*100	B.2.2.4 Once/Year	B.2.2.4 -Chosen laboratories	B.2.2.4 Laboratory visits	B.2.2.4 NA
	B.2.2.5 External quality control twice per year for the 12 laboratories chosen for the 2 years, then to add the ones of the following 2 years, after the 2nd year	B.2.2.5 Number of laboratories having external QC	B.2.2.5 Measure the progress of the capacity building.	B.2.2.5 Number of quality control specimen sent /year	B.2.2.5 Once/year	B.2.2.5 Reference laboratory (ies)	B.2.2.5 Send the quality control specimens and collect them	B.2.2.5 Few labs in the country have it
	B.2.3 Data Entry in GLASS B.2.3.1 Data collection from mature laboratories B.2.3.2 Data cleaning and entry into GLASS	B.2.3 Number of laboratories reporting to GLASS	B.2.3 Reach epidemiologi c representativ eness	B.2.3 Number of laboratories reporting to GLASS	B.2.3 Once/Year	B..2.3 WHO MOH	B.2.3 Data collection and entry	B.2.3 Two laboratories have already submitted data to GLASS.Not epidemiologi cally representative

Objective2	activity sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
B.3 Periodic issuing of an epidemiologically representative national AMR surveillance report in humans	B.3.1 -This report is based on WHONET data, according to local needs of physicians, pharmacists and researchers (stratification of data based on the type of priority organisms, site/region of infection or acquisition, etc.) -This report is posted on AMR webpages (MOH and MOA websites)	B.3.1 Epidemiologic report posted on AMR website yearly	B.3.1 Improve awareness in scientific society	B.3.1 Compilation of WHONET data	B.3.1 Once/5 years	B.3.1 University hospital(s)	B.3.1 Project	B.3.1 NA
B.4 Optimize AMR surveillance in the agricultural, food, veterinary, and environmental fields	B.4.1 Research project about AMR surveillance in the veterinary field.	B.4.1 Surveillance report every 2 years	B.4.1 Standardized AMR surveillance in cattle and poultry	B.4.1 Yes/No	B.4.1 every two years	B.4.1 Agriculture school MOA	B.4.1 Project	B.4.1 NA
	B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).	B.4.2 None						

Objective2	activity sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
B.4 Optimize AMR surveillance in the agricultural, food, veterinary, and environment al fields	B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields	B.4.3 None						
	B.4.4 -Assessment of YARI, agriculture laboratory, and the chamber of manufacturin g and commerce in Tripoli for the analysis of surveillance specimens in agricultural, food, veterinary, and environment al fields -Suggestion of a plan of the microbiology y work in this surveillance	B.4.4 Report about the capacity of these laboratories to do AMR surveillance in the veterinary world	B.4.4 Standardized AMR surveillance in the veterinary world	B.4.4 Yes/No	B.4.4 once/5 years	B.4.4 -YARI -Sana'a chamber of manufacturin g and commerce - AUY laboratory	B.4.4 Report	B.4.4 NA
	B.4.5 -Report results of ABX use and resistance surveillance in agriculture and veterinary world -Send a yearly report with recommenda tions to the animal drug registry about ABX purchasing in the country during the coming 2years	B.4.5 Quantity of purchased ABX that are listed in the “restricted use list” in the veterinary world	B.4.5 Control ABX use in the veterinary world	B.4.5 Quantity of purchased ABX	B.4.5 Once every 2 years	B.4.5 MOA	B.4.5 Report	B.4.5 NA

Objective2	activity sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline	Objective2
B.5 Create/ Appoint AMR reference lab(s)	B.5.1 Define TOR of AMR reference lab		B.5 Reference laboratory/ laboratories appointed and contracts done	B.5 Have a reference for difficult situations and catch alarming and emerging resistance trends	B.5 No of specimens/ activities of reference Lab in AMR	B.5 Once/Year	B.5 -WHO MOH	B.5 Appointment	B.5 NA
	B.5.2 Map potential lab(s) across Yemen								
	B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr ----								
	B.5.4 Nominate the reference lab(s)								
	B.5.5 MOH to sign a contract with the lab(s)								
B.6 Enhance research activities in AMR surveillance	B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobial s.		B.6.1 Research agenda listed on AMR website	B.6.1 Involve and update concerned facilities in research activities in surveillance	B.6.1 number of projects	B.6.1 Once/2 years	B.6.1 MOH WHO ESU	B.6.1 Agenda	B.6.1 NA

10.Axis C: Infection prevention and control (IPC)

Strategic plan

Global action plan strategic Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and prevention measures		
Potential measures of effectiveness: extent of reduction in the prevalence of preventable infections, and in particular the incidence of drug-resistant infections in health care settings		
Strategic Objective 3 interventions	**Activity / Sub-activity**	**Milestone**
C.1 Organization of the responsibilities for the execution of the tasks	C.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis	C.1 2022 three months from "time zero"
	C.1.2 Appointment of the members of the technical group along with its TOR	
C.2 Optimize IPC practices in (Hospitals, LTCFs and PHCC	C.2.1 Improve IPC practices in Hospitals C.2.1.1 To establish national IPC **guidelines**; guidelines to be all-inclusive including requirements and qualifications of IPC officer and physician and **checklist**	C.2 3 years C.2.1.1 three months from "time zero
	C.2.1.2 Inclusion of the checklist of the guidelines in **accreditation standards**	C.2.1.2 six months from "time zero"
	C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation	C.2.1.3 three years from "time zero"
	C.2.1.4 Syndicate of hospitals recommends periodic IPC **training** and **workshops** to employees hosted by scientific societies, universities, etc	C.2.1.4 2022-2023 1,5 years from "time zero"
	C.2.2 Improve IPC practices hospitals C.2.2.1 **To review and update guidelines of IPC in long- term care facilities that are** available in Ministry of Social Affairs	C.2.2.1 three months from "time zero"
	C.2.2.2 Inclusion of IPC checklist in the MOH **licensing** criteria of these facilities	C.2.2.2 six months from "time zero"
	C.2.3 Improve IPC practices in HCC C.2.3.1 Establish guidelines on IPC in the PHCC C.2.3.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities	C.2.3.1 six months from "time zero" C.2.3.2 nine months from "time zero"

Strategic Objective 3 interventions	Activity / Sub-activity	Milestone
C.3 Enhance IPC education different majors	C.3.1 Include IPC-related educational modules in human-health related majors (physicians, nurses, LAB, midwives, physiotherapists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)	C.3 2 years from "time zero" C.3.1 one year from "time zero"
	C.3.2 Include IPC-related educational modules in **veterinary schools curricula** C.3.2.1 Check the current situation of IPC in the ongoing veterinary curriculum	C.3.2.1 three months from "time zero"
	C.3.2.2 Review of IPC in regional and global veterinary curricula	C.3.2.2 three months from "time zero"
	C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement, if need be.	C.3.2.3 six months from "time zero"
	C.3.2.2 Review of IPC in regional and global veterinary curricula	C.3.2.2 three months from "time zero"
	C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement, if need be.	C.3.2.3 six months from "time zero"
	C.3.3 IPC-related educational modules in curricula of three schools (Agriculture, Nutrition, Environment) C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)	C.3.3.1 six months from "time zero"
	C.3.3.2 Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them	C.3.3.2 six months from "time zero"

Strategic Objective 3 interventions	Activity / Sub-activity	Milestone
C.4 Advanced IPC training for IPC professionals	C.3.3.3 Include the recommended tricyclic AMR and IPC in curricula when not available	C.3.3.3 2 years from “time zero”
	C.4.1 -Put TOR for IPC professionals in different healthcare facilities. -Put prerequisite training/experience of IPC physicians, officers, and nurses C.4.1.1 Include in the national IPC Guidelines the TOR of the professionals	C.4 3 months C.4.1.1 3 months
	C.4.2 Make training available and affordable in universities and professional societies C.4.2.1 MOH Sends letters to Ministry of Higher Education and to Order of physicians explaining the need and recommending training specialization opportunities and courses related to IPC	C.4.2.1 3 months
C.5 National Process Indicators in IPC	C.5.1 Baseline evaluation of current situation at a national level (research project) and make i a continuous process	C.5 Four years from “time zero” C.5.1 One year from “time zero”
	C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, et	C.5.2 Four years from “time zero”
C.6 Survey of Nosocomial Infections in hospitals	C.6.1 Conduct a point prevalence study on nosocomial infections in Yemen's hospitals	C.6 2 years C.6.1 2 years
C.7 IPC in the veterinary world	C.7.1 Review the OIE biosafety recommendations	C.7 6 months C.7.1 3 months
	C.7.2 Check the availability in of these recommendations in local veterinary laws	C.7.2 5 months
	C.7.3 Monitor the application of these laws C.7.3 .1 MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world	C.7.3 6 months

10.1. Operational plan and budge

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.1 Organization of the responsibilities for the execution of the tasks	C.1.1 Appointment of focal person n charge of following up the activities of the objectives of this axis	C.1 Appointment	C.1 One person and one technical group	C.1 three months from "time zero"	C.1 MOH	C.1 -MOH- General Director (Dr. ---) appoints of the technical working group -Focal person is appointed by the technical working group	C.1 One full time employee USD	C.1 AMR Fund	C.1 Appointment letter with job description
	C.1.2 Appointment of the members of the IPC TWG along with its TOR								

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsibl e entity	Cost	Source Of funding	Indicator
C.2 Optimize IPC practices in Hospitals, HCC	C.2.1 Improve IPC practices in Hospitals C.2.1.1 To establish national IPC guidelines; guidelines to be all-inclusive including requirements and qualifications of IPC officer and physician and checklist	C.2.1.1 Document	C.2.1.1 one	C.2.1.1 three months from "time zero"	C.2.1.1 -MOH -DC&S -WHO	C.2.1.1 IPC expert	C.2.1.1 USD	C.2.1.1 AMR Fund	C.2.1.1 Guidelines on MOH site
	C.2.1.2 Inclusion of the checklist of the guidelines in accreditation standards	C.2.1.2 Checklist	C.2.1.2 one	C.2.1.2 six months from "time zero"	C.2.1.2 -MOH -DC&S -WHO	C.2.1.2 -IPC expert -MOH- Project Coordinator (Dr----)	C.2.1.2 USD	C.2.1.2 AMR Fund	C.2.1.2 Letter from team to IPC Officer
	C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation	C.2.1.3 Report	C.2.1.3 one every 5 years	C.2.1.3 three years from "time zero"	C.2.1.3 MOH	C.2.1.3 -IPC coordinator or temporary consultant Accreditati on team	C.2.1.3 USD	C.2.1.3 Syndicate of hospitals	C.2.1.3 Percentage of hospitals with acceptable results for IPC in accrediting

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.2 Optimize IPC practices in Hospitals, HCC	C.2.1.4 Syndicate of hospitals recommend s periodic IPC training and workshops to employees hosted by scientific societies, universities , etc.	C.2.1.4 Schedule	C.2.1.4 five	C.2.1.4 1,5 years from "time zero"	C.2.1.4 Hospitals Universities	C.2.1.4 -MOH-Head of Preventive Medicine and Communicable Diseases Dpts (Dr---	C.2.1.4 USD	C.1.1.4 WHO	C.2.1.4 Number of IPC workshops per year
	C.2.2 Improve IPC practices in hospital C.2.2.1 To review and update guidelines of IPC in hospital that are available in Ministry of Social Affairs	C.2.2.1 Guidelines	C.2.2.1 One	C.2.2.1 three months from "time zero"	C.2.2.1 MOH	C.2.2.1 -Order of nurses (Ms -----) -Private sector (Dr. ----)	C.2.2.1 USD	C.2.2.1 AMR fund	C.2.2.1 Updated guidelines on website
	C.2.2.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities	C.2.2.2 Checklist	C.2.2.2 One	C.2.2.2 six months from "time zero"	C.2.2.2 MOH	C.2.2.2 -MOH-Project Coordinator (Dr---))	C.2.2.2 USD	C.2.2.2 None	C.2.2.2 Checklist of IPC in accreditation standards

