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

Prepared by

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Officer Communicable Diseases Department- World Health Organization

Dr Ahmed Ali Qaid Thabit

Ministry of Public Health and Population
His Excellency Minister/ Dr. Taha Ahmed Al-Mutawakel

2022-2026
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<tr>
<td>ABX</td>
<td>Antibiotics</td>
<td></td>
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<td>ACC</td>
<td>Antimicrobial Coordination Committee</td>
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<td>AMR</td>
<td>Antimicrobial resistance</td>
<td></td>
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<td>AUY</td>
<td>Agriculture University of Yemen</td>
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<td>AMS</td>
<td>Antimicrobial Stewardship</td>
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<tr>
<td>CERD</td>
<td>Center for Educational Research and Development</td>
<td></td>
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<tr>
<td>CIAM</td>
<td>Critically Important Antimicrobials</td>
<td></td>
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<tr>
<td>CME</td>
<td>Continuous Medical Education</td>
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<td>CIAM</td>
<td>Critically Important Antimicrobials</td>
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<td>DDD</td>
<td>Defined Daily Dose</td>
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<td>Dpt</td>
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<td>EMRO</td>
<td>Eastern Mediterranean Region Office</td>
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<td>ESU</td>
<td>Epidemiological Surveillance Unit</td>
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<tr>
<td>GAP</td>
<td>Global Action Plan</td>
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<td>GLASS</td>
<td>Global Antimicrobial Resistance Surveillance System</td>
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<td>ID</td>
<td>Infectious Diseases</td>
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<td>IHR</td>
<td>International Health Regulation</td>
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<td>IPC</td>
<td>Infection Prevention and Control IT: Information Technology</td>
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<td>YARI</td>
<td>Yemen Agricultural Research Institute Microbiology</td>
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<td>DC&amp;S</td>
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<td>MOA</td>
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<td>MOH</td>
<td>Ministry of Health and population</td>
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<td>MoA</td>
<td>Ministry of Agriculture and animal worth</td>
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<tr>
<td>MoE</td>
<td>Ministry of Education</td>
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<td>MoI</td>
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<tr>
<td>NA</td>
<td>Not Available</td>
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<td>NAP</td>
<td>National Action Plan</td>
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<td>NGO</td>
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<td>NSC</td>
<td>National multi-sectoral steering Committee</td>
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<td>OIE</td>
<td>World organization for animal health</td>
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<td>PHC</td>
<td>Primary HealthCare</td>
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<td>PHCC</td>
<td>Primary Health Care Center</td>
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<tr>
<td>QC</td>
<td>Quality Control</td>
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<td>SOCs</td>
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<td>SU</td>
<td>Sana'a University</td>
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<td>TOR</td>
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<td>Television</td>
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<td>United Nations</td>
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<tr>
<td>USD</td>
<td>United States Dollars</td>
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<td>WHO</td>
<td>World Health Organization</td>
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<td>WHONET</td>
<td>World Health Organization soft wire program</td>
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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 اثير امنا من الأمراض المعدية المقاومة للمضادات الميكروبية

الرسالة:–

استمرار العلاج الناجح أطول فترة ممكنة من خلال الامتعاث 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 AMR

المقدمة:

إن مقاومة المضادات الميكروبية (AMR) ارتفعت إلى مستويات خطيرة بأيام العالم كافة حالياً (Al-Shami& Al-Haimi, 2018)، وثمة آليات مقاومة جديدة في ظهور والانتشار على مستوى العالم وهي تهدد قدراتنا على علاج الأمراض المعدية الشائعة. (Al-Hammad& Al-Shamahy, 2018)

ووجدت قاعدة متزايدة من عدوى العدوى مثل العدوى الالتهابية والسل وتسمم الدم والسيلان التي أصبح علاجها أسهل بل مستحيل أحياناً بسبب تدني فاعلية المضادات الحيوية. نتيجة صرف المضادات من دون وصفة طبية لأعراض الاستعمال البشري أو الحيوي; كما أنها تستخدم بشكل عشوائي في مجال الزراعة وترطيب الحيوانات. ويتتبون أيضاً في البلدان التي لا تطبق مبادرات توجيهية معقولة في مجال العلاج لالعاملين الصحيين والأطباء البيطريين غالباً ما يفرطون باستخدام مضادات الحيوية التي كما هو موجود في اليمن. وإدن تفسر في اتخاذ الإجراءات فإنا نحن مconvون على عصر ما بعد المضادات الحيوية الذي يمكن أن تصبح فيه عدوى الالتهابات الشائعة والإصابات الطفيفة قاتلة مرة أخرى.