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsibl e entity	Cost	Source Of funding	Indicator
C.2 Optimize IPC practices in Hospitals, HCC	C.2.3 Improve IPC practices in HCC C.2.3.1 Establish guidelines on IPC in the PHCC	C.2.3.1 Guidelines	C.2.3.1 One	C.2.3.1 six months from "time zero"	C.2.3.1 -MOH -DC&S -WHO	C.2.3.1 Private Sector (Dean of School of Nursing- -- University) (Dr.---)	C.2.3.1 USD	C.2.3.1 AMR fund WHO	C.2.3.1 Guidelines on website
	C.2.3.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities	C.2.3.2 Checklist	C.2.3.2 One	C.2.3.2 nine months from "time zero"	C.2.3.2 MOH	C.2.3.2 Private Sector (Dean of School of Nursing- -- University) (Dr.---)	C.2.3.2 USD	C.2.3.2 AMR fund	C.2.3.2 Checklist of IPC in accreditatio n standards.
C.3 Enhance IPC education different majors	C.3.1 Include IPC-related educational modules in human- health related majors (physicians , nurses, midwives, physiotherapists, pharmacist s, dentists, lab technicians, radiologists , nutrition, medical and paramedical schools)	C.3.1 -Basic recommend ations to be included -IPC Letters from Ministry of education to different teaching establishme nts	C.3.1 one per year 2 types: 1.General 2.Specific to nurses, midwives medical students.	C.3.1 one year from "time zero"	C.3.1 Ministry of Education MOH	C.3.1 One appointed consultant helped by: -Order of nurses- Director (Ms. ---) -Order of Midwives- member (Ms-- -MOH- PHC Dpt- Dental Coordinator (Dr ---) -Technical Schools (Ms. - "2h/specialist	C.3.1 USD	C.3.1 AMR Fund	C.3.1 Percentage of health curricula that contain IPC modules

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.3 Enhance IPC education different majors	C.3.2 Include IPC-related educational modules in veterinary schools curricula C.3.2.1 Check the current situation of IPC in the ongoing veterinary curriculum	C.3.2.1 Report	C.3.2.1 One	C.3.2.1 three months from "time zero"	C.3.2.1 MOA	C.3.2.1 -MOA- Head of Animal Health Service (Dr. -----	C.3.2.1 USD	C.3.2.1 AMR fund	C.3.2.1 None
	C.3.2.2 Review of IPC in regional and global veterinary curricula	C.3.2.2 Report	C.3.2.2 One	C.3.2.2 three months from "time zero"	C.3.2.2 MOA	C.3.2.2 -MOA- Head of Animal Health Service (Dr. ---)	C.3.2.2 USD	C.3.2.2 AMR fund	C.3.2.2 None
	C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement	C.3.2.3 Proposal	C.3.2.3 One	C.3.2.3 six months from "time zero"	C.3.2.3 MOA	C.3.2.3 -MOA- Head of Animal Health Service (Dr. ---) -AUY-Dpt of Agriculture (Dr. ---)	C.3.2.3 USD	C.3.2.3 AMR fund	C.3.2.3 Proposal is sent to veterinary school, and IPC included in program

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.3 Enhance IPC education different majors	C.3.3 IPC- related educational modules in curricula of three schools (Agriculture, Nutrition, Environment) C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)	C.3.3.1 Report	C.3.3.1 One	C.3.3.1 six months from "time zero"	C.3.3.1 MOH Agriculture schools (AUY, SU)	C.3.3.1 -MOA- Head of Poultry Husbandry Dpt (Eng. -----)	C.3.3.1 USD	C.3.3.1 AMR fund	C.3.3 IPC module to be included in the three curricula of sent from respective ministries as recommendation to the schools
	C.3.3.2 Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them	C.3.3.2 Report	C.3.3.2 One	C.3.3.2 six months from "time zero"	C.3.3.2 MOH Agriculture schools (AUY, SU)	C.3.3.2 -SU-Dpt of Agriculture (Dr. ---)	C.3.3.2 USD	C.3.3.2 AMR fund	
	C.3.3.3 Include the recommended AMR and IPC in curricula when not available	C.3.3.3 Memo to Ministry of Education	C.3.3.3 One	C.3.3.3 2 years from "time zero"	C.3.3.3 MOH Agriculture schools (AUY, SU)	C.3.3.3 -MOA- Head of Poultry Husbandry Dpt (-----) -Private sector (----	C.3.3.3 USD	C.3.3.3 AMR fund	

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.4 Advanced IPC training for IPC professionals	C.4.1 -Put TOR for IPC professional ls in different healthcare facilities. -Put prerequisite training/experience of IPC physicians, officers, and nurses C.4.1.1 Include in the national IPC Guidelines the TOR of the professionals	C.4.1.1 Part of IPC guidelines	C.4.1.1 One	C.4.1.1 3 months	C.4.1.1 MOH WHO	C.4.1.1 Same as guidelines	C.4.1.1 Within cost of guidelines	C.4.1.1 AMR Fund	C.4.1.1 TOR of IPC professionals are included in the IPC guidelines
	C.4.2 Make training available and affordable in universities and professional societies C.4.2.1 MOH Sends letters to Ministry of Higher Education and to Order of physicians explaining the need and recommending training specialization opportunities and courses related to IPC	C.4.2.1 Letter	C.4.2.1 One	C.4.2.1 3 months	C.4.2.1 MOH	C.4.2.1 Technical working group	C.4.2.1 USD	C.4.2.1 WHO	C.4.2.1 As curricula

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsibl e entity	Cost	Source Of funding	Indicator
C.5 National Process Indicators in IPC	C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process	C.5.1 Research project	C.5.1 One	C.5.1 One year from "time zero"	C.5.1 MOH ICD&S Hospitals	C.5.1 -Private sector, WHO consultant, former DC&S president (Dr. ----) -Private sector, former DC&S president (Dr--i) -Private sector (---) -ESU	C.5.1 USD	C.5.1 Fund raising	C.5.1 Results are posted on AMR website
	C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, etc)	C.5.2 Research project	C.5.2 One	C.5.2 Four years from "time zero"	C.5.2 MOH ICD&S Hospitals	C.5.2 - DC&S -ESU	C.5.2 USD	C.5.2 Fund raising	C.5.2 Percentage of hospitals that report results of process indicators
C.6 Survey of Nosocomia l Infections in hospitals	C.6.1 Conduct a point prevalence study on nosocomial infections in Yemeni hospitals	C.6.1 Survey	C.6.1 one	C.6.1 2 years	C.6.1 Yemeni Hospitals	C.6.1 Technical working group	C.6.1 USD	C.6.1 AMR Fund	C.6.1 Results of study published

Objective3	Activity Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source Of funding	Indicator
C.7 IPC in the veterinary world	C.7.1 Review the OIE biosafety recommendations	C.7.1 Report	C.7.1 one	C.7.1 3 months	C.7.1 MOA	C.7.1 Technical working group	C.7.1 USA	C.7.1 WHO	C.7.1 None
	C.7.2 Check the availability in of these recommend ations in local veterinary laws	C.7.2 Report	C.7.2 one	C.7.2 5 months	C.7.2 MOA	C.7.2 -Technical working group -MOA-Head of Animal Health Service (Dr. ----	C.7.2 USD	C.7.2 AMR Fund	C.7.2 None
	C.7.3 Monitor the application of these laws C.7.3 MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world	C.7.3 Letter	C.7.3 one	C.7.3 6 months	C.7.3 MOH	C.7.3 Technical working group	C.7.3 USD	C.7.3 WHO	C.7.3 None

10.2. Monitoring and evaluation plan objective 3

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.1 Organization of the responsibilities for the execution of the tasks	C.1.1 Appointment of focal person charge of following up the activities of the objectives of this axis	C.1 Appointment letter with job description	C.1 Follow up on activities	C.1 Letter	C.1 NA	C.1 NA	C.1 NA	C.1 Not appointed
	C.1.2 Appointment of the members of the technical group along with its TOR							
C.2 Optimize IPC practices in Hospitals, long term care facilities and PHCC	C.2.1 Improve IPC practices in Hospitals C.2.1.1 To finalize national IPC guidelines; guidelines to be all- inclusive including requirements and qualification s of IPC officer and physician and checklist	C.2.1.1 Guidelines on MOH site	C.2.1.1 Update and standardization of IPC	C.2.1.1 Yes/no	C.2.1.1 Once/5 years	C.2.1.1 International guidelines	C.2.1.1 Scientific review	C.2.1.1 In progress

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.2 Optimize IPC practices in Hospitals, long term care facilities and PHCC	C.2.1.2 Inclusion of the checklist of the guidelines in accreditation standards	C.2.1.2 Letter from team to IPC Officer	C.2.1.2 Audit IPC during the accreditation audit in hospitals	C.2.1.2 Yes/No	C.2.1.2 Once/5 years	C.2.1.2 Accreditation checklists	C.2.1.2 Letter Meeting Accreditation committee	C.2.1.2 Partial
	C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation	C.2.1.3 Percentage of hospitals with acceptable results for IPC in accreditation	C.2.1.3 Increase the number of hospitals that are compliant with national IPC guidelines.	C.2.1.3 (Number of compliant hospitals/Total number of audited hospitals) x100	C.2.1.3 Once/3 years	C.2.1.3 Accreditation audit results	C.2.1.3 Checklist in accreditation audit	C.2.1.3 Not started yet
	C.2.1.4 Syndicate of hospitals recommends periodic IPC training and workshops to employees hosted by scientific societies, universities,etc	C.2.1.4 Number of IPC workshops per year	C.2.1.4 Have qualified HCW in charge of IPC, and have more efficient programs in hospitals	C.2.1.4 Number of workshops/ Number of universities providing health sciences programs	C.2.1.4 Once/5 years	C.2.1.4 International standards	C.2.1.4 Scientific review	C.2.1.4 Workshops are being done but not followed up

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.2 Optimize IPC practices in Hospitals, long term care facilities and PHCC	C.2.2 Improve IPC practices in long-term care facilities C.2.2.1 To review and update guidelines of IPC in long-term care facilities that are available in Ministry of Social Affairs	C.2.2.1 Updated guidelines on website	C.2.2.1 Standardize IPC in long term	C.2.2.1 Yes /no	C.2.2.1 Once	C.2.2.1 Ministry of social affairs Guidelines	C.2.2.1 Review and update	C.2.2.1 NA
	C.2.2.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities	C.2.2.2 Checklist of IPC in accreditation standards	C.2.2.2 Improve application of IPC in these facilities	C.2.2.2 Yes /no	C.2.2.2 Once	C.2.2.2 -Long term care facilities -MOH -Ministry of social affairs	C.1.2.2 Letter Meeting	C.1.2.2 NA
	C.2.3 Improve IPC practices in PHCC C.2.3.1 Establish guidelines on IPC in the PHCC	C.2.3.1 Guidelines on website	C.2.3.1 Standardize IPC in PHCC	C.2.3.1 Yes/No	C.2.3.1 Once per 6 months	C.2.3.1 Guidelines AMS/AMR website	C.2.3.1 Checking	C.2.3.1 NA
	C.2.3.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities	C.2.3.2 Checklist of IPC in accreditation standards.	C.2.3.2 Improve application of IPC in these facilities	C.2.3.2 Yes/No	C.2.3.2 Once per 6 months	C.2.3.2 Accreditation guidelines	C.2.3.2 Letter Meeting Accreditation committee	C.2.3.2 NA

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.3 Enhance IPC education different majors	C.3.1 Include IPC- related educational modules in human- health related majors (physicians, nurses, midwives, physiotherap ists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)	C.3.1 Percentage of health curricula that contain IPC modules	C.3.1 Include IPC in basic education of health professionals	C.3.1 (Number of curricula that have IPC module/Tota l number of health sciences curricula) *100	C.3.1 Once/5 years	C.3.1 Curricula IPC guidelines	C.3.1 Letters to universities	C.3.1 IPC included but non-standardized and unorganized
	C.3.2 Include IPC- related educational modules in veterinary schools curricula C.3.2.1 Check the current situation of IPC in the ongoing veterinary Curriculum C.3.2.2 Review of IPC in regional and global veterinary curricula	C.3.2.1 None C.3.2.2 None						

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.3 Enhance IPC education different majors	C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement , if need be.	C.3.2.3 Proposal is sent to veterinary school, and IPC included in program	C.3.2.3 Improve IPC education in veterinary school	C.3.2.3 Yes/No	C.3.2.3 Once	C.3.2.3 Veterinary school MOA	C.3.2.3 Check if proposal sent	C.3.2.3 NA
	C.3.3 IPC- related educational modules in curricula of three schools (Agriculture, Nutrition, Environment) C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)	C.3.3 IPC module to be included in the three curricula of sent from respective ministries as recommendation to the schools	C.3.3 Improve IPC education in Agriculture, Nutrition, Environment Schools	C.3.3 Number of university programs that include IPC according to recommendation/Total number of audited programs	C.3.3 Once/year	C.3.3 The 3 schools	C.3.3 Checking	C.3.3 In a superficial way
	C.3.3.2 Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them C.3.3.3 Include the recommende d tricyclic AMR and IPC in curricula when not available							

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.4 Advanced IPC training for IPC professionals	C.4.1 -Put TOR for IPC professionals in different healthcare facilities. -Put prerequisite training/ expe rience of IPC physicians, officers, and nurses C.4.1.1 Include in the national IPC Guidelines the TOR of the professionals	C.4.1.1 TOR of IPC professionals are included in the IPC guidelines	C.4.1.1 To standardize the work and follow-up on the performance	C.4.1.1 Yes/No	C.4.1.1 Once	C.4.1.1 MOH WHO	C.4.1.1 Checking	C.4.1.1 NA
	C.4.2 Make training available and affordable in universities and professional societies C.4.2.1 MOH Sends letters to Ministry of Higher Education and to Order of physicians explaining the need and recommending training specialization opportunities and courses related to IPC	C.4.2.1 None						

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.5 National Process Indicators in IPC	C.5.1 Baseline evaluation of current situation at a national level(research project) and make it a continuous process	C.5.1 Results are posted on AMR website	C.5.1 Have a baseline evaluation	C.5.1 Percentage of hospitals that do have milestones of IPC	C.5.1 Once	C.5.1 Hospitals that are epidemiologically representative	C.5.1 Project	C.5.1 NA
	C.5.2 National indicators to be incrementall y applied with time (hand hygiene, PPE, isolation, other standard precautions, etc)	C.5.2 Percentage of hospitals that report results of process indicators	C.5.2 improve application of IPC principles	C.5.2 For each process indicator 5 hospitals that have a follow up of the indicator	C.5.2 Once/3 years	C.5.2 Hospitals that are epidemiologically representative	C.5.2 Project	C.5.2 NA
C.6 Survey of Nosocomial Infections in hospitals	C.6.1 Conduct a point prevalence study on nosocomial infections in Yemeni hospitals	C.6.1 Results of study published	C.6.1 To join the WHO point prevalence HAI study, and benchmark with global data	C.6.1 NA	C.6.1 Once	C.6.1 Hospitals MOH	C.6.1 Study	C.6.1 NA
C.7 IPC in the veterinary world	C.7.1 Review the OIE biosafety recommendations	C.7.1 None						

Objective3	Activity /Sub-activity	Indicator	Purpose	Calculation	Frequency Of Data collection	Data Source	Method	Baseline
C.7 IPC in the veterinary world	C.7.2 Check the availability in of these recommenda tions in local veterinary laws	C.7.2 None						
	C.7.3 Monitor the application of these laws C.7.3 MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world	C.7.3 None						

11. Axis D: Antibiotic use

Strategic plan

Objective 4: Optimize the use of antimicrobial medicines in human and animal health		
Potential measure of effectiveness: extent of reduction in National human consumption of antibiotics (with allowance for the need for improved access in some settings), the consumption of antibiotics used in food production (terrestrial and aquatic livestock, and other agricultural practices), and the use of medical and veterinary antimicrobial agents forapplications other than human and animal health		
Strategic objective 4 interventions	**Activity / Sub-activity**	**Milestone / Date (operational plan)**
D.1 Organization of the responsibilities for the execution of the tasks	D.1.1 Appointment of focal person n charge of following up the activities of the objectives of this axis	D.1 three months from time zero D.1.1 three months from time zero
	D.1.2 Appointment of the members of the technical working group along with its TOR	D.1.2 three months from time zero
D.2 Improve ABX quality control	D.2.1 To support and include ABX as priority drugs in the pharmacovigilance project of the Yemeni University and the adverse drug event reporting program of the Order of Pharmacists	D.2 One year from time zero D.2.1 One year from time zero
D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans	D.3.1 Define CIAM D.3.1.1 Literature search	D.3 Six months from time zero D.3.1.1 Three months from time zero
	D.3.1.2 Formulate the list	D.3.1.2 Six months from time zero
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data	D.4.1 Workshops on metrics for ABX use measurement	D.4 5 years D.4.1 Six months from time zero and 1 year from time zero

CIAM: Critically Important Antimicrobials

Strategic objective 4 interventions	Activity / Sub-activity	Milestone / Date (operational plan)
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data	D.4.2 Compilation of data from hospitals D.4.2.1 Determine the epidemiologically representative sample of hospitals for surveillance of ABX	D.4.2.1 three months from time zero
	D.4.2.2 -Validate the measurement of hospital consumption by DDD/1000 patient days in a batch of 4 hospitals per year -Include the hospitals with adequate measurements in a sequential manner into the surveillance list and data -Advice to hospitals that don't have adequate data	D.4.2.2 One year and three months from time zero and continue yearly for 5 years
	D.4.2.3 Surveillance of ABX use in Yemeni hospitals by auto reporting DDDs	D.4.2.3 1.5 years from time zero then yearly for 5 years
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.1 Workshops on AMS twice per year	D.5 5 years D.5.1 Six months from time zero then yearly for 5 years
	D.5.2 Preparation and dissemination of national treatment guidelines on D.5.2.1 Put a list of essential guidelines infectious diseases to standardize the strategies of ABX use based on local epidemiology	D.5.2.1 six months from time zero
	D.5.2.2 Prepare the missing guidelines	D.5.2.2 Finalize within 1 year from time zero
	D.5.2.3 Prepare and follow a schedule for the presentation of the guidelines in the respective scientific societies meeting and for the endorsement of these guidelines with the respective societies	D.5.2.3 Starting 1 year from time zero and finalized 3 years from time zero

AMS: Antimicrobial Stewardship

Strategic objective 4 interventions	**Activity / Sub-activity**	**Milestone / Date (operational plan)**
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.2.4 Post these guidelines on the AMR/AMS website	D.5.2.4 1.5 years from time zero
	D.5.3 Inclusion of AMS programs among hospital accreditation standards	D.5.3.1 Three months from time zero
	D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals.	D.5.4 2021 and after each accreditation audit for 5 years
	D.5.5 Development of AMS webpage in the MOH website	D.5.5 six months from time zero
D.6 Organize the dispensing of antimicrobials in the community pharmacies	D.6.1 Nominate a task group for the meeting between MOH including Dr. ------ and the Order of pharmacists	D.63 month D.6.13 month
	D.6.2 Meeting between a high-authority-level task force and the President of the Order of Pharmacists to agree over a plan to restrict dispensing of ABX	D.6.2 To be finalized 3 months from time zero
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.1 Banning importation and use of CIAM in the veterinary field D.7.1.1 The CIAM list will be sent to the minister to ban their importation for veterinary use	D.7 Two years from time zero D.7.1.1 Will be sent nine months from time zero
	D.7.1.2 The veterinary drug office will not import these agents	D.7.1.2 one year from time zero
	D.7.2 Check if CIAM are used in agriculture and environment D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list.	D.7.2.1 nine months from time zero
	D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel.	D.7.2.2 two years from time zero
	D.7.2.3 Get results of ABX residues in food items being done in Yemen	D.7.2.3 three months from time zero

Strategic objective 4 interventions	Activity / Sub-activity	Milestone / Date (operational plan)
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.3 Surveillance of importation of regularly used ABX to Yemen D.7.3.1 Form a registry of imported ABX in veterinary world	D.7.3.1 Six months from time zero
	D.7.4 Research study about ABX consumption D.7 4.1 Research project by one of Masters Student at Sana'a University (SU)	D.7 4.1 starting at time zero for one year
	D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)	D.7 4.2 Two years from time zero
	D.7.5 Research study about unofficial importation of ABX to Yemen D.7.5 Research project in Agriculture school	D.7.5 Two years from time zero

11.1. Operational plan and budget objective 4

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.1 Organization of the responsibilities for the execution of the tasks	D.1.1 Appointme nt of focal person n charge of following up the activities of the objectives of this axis	D.1.1 Letter	D.1.1 One	D.1.1 three months from time zero	D.1.1 MOH	D.1.1 -WHO- National Professional Officer (Dr.----)- MOH- General Director (Dr.------	D.1.1 USD	D.1.1 WHO	D.1.1 Focal person nominated
	D.1.2 Appointm nt of the members of the technical working group along with its TOR	D.1.2 Letter	D.1.2 One	D.1.2 three months from time zero	D.1.2 MOH	D.1.2 - WHO- National Professional Officer (Dr.---- -MOH- General Director (Dr.------)	D.1.2 USD	D.1.2 WHO	D.1.2 Technical working group assigned

objective4	Activity/ Sub- activity		Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.2 Improve ABX quality control	D.2.1 To support and include ABX as priority drugs in the pharmacovi gilance project of the Yemeni University and the adverse drug event reporting program of the Order of Pharmacist s		D.2.1 Network	D.2.1 One	D.2.1 One year from time zero	D.2.1 MOH	D.2.1 -MOH- Head of Preventive Medicine and Communic able Diseases Dpts (Dr. -- -MOH- Quality Assurance of Pharmaceut ical Products Program Director (Dr. --)	D.2.1 USD	D.2.1 WHO MOH	D.2.1 Number of generic antibiotics that are tested by the pharmacovi gilance programs
D.3 Control the use of critically important antimicrobi al molecules (CIAM) in humans	D.3.1 Define CIAM	D.3.1.1 Literature search survey	D.3.1.1 List	D.3.1.1 One	D.3.1.1 Three months from time zero	D.3.1.1 MOH MOA	D.3.1.1 -Private sector, WHO consultant, former DC&S president (Dr. ---)	D.3.1.1 USD	D.3.1.1 WHO MOH	D.3.1 List of CIAM posted on AMR/AMS website

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
	D.3.1.2 Formulate the list of CIAM	D.3.1.2 National list of CIAM	D.3.1.2 One	D.3.1.2 Six months from time zero	D.3.1.2 - MOH -MOA	D.3.1.2 -MOA- Head of Animal Health Service (Dr. ---) -Private sector, WHO consultant, former DC&S president (Dr. ---) -Private sector (Dr , Dr-----)	D.3.1.2 USD	D.3.1.2 AMR Fund	
D.4 Sentinel Surveillanc e of ABX (CIAM) consumptio n from a network of hospitals and benchmark with international ldata	D.4.1 Workshops on metrics for ABX use measurement	D.4.1 Workshops	D.4.1 Six	D.4.1 Six months from time zero and 1 year from time zero	D.4.1 3 in Sana'a, 1 in Aden, 1 in the , 1 in Alhodiedah the Hadramout and 1 in Ibb	D.4.1 Focal person	D.4.1 USD (6 workshops)	D.4.1 AMR fund	D.4.1 Percentage of hospitals that sent attendees

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international ldata	D.4.2 Compilation of data from hospitals D.4.2.1 Determine the epidemiologically representative sample of hospitals for surveillance of ABX	D.4.2.1 List	D.4.2.1 One	D.4.2.1 three months from time zero	D.4.2.1 MOH	D.4.2.1 -MOH- Head of pharmacy service (Dr. -MOH- Head of Epidemiological Surveillance Program (Dr---)	D.4.2.1 USD	D.4.2.1 MOH WHO	D.4.2.1 The list is available
	D.4.2.2 -Validate the measurement of hospital consumption by DDD/1000 Patient days in a batch of 4 hospitals per year -Include the hospitals with adequate measurements in a sequential manner into the surveillance list and data -Advice to hospitals that don't have adequate data	D.4.2.2 Hospital data assessment 4 times per year over 5 years	D.4.2.2 Four per year over 5 years	D.4.2.2 One year and three months from time zero and continue yearly for 5 years	D.4.2.2 -MOH -WHO	D.4.2.2 AMS expert	D.4.2.2 USD per year for 5 years = USD	D..4.2.2 AMR fund	D.4.2.2 None

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international ldata	D.4.2.3 Surveillance of AB X use in Yemeni hospitals by auto reporting DDDs	D.4.2.3 Report	D.4.2.3 Once per year	D.4.2.3 1.5 years from time zero then yearly for 5 years	D.4.2.3 -MOH -WHO	D.4.2.3 -MOH- Head of pharmacy service (Dr. -MOH- Head of Epidemiological Surveillance Program (Dr. ---)	D.4.2.3 USD	D.4.2.3 WHO MOH	D.4.2.3 Report on ABX use for 2020/2021 posted on website
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.1 Workshops on AMS **twice** per year	D.5.1 Workshops	D.5.1 two per year over 5 years	D.5.1 Six months from time zero then yearly for 5 years	D.5.1 -MOH -WHO -DC&S	D.5.1 -Private sector, (Dr. -Private sector, WHO consultant, former DC&S president Dr	D.5.1 USD *10= USD/year	D.5.1 AMR fund	D.5.1 Number of workshops on AMS per year
	D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to Standardize D.5.2.1 Put a list of essential guidelines the strategies of ABX use based on local epidemiology	D.5.2.1 List	D.5.2.1 One	D.5.2.1 six months from time zero	D.5.2.1 -WHO -DC&S	D.5.2.1 -Private sector, (Dr. --) -Private sector, WHO consultant two (Dr. ---, Dr. ---)	D.5.2.1 Three guidelines USD	D.5.2.1 AMR fund	D.5.2.1 D.5.2.2 Number of guidelines published and posted on AMR/AMS website

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.5 Prepare hospitals and build their capacity for Antimicrob ial stewardship (AMS) programs	D.5.2.2 Prepare the missing guidelines	D.5.2.2 List	D.5.2.2 One	D.5.2.2 Finalize within 1 year from time zero	D.5.2.2 -WHO -DC&S	D.5.2.2 Focal person will distribute the tasks according to the list.	D.5.2.2 Included in D.5.2.1	D.5.2.2 AMR fund	
	D.5.2.3 Prepare and follow a schedule for the presentation of the guidelines in the respective scientific societies meeting and for the endorsement of these guidelines with the respective societies	D.5.2.3 Schedule	D.5.2.3 One	D.5.2.3 Starting 1 year from time zero and finalized 3 years from time zero	D.5.2.3 MOH	.5.2.3 -Focal person -DC&S president (Dr. --)	D.5.2.3 Workshops 3 times per year (USD per workshop) *3*5=USD	D.5.2.3 AMR fund	D.5.2.3 Percentage of guidelines endorsed by respective scientific societies
	D.5.2.4 Post these guidelines on the AMR/AMS website	D.5.2.4 Guidelines	D.5.2.4 to be assigned later	D.5.2.4 1.5 years from time zero	D.5.2.4 MOH	D.5.2.4 -Focal person -IT consultant	D.5.2.4 None	D.5.2.4 None	D.5.2.4 Number of guidelines posted on AMR/AMS website.

objective4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.3 Inclusion of AMS programs among hospital accreditation standards	D.5.3.1 AMS checklist in accreditation	D.5.3.1 One	D.5.3.1 Three months from time zero	D.5.3.1 MOH	D.5.3.1 -Private sector, WHO consultant, former DC&S president (Dr. --) -MOH- Project Coordinator (Eng. --)	D.5.3.1 USD	D.5.3.1 WHO	D.5.3.1 AMS and its checklist available in accreditation standards
	D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals.	D.5.4 Report	D.5.4 One	D.5.4 2021 and after each accreditation audit for 5 years	D.5.4 MOH	D.5.4 MOH accreditation team	D.5.4 USD	D.5.4 WHO	D.5.4 Number of feedback given/number of hospitals
	D.5.5 Development of AMS webpage in the MOH website	D.5.5 AMS on website	D.5.5 One	D.5.5 six months from time zero	D.5.5 -MOH -MOA	D.5.5 IT consultant	D.5.5 USD	D.5.5 AMR fund	D.5.5 AMS section present on AMR/MOH website

objective 4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.6 Organize the dispensing of antimicrobials in the community pharmacies	D.6.1 Nominate a task group for the meeting between MOH including Dr. ---- and the Order of pharmacists	D.6.1 Group	D.6.1 one	D.6.1 3 months	D.6.1 MOH	D.6.1 Technical working group	D.6.1 USD	D.6.1 WHO	D.6.1 None
	D.6.2 Meeting between a high- authority- level task force and the President of the Order of Pharmacist s to agree over a plan to restrict dispensing of ABX	D.6.2 Meeting	D.6.2 One	D.6.2 To be finalized 3 months from time zero	D.6.2 -MOH -Order of Pharmacists	D.6.2 -MOH- Head of pharmacy service (Dr. -MOH- General Director(Dr. -Private sector, WHO consultant, former DC&S president (Dr. --) - MOH- Director of Public Relations & Health Education Dpts (Dr.	D.6.2 USD	D.6.2 WHO	D.6.2 Agenda for collaboration put

objective 4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.1 Banning importation and use of CIAM in the veterinary field D.7.1.1 The CIAM list will be sent to the minister to ban their importation for veterinary use	D.7.1.1 Letter	D.7.1.1 One	D.7.1.1 Will be sent 12 months from time zero	D.7.1.1 MOA	D.7.1 -MOA-Head of Animal Health Service (Dr. --l) -FAO represnt ative	D.7.1 USD	D.7.1 AMR fund	D.7.1 DDD of CIAM molecules imported per year
	D.7.1.2 The veterinary drug office will not import these agents	D.7.1.2 Memo	D.7.1.2 One	D.7.1.2 one year from time zero	D.7.1.2 MOA				
	D.7.2 Check if CIAM are used in agriculture and environment D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list.	D.7.2.1 List	D.7.2.1 One	D.7.2.1 12 months from time zero	D.7.2.1 MOA	D.7.2 -MOA-Head of Poultry Husbandry Dpt (Eng. ---)	D.7.2 USD	D.7.2 AMR fund	D.7.2.1 Report on antimicrobials officially imported for agriculture use

objective 4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel	D.7.2.2 List	D.7.2.2 One	D.7.2.2 two years from time zero	D.7.2.2 MOA				D.7.2.2 None
	D.7.2.3 Get results of ABX residues in food items being done in Yemen	D.7.2.3 Report	D.7.2.3 One	D.7.2.3 three months from time zero	D.7.2.3 MOA	D.7.2.3 -MOA- Head of Animal Health Servic(Dr--)	D.7.2.3 USD	D.7.2.3 None	D.7.2.3 None
	D.7.3 Surveillance of importation of regularly used ABX to Yemen D.7.3.1 Form a registry of imported ABX in veterinary world	D.7.3.1 Registry	D.7.3.1 One	D.7.3.1 Six months from time zero	D.7.3.1 MOA	D.7.3.1 -MOA- Head of Animal Health Service (Dr. --)	D.7.3.1 USD	D.7.3.1 None	D.7.3.1 Presence of annual data of imported veterinary ABX on registry

objective 4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.4 Research study about ABX consumption D.7 4.1 Research project by one of Masters Student at Sana'a University (SU)	D.7 4.1 Project	D.7 4.1 One	D.7 4.1 starting at time zero for one year	D.7 4.1 -SU -MOA	D.7 4.1 -SU- coordinator of Masters degree in Food Safety and Analys (Dr --)- Private sector, WHO consultant, former DC&S president (Dr. ---) -MOA- Head of Animal Health Service (Dr. --)	D.7 4.1 USD SU)	D.7 4.1 SU WHO MOH	D.7 4.1 Percentage and list

objective 4	Activity/ Sub- activity	Unit	Quantity	Date	Location	Responsible Entity	Cost	Source Of Funding	Indicator
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)	D.7 4.2 Project	D.7 4.2 One	D.7 4.2 Two years from time zero	D.7 4.2 -MOA - Agriculture school (SU) -DC&S	D.7 4.2 -DC&S Member -SU-Dpt of Agriculture (Dr. --) -MOA- Head of Poultry Husbandry Dpt (Eng. ---)	D.7 4.2 USD	D.7 4.2 SU Research WHO MOH	D.7 4.2 Report on the national use of ABX in poultry farms
	D.7.5 Research study about unofficial importation of ABX to Yemen D.7.5.1 Research project in Agriculture school	D.7.5 Project	D.7.5 One	D.7.5 Two years from time zero	D.7.5 -MOA - Agriculture school (SU)	D.7.5 SU-Dpt of Agriculture (Dr. --)	D.7.5 USD D.7.5 .1 USD	D.7.5 SU Research WHO MOH	D.7.5 Report on the unofficial ABX importation used in veterinary world

11.2. Monitoring and evaluation plan OF Axis D

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.1 Organization of the responsibilities for the execution of the tasks	D.1.1 Appointment of focal person n charge of following up the activities of the objectives of this axis	D.1.1 Focal person nominated	D.1 Follow up of activities and to be in charge of some of them	D.1 Yes/No	D.1 Once/5 years	D.1 MOH WHO	D.1 Letter	D.1 NA
	D.1.2 Appointment of the members of the technical working group along with its TOR	D.1.2 Technical working group assigned						
D.2 Improve ABX quality control	D.2.1 To support and include ABX as priority drugs in the pharmacovigilance project of the Yemeni University and the adverse drug event reporting program of the Order of Pharmacists	D.2.1 Number of generic antibiotics that are tested by the pharmacovigilance programs	D.2.1 Evaluate post-marketing efficacy and safety of generic ABX that are licensed by MOH and used in Yemen	D.2.1 No of reports /month (Including Zero report)	D.2.1 Once/5 years	D.2.1 AMS website	D.2.1 Network	D.2.1 NA

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans	D.3.1 Define CIAM D.3.1.1 Literature search D.3.1.2 Formulate the list	D.3.1 List of CIAM posted on AMR/AMS website	D.3.1 Make sure it is prepared and accessed by all	D.3.1 Yes/No	D.3.1 Once/5 years	D.3.1 Literature search	D.3.1 Search	D.3.1 NA
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data	D.4.1 Workshops on metrics for ABX use measurement	D.4.1 Percentage of hospitals that sent attendees	D.4.1 To standardize measurement in Yemen	D.4.1 Number of hospitals that sent attendees/ number of invited hospitals* 100	D.4.1 Once/5 years	D.4.1 Workshop	D.4.1 Workshop	D.4.1 NA
	D.4.2 Compilation of data from hospitals D.4.2.1 Determine the epidemiologically representativ e sample of hospitals for surveillance of ABX	D.4.2.1 The list is available	D.4.2.1 Establish epidemiologically representativ e surveillance of AMR	D.4.2.1 Yes/No	D.4.2.1 Once/5 years	D.4.2.1 -MOH -ESU	D.4.2.1 Epidemiologic sampling	D.4.2.1 NA

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data	D.4.2.2 -Validate the Measurement of hospital consumption by DDD/1000 patient days in a batch of 4 hospitals per year -Include the hospitals With adequate measurements in a sequential manner into the surveillance list and data -Advice to hospitals that don't have adequate data	D.4.2.2 None						
	D.4.2.3 Surveillance of ABX use in Yemeni hospitals by auto reporting DDDs	D.4.2.3 Report on ABX use for 2019/2020 posted on website	D.4.2.3 -Baseline evaluation and follow up -In preparation for national outcome AMS indicators	D.4.2.3 Yes /No	D.4.2.3 June every year	D.4.2.3 Yemeni hospitals	D.4.2.3 Compilation of results from hospital reports	D.4.2.3 NA

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.1 Workshops on AMS twice per year	D.5.1 Number of workshops on AMS per year	D.5.1 Standardization of AMS and follow up of indicators.	D.5.1 Number of workshops twice per year	D.5.1 Yearly	D.5.1 AMS focal person	D.5.1 Workshop	D.5.1 Sporadic availability
	D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to standardize the strategies of ABX use based on local epidemiology D.5.2.1 Put a list of essential guidelines D.5.2.2 Prepare the missing guidelines	D.5.2.1 D.5.2.2 Number of guidelines published and posted on AMR/AMS website	D.5.2.1 D.5.2.2 Standardize ABX prescription habits among professionals	D.5.2.1 D.5.2.2 Number of guidelines published and posted on AMR/AMS website	D.5.2.1 D.5.2.2 Once/5 years	D.5.2.1 D.5.2.2 International guidelines plus local epidemiology from surveillance reports	D.5.2.1 D.5.2.2 Writing	D.5.2.1 D.5.2.2 The available national guidelines are in complete
	D.5.2.3 Prepare and follow a schedule for the presentation of the guidelines in the respective scientific societies meeting and for the endorsement of these guidelines with the respective societies	D.5.2.3 Percentage of guidelines endorsed by respective scientific societies	D.5.2.3 Improve application of these guidelines by professionals	D.5.2.3 (Number of scientific target societies that endorse these guidelines/ Number of target societies) *100	D.5.2.3 Once/5 years	D.5.2.3 Scientific societies	D.5.2.3 Meetings Lectures Workshops	D.5.2.3 NA

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs	D.5.2.4 Post these guidelines on the AMR/AMS website	D.5.2.4 Number of guidelines posted on AMR/AMS website.	D.5.2.4 Improve the visibility of these guidelines	D.5.2.4 Yes/No	D.5.2.4 Once/5 years reviewing and updating guidelines if needed	D.5.2.4 AMS Website	D.5.2.4 Posting on MOH website	D.5.2.4 NA
	D.5.3 Inclusion of AMS programs among hospital accreditation standards	D.5.3.1 AMS and its checklist available in accreditation standards	D.5.3.1 Standardization	D.5.3.1 Yes /No	D.5.3.1 Once/5 years	D.5.3.1 Accreditation standards	D.5.3.1 Checking	D.5.3.1 NA
	D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals.	D.5.4 Number of feedback given/number of hospitals	D.5.4 Improve AMS work in hospitals	D.5.4 Number of feedback given/number of hospitals*100	D.5.4 Every 3 years depending on the frequency of accreditation renewal	D.5.4 Accreditation audit results analysis	D.5.4 data analysis and report	D.5.4 NA
	D.5.5 Developmen t of AMS webpage in the MOH website	D.5.5 AMS section present on AMR/MOH website	D.5.5 Improve visibility of AMS and make guidelines available to all professionals	D.5.5 -Yes/No -Report of anonymous hospitals -National indicators results	D.5.5 -Once/5 years -Yearly reports	D.5.5 MOH Website	D.5.5 Checking	D.5.5 NA

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.6 Organize the dispensing of antimicrobials in the community pharmacies	D.6.1 Nominate a task group for the meeting between MOH including Dr. W Ammar and the Order of pharmacists	D.6.1 None						
	D.6.2 Meeting between a high-authority- level task force and the President of the Order of Pharmacists to agree over a plan to restrict dispensing of ABX	D.6.2 Agenda for collaboration put	D.6.2 Discuss and put a plan that is acceptable by pharmacists about dispensing of ABX over-the-counter	D.6.2 Minutes of meeting and activities added to the plan	D.6.2 Once	D.6.2 Meeting	D.6.2 Meeting	D.6.2 Previous work with pharmacists at lower levels that did not lead to official action

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.1 Banning importation and use of CIAM in the D.7.1.1 The CIAM list will be sent to the minister to veterinary field D.7.1 DDD of CIAM molecules imported per year ban their importation for veterinary use	D.7.1 Establish baseline and follow up of the quantity	D.7.1 Report on 2022 and 2023 data and type of ABX used in the country per year.	D.7.1 Once for 2022/2023 then every year Veterinary ABX registry available and yearly report posted on AMR website	D.7.1 Veterinary drug office	D.7.1 Research project for 1 year	D.7.1 NA	D.7 Control and regulate the use of ABX in the veterinary,
	D.7.1.2 The veterinary drug office will not import these agents							
	D.7.2 Check if CIAM are used in agriculture and environment D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list.	D.7.2.1 Report on antimicrobials officially imported for agriculture use	D.7.2.1 To check the extent of the use CIAM in agriculture	D.7.2.1 Report	D.7.2.1 Once/year	D.7.2.1 MOA	D.7.2.1 Research project for 1 year	D.7.2.1 NA
	D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel	D.7.2.2 None						

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7.2.3 Get results of ABX residues in food items being done in Yemen	D.7.2.3 None						
	D.7.3 Surveillance of importation of regularly used ABX to Yemen D.7.3.1 Form a registry of imported ABX in veterinary world	D.7.3.1 Presence of annual data of imported veterinary ABX on registry	D.7.3.1 Yearly report of imported ABX in veterinary world on AMR website	D.7.3.1 Yes/No	D.7.3.1 Yearly report.	D.7.3.1 Veterinary drug office	D D.7.3.1 Registry	D.7.3.1 NA
	D.7.4 Research study about ABX consumption D.7 4.1 Research project by one of Masters Student at Beirut Arab University (SU)	D.7 4.1 None						

objective 4	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency of Data collection	Data Source	Method	Baseline
D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors	D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)	D.7 4.2 Report on the national use of ABX in poultry farms	D.7 4.2 Determine baseline ABX use in poultry in Yemen.	D.7 4.2 Yes/No	D.7 4.2 Once	D.7 4.2Poultry farms		D.7 4.2Partially available not standardized surveillance
	D.7.5 Research study about unofficial importation of ABX to Yemen D.7.5 Research project in Agriculture school	D.7.5 Report on the unofficial ABX importation used in veterinary world	D.7.5 Evaluate the ABX purchases outside the official routing	D.7.5 Yes/No	D.7.5 Once	D.7.5 Veterinary pharmacies	D.7.5 Market research	D.7.5 NA

12. Axis E: Budget Planning and Fund Attraction

The plan for economic sustainability was replaced mainly by a plan for budget preparation and preparation of the ground for fund raising for the execution of the NAP.

Strategic plan

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		
Potential measures of effectiveness: extent of increase in sustainable investment in capacity to counter antimicrobial		
Strategic Objective 5 interventions	**Activity / Sub-activity**	**Mile stone/ Date (from operational plan)**
E.0 Organization of the responsibilities for the execution of the tasks	E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis	E.0 three months from time zero E.0.1 three months from time zero
	E.0.2 Nominate members of the technical working group	E.0.2 three months from time zero
E.1 AMR budget planning	E.1.1 Budget for each activity of the plan has been studied E.1.1.1 Budget for every sub- activity is put in the NAP	E.1 Finalized February 2021 E.1.1.1 Ready at "time zero
	E.1.2 Overall budget of the plan has been assessed E.1.2 Meeting between Dr. Dr. - WHO and Dr. MOH finalize the budget	E.1.2 20th December 2022
E.2 Looking for sources of funding for NAP	E.2.1 Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP E.2.1.1 Financing from WHO discussed E.2.1.2 Financing from MOH discussed E.2.1.3 Financing from MOA discussed E.2.1.4 Financing from NGO (FAO, Foundations Merieux) discussed	E.2 Nine months from "time zero E.2.1.1 six months from "time zero" E.2.1.2 six months from "time zero" E.2.1.3 1st Jan 2023 E.2.1.4 six months from "time zero"

Strategic Objective 5 interventions	Activity / Sub-activity	Mile stone/ Date (from operational plan)
E.2 Looking for sources of funding for NAP	E.2.2 Look for other funding sources (agencies or bodies or countries) E.2.2.1 Allocate a professional that will prepare proposals for funding E.2.2.2 The allocated professional prepares the general proposal E.2.2.3 Allocate a specialized person to do mapping of funders E.2.2.4 Send proposals to agencies or organizations that are potential funders	E.2.2.1 Three months from "time zero" E.2.2.2 Six months from "time zero" E.2.2.3 Three months from "time zero" E.2.2.4 Nine months from "time zero"
	E.2.3 Include private organizations interested in AMR into the NAP E.2.3.1 Mapping of private organizations interested in AMR E.2.3.2 Present collaboration proposals to these organizations	E.2.3.1 Three months from "time zero" E.2.3.2 Six months from "time zero"
E.3 Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and Bio repositories as sources of new antimicrobial molecules	E.3.1 Mapping of international organizations /countries for potential collaboration in the investigation of natural sources of biodiversity and E.3.1.1 Nominate the person who will be in charge of doing this mapping and having a list of these organizations E.3.1.2 Do the mapping plus list biorepositories as sources of new antimicrobial molecules E.3.1.3 Approach these organizations through showing them the achieved research in Yemen as well as potential for benefit sharing with these organizations	E.3 Nine months from "time zero" E.3.1.1 3 three months from "time zero E.3.1.2 Six months from "time zero" E.3.1.3 Nine months from "time zero
	E.3.2 Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules E.3.2.1 Communication with WHO/MOH to organize a yearly meeting where researchers in Yemen expose and discuss their studies in the field of biodiversity for alternatives to ABX E.3.2.2 Create a section of AMR Website where local studies, posters, articles, projects in biodiversity are posted	E.3.2.1 3 three months from "time zero" E.3.2.2 three months from "time zero

Strategic Objective 5 interventions	Activity / Sub-activity	Mile stone/ Date (from operational plan)
E.4 Establishing communication with public and private sector for collaboration to NAP	E.4.1 Establish a network of researchers in public and private sectors E.4.1.1 DC&S to host yearly workshop for researchers to discuss AMR research	E.4 One year from "time E.4.1.1 three months from "time zero
	E.4.2 Mapping of potential private partners to encourage research E.4.2.1 Nominate the person who will do the mapping E.4.2.2 Produce a list of potential partners	E.4.2.1 Three months from "time zero" E.4.2.2 Six months from "time zero"
	E.4.3 Establish communication and collaboration with private partners E.4.3.1 Preparation of specific proposals for collaboration with specific partners E.4.3.2 Establish communication and collaboration with these private partners	E.4.3.1 Nine months from "time zero" E.4.3.2 One year from "time zero

12.1. Operational plan and budget Objective 5

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.0 Organization of the responsibilities for the execution of the tasks	E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis	E.0.1 Letter	E.0.1 One	E.0.1 three months from time zero	E.0.1 MOH	E.0.1 -WHO- National Professional Officer (Dr. --) -MOH- General Director (Dr--) -MOA general director	E.0.1 USD	E.0.1 WHO	E.0.1 Focal person nominated
	E.0.2 Nominate members of the technical working group	E.0.2 Letter	E.0.2 One	E.0.2 three months from time zero	E.0.2 MOH	WHO- National Professional Officer (Dr. --) -MOH- General Director (Dr--)	E.0.2 USD	E.0.2 WOH	E.0.2 Technical working group assigned

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.1 AMR budget planning	E.1.1 Budget for each activity of the plan has been studied E.1.1.1 Budget for every sub-activity is put in the NAP	E.1.1 Budget for every sub-activity	E.1.1 One	E.1.1 Ready at "time zero"	E.1.1 WHO	E.1.1 -Private sector, WHO consultant, former DC&S president (Dr.---) -WHO-National Professional Officer (Dr. --)	E.1.1 Included in NAP preparation budget USD	E.1.1 AMR Plan	E.1.1 Budget finalized
	E.1.2 Overall budget of the plan has been assessed E.1.2 Meeting between Dr. ---- and Dr. ---- to finalize the budget	E.1.2 Meeting	E.1.2 One	E.1.2 20th December 2023	E.1.2 WHO Beirut	E.1.2 -Private sector, WHO consultant, former DC&S president(Dr. ---) -WHO-National Professional Officer (Dr. --)	E.1.2 Included in NAP preparation budget USD	E.1.2 AMR Plan	E.1.2 Budget finalized

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.2 Looking for sources of funding for NAP	E.2.1 Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP E.2.1.1 Financing from WHO discussed E.2.1.2 Financing from MOH discussed E.2.1.3 Financing from MOA discussed E.2.1.4 Financing from NGO (FAO,Fondation) discussed	E.2.1.1 Meeting	E.2.1.1 one	E.2.1.1 six months from "time zero"	E.2.1.1 WHO	E.2.1.1 -Focal person -Technical working group	E.2.1 USD	E.2.1 WHO	E.2.1 Percentage of budget is available
		E.2.1.2 Meeting with Dr -------	E.2.1.2 one	E.2.1.2 six months from "time zero"	E.2.1.2 MOH	E.2.1.2 -Focal person -Technical working group			
		E.2.1.3 Meeting with MOA general director	E.2.1.3 one	E.2.1.3 1st Jan 2022	E.2.1.3 MOA	E.2.1.3 -Focal person -Technical working group			
		E.2.1.4 Meetings with agencies	E.2.1.4 3-4	E.2.1.4 six months from "time zero"	E.2.1.4 Agencies	E.2.1.4 -Focal person- Technical working group			

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.2 Looking for sources of funding for NAP	E.2.2 Look for other funding sources (agencies or bodies or countries) E.2.2.1 Allocate a professional that will prepare proposals for funding E.2.2.2 The allocated professional prepares the general proposal E.2.2.3 Allocate a specialized person to do mapping of funders E.2.2.4 Send proposals to agencies or organizations that are potential funders	E.2.2.1 Team	E.2.2.1 One	E.2.2.1 Three months from "time zero"	E.2.2.1 -MOH -WHO	E.2.2.1 Technical working group	E.2.2.1 USD	E.2.2.1 WHO	E.2.2 Number of proposals sent to organizations that are potential funders
		E.2.2.2 Proposal	E.2.2.2 One	E.2.2.2 Six months from "time zero"	E.2.2.2 -WHO -MOH -MOA	E.2.2.2 Technical working group	E.2.2.2 USD	E.2.2.2 AMR fund	
		E.2.2.3 Person	E.2.2.3 One	E.2.2.3 Three months from "time zero"	E.2.2.3 -WHO -MOH -MOA	E.2.2.3 Technical working group	E.2.2.3 USD	E.2.2.3	
		E.2.2.4 Proposal	E.2.2.4 One	E.2.2.4 Nine months from "time zero"	E.2.2.4 -WHO -MOH -MOA	E.2.2.4 Focal person	E.2.2.4 USD	E.2.2.4 AMR fund	

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.2 Looking for sources of funding for NAP	E.2.3 Include private organizatio ns interested in AMR into the NAP E.2.3.1 Mapping of private organizatio ns interested in AMR E.2.3.2 Present collaboratio n proposals to these organizations	E.2.3.1 List	E.2.3.1 One	E.2.3.1 Three months from "time zero"	E.2.3.1 -WHO -MOH -MOA	E.2.3.1 Person in charge mapping of potential funders	E.2.3.1 USD	E.2.3.1 AMR fund	E.2.3 Number of private organizations that are collaborating with NAP
		E.2.3.2 Proposal	E.2.3.2 One	E.2.3.2 Six months from "time zero"	E.2.3.2 -WHO -MOH -MOA	E.2.3.2 Proposal specialist	E.2.3.2 Included in E.2.2.4	E.2.3.2 Budget for 2.2.4	
E.3 Mapping of organizatio ns for potential collaboratio n in the investigatio n of natural sources of biodiversity and bioreposito ries as sources of new antimicrobi al molecules	E.3.1 Mapping of international organizations /countries for potential collaboration in the investigation of natural sources of biodiversity and bio-repositories E.3.1.1 Nominate the person who will be in charge of doing this mapping and having a list of these organizations E.3.1.2 Do the mapping plus list ries as sources of new antimicrobial molecules	E.3.1.1 Person	E.3.1.1 One	E.3.1.1 3 three months from "time zero	E.3.1.1 -WHO -MOH -MOA	E.3.1.1 Person in charge mapping of potential funders	E.3.1.1 Included in E.2.2.4	E.3.1.1 Budget for 2.2.4	E.3.1 Number international of organizations collaborating on this issue
		E.3.1.2 List	E.3.1.2 One	E.3.1.2 Six months from "time zero"	E.3.1.2 -WHO -MOH -MOA	E.3.1.2 Person in charge of mapping organizatio ns and funds	E.3.1.2 Included in E.2.2.4	E.3.1.2 Budget for 2.2.4	

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsible entity	Cost	Source of funding	Indicator
E.3 Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and bioreposito ries as sources of new antimicrobi al molecules	E.3.1.3 Approach these organizatio ns through showing them the achieved research in Yemen as well as potential for benefit sharing with these organizations	E.3.1.3 Proposal	E.3.1.3 One	E.3.1.3 Nine months from "time zero"	E.3.1.3 -WHO -MOH -MOA	E.3.1.3 Focal person	E.3.1.3 USD	E.3.1.3	
	E.3.2 Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules E.3.2.1 Communic ation with WHO/MOH to organize a yearly meeting where researchers in Yemen expose and discuss their studies in the field of biodiversity for alternatives to ABX	E.3.2.1 Meeting	E.3.2.1 Once/year	E.3.2.1 3 three months from "time zero"	E.3.2.1 DC&S	E.3.2.1 President of DC&S (Dr. ---)	E.3.2.1 USD	E.3.2.1	E.3.2 Number of local research bodies that support biodiversity as a source of antimicrobial molecules
	E.3.2.2 Create a section of AMRWebsite where local studies, posters, articles, projects in biodiversity are posted	E.3.2.2 Section on AMR website	E.3.2.2 One	E.3.2.2 three months from "time zero"	E.3.2.2 MOH WHO	E.3.2.2 IT speciali st MOH WHO	E.3.2.2 Included in budget of website	E.3.2.2 AMR Website Budget	

Objective5	Activity/Sub- activity	Unit	Quantity	Date	Location	Responsibl e entity	Cost	Source of funding	Indicator
E.4 Establishin g communica tion with public and private sector for collaboratio n to NAP	E.4.1 Establish a network of researchers in public and private sectors E.4.1.1 DC&S to host yearly workshop for researchers to discuss AMR research	E.4.1.1 Workshop	E.4.1.1 One	E.4.1.1 three months from “time zero”	E.4.1.1 DC&S	E.4.1 -Private sector, WHO consultant, former DC&S president (Dr. - President of DC&S (Dr. --)	E.4.1 USD/	E.4.1 DC&S	E.4.1 Number of studies that are posted on AMR website about biodiversity in research for ABX
E.4 Establishin g communica tion with public and private sector for collaboratio n to NAP	E.4.2 Mapping of potential Private partners to Encourage research E.4.2.1 Nominate the person who will do the mapping E.4.2.2 Produce a list of potential partners	E.4.2.1 Person	E.4.2.1 One	E.4.2.1 Three months from “time zero”	E.4.2.1 - WHO -MOH -MOA	E.4.2 Person in charge of NAP	E.4.2 Part of website budget	E.4.2 AMR fund	E.4.2 Number of private partners that are collaborating to research
		E.4.2.2 List	E.4.2.2 One	E.4.2.2 Six months from “time zero”	E.4.2.2 -WHO -MOH -MOA	E.4.2.2 Nominated person for mapping	E.4.2.2 Included in 2.3.1	E.4.2.2 Budget of 2.3.1	
	E.4.3 Establish communication andcollaboration with private partners E.4.3.1 Preparation of specific proposals for collaboration with specific partners E.4.3.2 Establish communica tion and collaboration with these private partners	E.4.3.1 Proposal	E.4.3.1 One	E.4.3.1 Nine months from “time zero”	E.4.3.1 -WHO -MOH -MOA	E.4.3.1 Proposal specialist	E.4.3.1 Focal person	E.4.3.1 None	E.4.3 Number of private partners that are collaborating to AMR
		E.4.3.2 Communic ation	E.4.3.2 Number of potential partners	E.4.3.2 One year from “time zero”	E.4.3.2 -WHO -MOH -MOA	E.4.3.2 Person in charge of NAP	E.4.3.2 Focal person	E.4.3.2 None	

12.2. Monitoring and evaluation plan For Axis E

Objective5	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
E.0 Organization of the responsibilities for the execution of the tasks	E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis E.0.2 Nominate members of the technical working group	E.0.1 Focal person nominated E.0.2 Technical working group assigned	E.0 Organization of the responsibilities for the execution of the tasks	E.0 Yes/No	E.0 Once/5 years	E.0 -MOH -WHO -MOA	E.0 Letter	E.0 NA
E.1 AMR budget planning	E.1.1 Budget for each activity of the plan has been studied E.1.1.1 Budget for every sub-activity is put in the NAP E.1.2 Overall budget of the plan has been assessed E.1.2.2 Meeting between Dr. WHO and Dr. MOH to finalize the budget	E.1.1 Budget finalized E.1.2 Budget finalized	E.1 Mandatory	E.1 Yes/No	E.1 Once/5 years	E.1 -WHO -Private sector, WHO consultant, former DC&S president (DR….)	E.1 Calculation	E.1 NA

Objective5	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
E.2 Looking for sources of funding for NAP	**E.2.1 Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP** E.2.1.1 Financing from WHO discussed E.2.1.2 Financing from MOH discussed E.2.1.3 Financing from MOA discussed E.2.1.4 Financing from NGO (FAO, Fondation Merieux) discussed	E.2.1 Percentage of budget is available	E.2.1 Vision of financial needs	E.2.1 Yes/No	E.2.1 Once/5 years	E.2.1 -WHO -MOH -MOA	E.2.1 Meetings	E.2.1 NA
	E.2.2 Look for other funding sources (agencies or bodies or countries) E.2.2.1 Allocate a professional that will prepare proposals for funding E.2.2.2 The allocated professional prepares the general proposal	E.2.2 Number of proposals sent to organizations that are potential funders	E.2.2 Attract Funds	E.2.2 Number of proposals sent to organizations that are potential funders	E.2.2 Once/5 years	E.2.2 -WHO -MOH -MOA	E.2.2 Mapping organizations and sending proposal	E.2.2 NA

Objective5	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
E.2 Looking for sources of funding for NAP	E.2.2.3 Allocate a specialized person to do mapping of funders E.2.2.4 Send proposals to agencies or organization s that are potential funders							
	E.2.3 Include private organization s interested in AMR into the NAP E.2.3.1 Mapping of private organization s interested in AMR E.2.3.2 Present collaboration proposals to these organizations	E.2.3 Number of private organization s that are collaborating with NAP	E.2.3 Pool money into the plan to be able to execute it	E.2.3 Number of private organization s that are collaborating with NAP	E.2.3 Once/5 years	E.2.3 -WHO -MOH -MOA	E.2.3 Mapping organization s and sending proposal	E.2.3 NA

Objective5	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
E.3 Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules	**E.3.1 Mapping of international organizations /countries for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules** E.3.1.1 Nominate the person who will be in charge of doing this mapping and having a list of these organizations E.3.1.2 Do the mapping plus list E.3.1.3 Approach these organizations through showing them the achieved research in Yemen as well as potential for benefit sharing with these organization s	E.3.1 Number international of	E.3.1 This field needs multinational collaboration	E.3.1 Number international of	E.3.1 Once/5 years	E.3.1 -WHO -MOH -MOA	E.3.1 Mapping organizations and	E.3.1 NA
		organizations collaborating on this issue	. This is to have win-win collaboration	organizations collaborating on this issue			sending proposal	

Objective5	Activity Sub-activity		Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
E.3 Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules	E.3.2 Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules E.3.2.1 Communicat ion with LAS to organize a yearly Meeting where Researchers in Yemen expose and discuss their studies in the field of biodiversity for alternatives to ABX E.3.2.2 Create a section of AMR Website where local studies, posters, articles, projects in biodiversity are posted		E.3.2 Number of local research bodies that support biodiversity as a source of antimicrobial molecules	E.3.2 Establish continuity of the work nationwide and communicati on among researchers	E.3.2 Number of local research bodies that support biodiversity as a source of antimicrobial molecules	E.3.2 Once/5 years	E.3.2 -WHO -MOH -DC&S	E.3.2 Communicat ion	E.3.2 NA
E.4 Establishing communicati on with public and private sector for collaboration to NAP	E.4.1 Establish a network of researchers in public and private sectors	E.4.1.1 DC&S to host yearly workshop for researchers to discuss AMR research	E.4.1 Number of studies that are posted on AMR website about biodiversity in research for ABX	E.4.1 Establish continuity of the work nationwide and communicatio n among researchers	E.4.1 Number of studies that are posted on AMR website about biodiversity in research for ABX	E.4.1 Once/5 years	E.4.1 -DC&S	E.4.1 Communicat ion	E.4.1 NA

Objective5	Activity Sub-activity	Indicator	Purpose	Calculation	Frequency	Data source	Method	Baseline
	E.4.2 Mapping of potential private partners to encourage research E.4.2.1 Nominate the person who will do the mapping E.4.2.2 Produce a list of potential partners	E.4.2 Number of private partners that are collaborating to research	E.4.2 Bring funds from private sector	E.4.2 Number of private partners that are collaborating to research	E.4.2 Once/5 years	E.4.2 -WHO -MOH -DC&S	E.4.2 Mapping	E.4.2 NA
	E.4.3 Establish communicati on and collaboration with private partners E.4.3.1 Preparation of specific proposals for collaboration with specific partners E.4.3.2 Establish communicati on and collaboration with these private partners	E.4.3 Number of private partners that are collaborating to AMR	E.4.3 Bring funds from private sector	E.4.3 Number of private partners that are collaborating to AMR	E.4.3 Once/5 years	E.4.3 -WHO -MOH -DC&S	E.4.3 Communicat ion	E.4.3 NA

13. Summary of main activities budget

Global action plan strategic Objective (1) Develop awareness and understanding of antimicrobial resistance through effective communication, education, behavior changes, and training				
Potential measures of effectiveness: Extent of reduction in national human consumption of antibiotics (with allowance for the need for improved access in some settings), and reduction in the volume of antibiotic use in food production				
Activity	Work Shop	Frequency	Year	Fund/ USD
A.1.1Nominate a focal person in charge of following up the activities of the objectives of this axis **ترشيح شخص مسؤول عن متابعة أنشطة أهداف هذا المحور**			**2022-2026** **3000$**	**3000* one person*12 months=** **36,000** USD
A.1.2 Choose the members of the Awareness TWG **اختيار أعضاء مجموعة العمل الفنية للتوعية) (TWG راديو / تلفزيون ، خبير وسائط اجتماعية ، فني ، صيدلي ، أطباء أمراض معدية ، أطباء بيئة ، أخصائي الأحياء الدقيقة ، طبيب بيطري ، زراعة ، وزارة الصحة وممثل عن منظمة الصحة العالمية) شخص** **مجموعة فنية واحدة - 8 أعضاء من كل قطاع -**		**10 PSERSONS**	**2022-2026** **300$**	**15,600** **300*10person* 12month=** **36,000** USD
A.1.4 Slogan for AMR		A.1.4 one	A.1.4 two months from time “zero	5000
A.2.1.1 **DC&S**, University OF medicine scheduled lectures in national conferences of the medical, pharmaceutical, nursing, veterinary, agricultural and environmental fields across Yemen		A.2.1.1 One	A.2.1.1 two months from time “zero	10000
A.2.1.2 Ask syndicates/ orders (human and animal health and agriculture) that for CME credits to be given for any lecture involving ABX use, at least 2-3 slides should be put to increase awareness about AMR and the ways to prevent it including antimicrobial use.		A.2.1.2 depending on number ofsyndicates/ orders	A.2.1.2 Six months from time “zero	10000
Ask orders of pharmacists **Veterinarians,** physicians, and dentists to send monthly SMS as reminders to health professionals about the dangers of AMR and/or AMR News		A.2.1.3 three	A.2.1.3 36 months from time zero	12000
A.2.1.4 Workshops on AMR awareness to media professionals	Workshops Five	A.2.1.4 Once/ 5years	A.2.1.4 Once/ year /5 years	15000 *5= 75,000
A.2.1.5 Do one workshop Per governorate per year to veterinarians and agriculture specialists (Train thetrainer)	Workshops 12	A.2.1.5 12 per year	A.2.2.1 Three months from time “zero	10,000*12*5= 600,000
A.2.2.1Create a webpage for AMR on the official websites of MOH and MOA		A.2.2.1One	A.2.2.1Three months from time “zero	A.2.2.1 20,000

Global action plan strategic Objective (1) Develop awareness and understanding of antimicrobial resistance through effective communication, education, behavior changes, and training				
Potential measures of effectiveness: Extent of reduction in national human consumption of antibiotics (with allowance for the need for improved access in some settings), and reduction in the volume of antibiotic use in food production				
Activity	Work Shop	Frequency	Year	Fund/ USD
A.2.2.2 Use existing Webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram		A.2.2.2 Four	A.2.2.2 One year from time zero	A.2.2.2 10,000
A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/ Social media spots		A.3.1 One set of material	A.3.1 Six months from time zero	A.3.1 25,000
A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisement		A.4.1 12/ year	A.4.1 Six months from time zero	A.4.1 36000*5= 180000
A.4.5 SMS through national telecommu nication companies sent **four times per year** and during the global AMR awareness week		A.4.5 four per year	A.4.5 Starting end of first year from time zero	20000
A.5.1.1 Prepare a checklist **Guidelines** Including basic Information about AMR that should be included in school curricula		A.5.1.1 One	A.5.1.1 Start 3 months from time zero, Ready at end of first year from time zero	A.5.1.1 10,000
A.5.2.1 Prepare checklists for university curricula of these specialties each one separately		A.5.2.1 Based on Number of curricula of health specialties	A.5.2.1 Start 3 months from time zero Finalized 9 months from time zero	A.5.2.1 10,000 *10= 100,000
A.sssddddd5.2.2 Check curricula of health specialties to include information on AMR Include AMR tricyclic education		A.5.3.1 One	A.5.2.2 Start 3 months from time zero Finalized 9 months from time zero	A.5.2.2 10,000 *5= 50,000

Global action plan strategic Objective (1) Develop awareness and understanding of antimicrobial resistance through effective communication, education, behavior changes, and training				
Potential measures of effectiveness: Extent of reduction in national human consumption of antibiotics (with allowance for the need for improved access in some settings), and reduction in the volume of antibiotic use in food production				
Activity	Work Shop	Frequency	Year	Fund/ USD
A.5.3.1 Prepare a checklist for the needed information on AMR for veterinary school curricula		A.5.3.1 Three months from time zero	A.5.3.1 Three months from time zero	A.5.3.1 6000
A.5.3.2 Fill the gap in AMR information in veterinary school curricula		A.5.3.2 One	A.5.3.2 Six months from time zero	A.5.3.2 5,000
A.5.4.1 Checklist for the needed information on AMR for agriculture school curricula		A.5.4.2 One	A.5.4.2 Six months from time zero	A.5.4.2 6,000
A.6.2.1 Meeting with CEO s of main Pharmaceutical companies and working group and present the highlights of the AMR plan in general, awareness specifically and put plan of contribution to awareness activities		A.6.2.1 Three	A.6.2.1 6 months	A.6.2.1 12,000
Total Grant for five years				**1,228,000 USD**

Global action plan Strategic Objective 2: Strengthen the knowledge evidence base through surveillance and Research				
Potential measure of effectiveness: extent of reduction in the prevalence of antimicrobial resistance, based on data collected through integrated programmes for surveillance of antimicrobial resistance in Yemen				
Activity	Work Shop	Frequency	Year	Fund/ USD
B.1.1Appointment of focal person charge of following up the activities of the objectives ofthis axis		**One person**	**2022-2026** **3000$**	**3000* one person*12 months=** **36,000** USD
B.1.2Appointment of the members of the technical working group along with its TOR		**10 persons**	**2022-2026** **300$**	**300*10person* 12month=** **36,000** USD
B.2.2.1 Organize a nationwide workshop about GLASS and the plan of inclusion in GLASS and introduction to WHONET repeat the same the following year, then the following years	Workshop	B.2.2.1 one every 5 years	B.2.2.1 Three months from time zero	B.2.2.1 10,000 *5 = 50,000
B.2.2.3 Do a start up WHONET training for the 12 laboratories that were chosen for the coming 2 years every 2 years	Workshop	B.2.2.3 One every two years	B.2.2.3 Three months from time zero	B.2.2.3 15,000*2= 30,000
B.2.2.4 Do 3 laboratory visits for capacity building/year for 6 laboratories in different areas for building capacity and WHONET training	Workshop	B.2.2.4 Two visits per lab each year for 12 laboratories	B.2.2.4 starting year 1	2 vists*12 lab.*5 years *10,000= 600,000
B.2.2.5 External quality control twice per year for the 12 laboratories chosen for the 2 years, then to add the ones of the following 2 years, after the 2nd year		B.2.2.5 Years 1 &2 = 50sample /year *4 years 120 samples	B.2.2.5 Six months from time zero	B.2.2.5 100 USD /specimen (24*12* 100)*4 years= 120*100 144000 USD/ for 4 years
B.2.3.1 Data collection from mature laboratories		B.2.3.1 Once/year	B.2.3.1 Start end of 1st year from time zero	.2.3.1 5000*12= 60,000*5year Total 300,000

Global action plan Strategic Objective 2: Strengthen the knowledge evidence base through surveillance and Research				
Potential measure of effectiveness: extent of reduction in the prevalence of antimicrobial resistance, based on data collected through integrated programmes for surveillance of antimicrobial resistance in Yemen				
Activity	Work Shop	Frequency	Year	Fund/ USD
B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).		B.4.2 one	B.4.2 9 months from time zero	B.4.2 10,000
B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields		B.4.3 One	B.4.3 6 months from time zero	B.4.3 5000
B.4.4 -Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Sana'a for the analysis of surveillance e specimens in agricultural, food, veterinary, and environmental fields -Suggestion of a plan of the microbiology work in this surveillance		B.4.4 Three Visits	B.4.4 Six months from time zero and completed nine months from time zero	B.4.4 10,000 USD per visit Total: 3 visits= 30,000
-Report results of ABX use And resistance surveillance in **agriculture and veterinary** world -Send a yearly report with Recommendations to the **animal drug registry** about ABX purchasing in the country during the coming 2 years		B.4.5 Once every 2 years	B.4.5 First report should be ready at end of year 2 from time zero	B.4.5 10,000/report (Every 2years) Total30,000
B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr ----		B.5.3 one to each potential reference laboratory	B.5.3 5 months from time zero	B.5.3 5000*12 60,000
Total Grant for five years				**1,331.000 USD**

Global action plan strategic Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and prevention measures				
Potential measure of effectiveness extent of reduction in the prevalence of preventable infections, and in particular the incidence of drug-resistant infections in health care settings				
Activity	Work Shop	Frequency	Year	Fund/ USD
C.1.1 Appointment of focal person n charge of following up the activities of the objectives of this axis		C.1 One person	C.1 three months from “time zero”	36,000
C.1.2 Appointment of the members of the IPC TWG along with its TOR		10 persons		36,000
C.2.1 Improve IPC practices in Hospitals C.2.1.1 To establish national IPC guidelines; guidelines to be all-inclusive including requirements and qualifications of IPC officer and physician and checklist		C.2.1.1 five	C.2.1.1 three months from “time zero”	C.2.1.1 50,000
C.2.1.2 Inclusion of the checklist of the guidelines in accreditation standards		C.2.1.2 one	C.2.1.2 six months from “time zero”	C.2.1.2 10,000
C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation		C.2.1.3 one every 5 years	C.2.1.3 three years from “time zero”	C.2.1.3 30,000
C.2.1.4 Syndicate of hospitals recommend s periodic IPC training and workshops to employees hosted by scientific societies, universities , etc.	workshops	C.2.1.4 five	C.2.1.4 1,5 years from “time zero”	C.2.1.4 75,000
C.2.2 Improve IPC practices in hospital C.2.2.1 To review and update guidelines of IPC in hospital that are available in Ministry of Social Affairs		C.2.2.1 One	C.2.2.1 three months from “time zero”	C.2.2.1 30,000
C.2.2.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities		C.2.2.2 One	C.2.2.2 three months from “time zero	C.2.2.2 15,000
C.2.3.1 Establish guidelines on IPC in the PHCC		C.2.3.1 One	C.2.3.1 six months from “time zero”	C.2.3.1 30,000
C.3.1 Include IPC-related educational modules in human- health related majors (physicians , nurses, midwives, physiotherapists, pharmacist s, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)		C.3.1 one per year 2 types: 1.General 2.Specific to nurses, midwives medical students.	C.3.1 one year from “time zero”	C.3.1 75,000

Global action plan strategic Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and prevention measures				
Potential measure of effectiveness extent of reduction in the prevalence of preventable infections, and in particular the incidence of drug-resistant infections in health care settings				
Activity	Work Shop	Frequency	Year	Fund/ USD
C.3.2Include IPC-related educational modules in veterinary schools curricula C.3.2.1 Check the current situation of IPC in the ongoing veterinary curriculum		C.3.2.1 One	C.3.2.1 three months from "time zero"	C.3.2.1 25,000
C.3.2.2 Review of IPC in regional and global veterinary curricula		C.3.2.2 One	C.3.2.2 three months from "time zero"	C.3.2.2 10,000
C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement		C.3.2.3 One	C.3.2.3 six months from "time zero"	C.3.2.3 10000
C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)		C.3.3.1 One	C.3.3.1 six months from "time zero"	C.3.3.1 30,000
C.3.3.3 Include the recommended AMR and IPC in curricula when not available		C.3.3.3 One	C.3.3.3 2 years from "time zero"	C.3.3.3 10,000
C.3.3.2 Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them		C.3.3.2 One	C.3.3.2 six months from "time zero"	C.3.3.2 10,000
C.4.2 Make training available and affordable in universities and professional societies C.4.2.1 MOH Sends letters to Ministry of Higher Education and to Order of physicians explaining the need and recommending training specialization opportunities and courses related to IPC		C.4.2.1 One	C.4.2.1 3 months	C.4.2.1 10000

Global action plan strategic Objective 3: Reduce the incidence of infection through effective sanitation, hygiene and prevention measures				
Potential measure of effectiveness extent of reduction in the prevalence of preventable infections, and in particular the incidence of drug-resistant infections in health care settings				
ACTIVITY	WORK SHOP	frequency	YEAR	FUND/ USD
C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process		C.5.1 One	C.5.1 One year from "time zero"	C.5.1 100,000
C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, etc		C.5.2 One	C.5.2 Four years from "time zero"	C.5.2 30,000
C.6.1 Conduct a point prevalence study on nosocomial infections in Yemeni hospitals		C.6.1 one	C.6.1 2 years	C.6.1 20,000
C.7.1 Review the OIE biosafety recommendations		C.7.2 one	C.7.2 5 months	C.7.2 10,000
Total Grant for five years				**652, 000USD**

Objective 4: Optimize the use of antimicrobial medicines in human and animal health				
Potential measure of effectiveness: extent of reduction in National human consumption of antibiotics (with allowance for the need for improved access in some settings), the consumption of antibiotics used in food production (terrestrial and aquatic livestock, and other agricultural practices), and the use of medical and veterinary antimicrobial agents forapplications other than human and animal health				
Activity	Work Shop	Frequency	Year	Fund/ USD
D.1.1 Appointment of focal person ncharge of following up the activities of the objectives of this axis		**One person**	**2022-2026** **300$**	**3000* one person*12 months=** **18,000** USD
D.1.2 Appointment of the members of the technical working group along with its TOR		**4 persons**	**2022-2026** **100$**	**300*10person* 12month=** **24,000** USD
D.2.1 support and include ABX as priority drugs in the pharmacovigilance project of the Yemeni University and the adverse drug event reporting program of the Order of Pharmacist s		D.2.1 One	D.2.1 One year from time zero	D.2.1 20,000
D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans		D.3.1.1 One	D.3.1.1 Three months from time zero	D.3.1.1 20,000
D.3.1.2 Formulate the list of CIAM		D.3.1.2 One	D.3.1.2 Six months from time zero	D.3.1.2 10,000
D.4 Sentinel Surveillance of ABX(CIAM)consumption from a network of hospitals and benchmark with international ldata Workshops on metrics for ABX use measurement	Workshops	D.4.1 Six	D.4.1 Six months from time zero and 1 year from time zero	D.4.1 60,000
D.4.2.1 Determine the epidemiologically representative sample of hospitals for surveillance of ABX		D.4.2.1 One	D.4.2.1 three months from time zero	D.4.2.1 15,000
D.4.2.2 -Validate the measurement of hospital consumption by DDD/1000 Patient days in a batch of 4 hospitals per year -Include the hospitals with adequate measurements in a sequential manner into the surveillance list and data -Advice to hospitals that don't have adequate data		D.4.2.2 Four per year over 5 years	D.4.2.2 One year and three months from time zero and continue yearly for 5 years	D.4.2.2 10,000 USD per year for 5 years =50,000
D.4.2.3 Surveillance of AB X use in Yemeni hospitals by auto reporting DDDs		D.4.2.3 Once per year	D.4.2.3 1.5 years from time zero then yearly for 5 years	D.4.2.3 12,000
D.5.1 Workshops on Antimicrobial stewardship AMS **twice** per year	Workshops	D.5.1 two per year over 5 years	D.5.1 Six months from time zero then	D.5.1 10000 *2*5= =100,000

			yearly for 5 years	

Objective 4: Optimize the use of antimicrobial medicines in human and animal health				
Potential measure of effectiveness: extent of reduction in National human consumption of antibiotics (with allowance for the need for improved access in some settings), the consumption of antibiotics used in food production (terrestrial and aquatic livestock, and other agricultural practices), and the use of medical and veterinary antimicrobial agents forapplications other than human and animal health				
ACTIVITY	WORK SHOP	frequency	YEAR	FUND/ USD
D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to Standardize D.5.2.1 Put a list of essential guidelines the strategies of ABX use based on local epidemiology		D.5.2.1 One	D.5.2.1 six months from time zero	D.5.2.1 Threeg uidelines 45,000
D.5.2.3 Prepare and follow a schedule for the presentation of the guidelines in the respective scientific societies meeting and for the endorsement of these guidelines with the respective societies		D.5.2.3 One	D.5.2.3 Starting 1 year from time zero and finalized 3 years from time zero	D.5.2.3 Workshops 3 times per year (10000 USD per workshop) 10000*3*5=150,000
D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals D.5.5 Development of AMS webpage in the MOH website		D.5.4 One D.5.5 One	D.5.4 2023 and after each accreditation audit for 5 years D.5.5 six months from time zero	D.5.5 30,000
D.6.1 Nominate a task group for the meeting between MOH including Dr. ---- and the Order of pharmacists	Meeting	D.6.1 one	D.6.1 3 months	D.6.1 10,000
D.6.2 Meeting between a high- authority- level task force and the President of the Order of Pharmacist s to agree over a plan to restrict dispensing of ABX	Meeting	D.6.2 One	D.6.2 To be finalized 3 months from time zero	D.6.2 10,000
D.7.1.1 The CIAM list will be sent to the minister to ban their importation for veterinary use		D.7.1.1 One	D.7.1.1 Will be sent 12 months from time zero	D.7.1 15,000
D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list		D.7.2.1 One	D.7.2.1 12 months from time zero	D.7.2 9000
D.7.2 Check if CIAM are used in agriculture and environment		D.7.2 One	D.7.2 12 months from time zero	D.7.2 6000

Objective 4: Optimize the use of antimicrobial medicines in human and animal health				
Potential measure of effectiveness: extent of reduction in National human consumption of antibiotics (with allowance for the need for improved access in some settings), the consumption of antibiotics used in food production (terrestrial and aquatic livestock, and other agricultural practices), and the use of medical and veterinary antimicrobial agents for applications other than human and animal health				
Activity	Work Shop	Frequency	Year	Fund/ USD
D.7 4.1 Research project by one of Masters Student at Sana'a University (SU)		D.7 4.1 five	D.7 4.1 starting at time zero for one per year	D.7 4.1 50,000
D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)		D.7 4.2 three	D.7 4.2 Two years from time zero	D.7 4.2 30,000
D.7.5 Research study about unofficial importation of ABX to Yemen		D.7.5 two	D.7.5 Two years from time zero	D.7.5 30,000
D.7.5.1 Research project in Agriculture school		D.7.5 .1 two	D.7.5.1 Two years from time zero	D.7.5 . 30,000
Total Grant for five years				**744.000 USD**

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				
Potential measures of effectiveness: extent of increase in sustainable investment in capacity to counter antimicrobial				
Activity	Work Shop	Frequency	Year	Fund/ Usd
E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis		one	**2022-2026** **500$**	**3000* one person*12 months=** **30,000** USD
E.0.2 Nominate members of the technical working group		Three	**2022-2026** **100$**	**100*3person* 12month=** **18,000** USD
E.2 Looking for sources of funding for NAP E.2.2.2 The allocated professional Prepares the general proposal		E.2.2.2 One	E.2.2.2 Six months from "time zero"	E.2.2.2 10,000
E.2.2.4 Send proposals to agencies or organizations that are potential funders		E.2.2.4 One	E.2.2.4 Nine months from "time zero"	E.2.2.4 6000
E.2.3.1 Mapping of private organizations interested in AMR		E.2.3.1 One	E.2.3.1 Three months from "time zero"	E.2.3.1 20,000

E.4.1 Establish a network of researchers in public and private sectors DC&S to host yearly workshop for researchers to discuss AMR researches	workshop	E.4.1.1 One	E.4.1.1 three months from "time zero"	E.4.1 15,000
Total Grant for five years				**99,000 USD**
FOR Employees				**?????**

Total requested fund for all objectives for five years	
Objective number	**Cost**
Objective 1	**1,228,000 USD**
Objective 2	**1,331.000 USD**
Objective 3	**652, 000USD**
Objective 4	**744.000 USD**
Objective 5	**99,000 USD**
SUB TOTAL grand	**4,054,000 USD**
For national focal point for 5years	**36,000**
For AMR surveillance program and reference labs **15 desktop computer CORE-i8** **15 desktop and** **15 cupboard** **45 chair** **15 printer** **15 internet router**	**6700* 15=100,500USD**
Total grand	**4,190,500 USD**

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