كما يعد علاج مقاومة المضادات الميكروبية أولوية قصيرة بالنسبة إلى كل المنظمات المهتمة بالصحة العامة وأبرزها منظمة الصحة العالمية. وقد أقرت جمعية الصحة العالمية الثامنة والستون في أيار/مايو 2015 بعامة مشكلة الصحة العالمية التي تثيرها AMR وتقترح هذه الخطة تنفيذ تدخلات لمكافحة مقاومتها هدفها ضمان الوقاية من الأمراض المعدية وعلاجها بأداة مامونة وناجية وهذه الخطة تركز على خمس محاور استراتيجية أساسية:

1. زيادة الوعي بظاهرة AMR وكفالة فيهمها بشكل أفضل من خلال الاتصال والتعلم والتدريب الفعال.
2. تعزيز الأعمال وقاعدية البيئات من خلال التترصد وإجراء البحوث
3. خفض معدلات الإصابة بالعدوى من خلال التدابير الفعالة المتعلقة بالإصلاح والنظافة والوقاية من

العدوى والسيطرة عليها

4. العمل على ضمان استخدام الأدوية المضادة للميكروبات على الوجه الأتّل في مجال صحة

الإنسان والحيوان والزراعة

5. بيان المبادرات الاقتصادية لضمان الاستثمار المستدام الذي يراعي احتياجات اليمن،

وزيادة الاستثمار في مجال مكافحة مقاومة مضادات الميكروبات والأدوية ووسائل التشخيص

والفحوصات الجديدة وغيرها من التدخلات

وفي سبتمبر 2016 قطع معظم رؤساء الدول بما فيها اليمن التزامًا في الجمعية العامة للأمم المتحدة

بنييورك بإتباع نهج واسع ومنسق ومشترك في معالجة الأسباب الجذرية التي تحق وراء

قطاعات متعددة وخصوصًا حسب البلدان "الطب البيطري" و في

الجانب الزراعي استنادًا إلى منظمة الأمم المتحدة للأغذية والزراعة والمنظمة العالمية لصحة الحيوان

قرارات تؤيد خطة العمل العالمية (GAP) بشأن في إطار اعترافهما بالحاجة

الماسة إلى اتخاذ إجراءات مشتركة بين القطاعات للتصدي لمقاومتها ويوجد العديد من مضادات

الميكروبات المستعملة في الحيوانات المُنثِرة للغذاء مطابقة لتلك التي يستعملها الإنسان أو ترتبط بها

ارتباطًا وثيقًا، وكذلك الحال بالنسبة إلى معظم مضادات الميكروبات المستعملة في إنتاج النباتات، ومنها

نباتات البساتين

و إبادًا للالتزاماتنا الدولية، سيتم وضع خطة عمل وطنية لمقاومة مضادات الميكروبات ترأسها وزارة

الصحة العامة والسكان وحية الجهات الأخرى وبدعم من مكتب منظمة الصحة العالمية باليمن وإشراف

لجنة واسعة من الخبراء والأكاديميين من مختلف القطاعات ذات العلاقة. حيث ستتشدد الخطة الوطنية

على أهمية العمل بمفهمة الصحة الواحدة واهمية اشراك كافة القطاعات ذات العلاقة وتتجنب الخطة الوطنية

مقاومة المضادات الحيوية الخطوط العريضة للأهداف الاستراتيجية التي تركز عليها الخطة العالمية

لمؤسسة الصحة العالمية وتنكن الخطة الوطنية من الآتي:

• خطة استراتيجية توضح الأهداف الأولويات.
• خطة تنفيذية توضح النشاطات وإلزامية تنفيذها والإدارات الزمني لتنفيذها والتكلفة.
• خطة الرصد والتقدير لتحديد مؤشرات الاداء والإنجاز لكافة النشاطات

وستركز الخطة الوطنية اليمنية على (14) هدف فرعي تتمحور حول خمسة محاها استراتيجيّة المذكورة

علاوة هذه الأهداف كالتالي:
1. زيادة الوعي فيما يخص مقاومة الجراثيم للمضادات الحيوية في فئة العاملين في قطاع الصحة و
الصحة البيئية.
2. تحسين المفهوم العام لمقاومة المضادات الحيوية وآثارها على صحة الإنسان.
3. تغيير السلوك العام نحو استخدام أفضل للمضادات الحيوية.
4. إنشاء شبكة رصد وطنية لتحديد انماط ومعدلات مقاومة المضادات الحيوية.
5. تعزيز أداء المختبرات الطبية لتوفير خدمات قياسية يمكن الاعتماد عليها في علاج المرضى و توفير
معلومات صحيحة لشبكة الرصد الوطنية.
6. تحديد الأولويات المستهدفة لشبكة الرصد الوطنية.
7. تقوية برنامج مكافحة الأمراض في المؤسسات الصحية.
8. استحداث ممارسات للاعمن 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 للمضادات حيوية ذات جودة عالية.
11. ضمان الاستخدام الأمثل للمضادات الحيوية في الإنسان و الحيوان.
12. إنشاء شبكة وطنية لرصد استخدام واستهلاك المضادات الحيوية.
13. إنشاء الأدلة الوطنية لاستخدام المضادات الميكروبيه الاستخدام科尔
AMR.
14. تشجيع أنشطة البحوث الخاصة بـ
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 strengthen 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. 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 Point) Dr. Samir Muhammad Al-Sanbani
6. A representative of the Environment and Consumer Protection Authority (Focal Point) 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. A representative of the public sector (hospitals, pharmacies and laboratories) (Focal Point) Dr.-------
11. A representative of the Faculty 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>
<thead>
<tr>
<th>Antibiotic name</th>
<th>Antibiotics /classes</th>
<th>Resistant No.</th>
<th>%</th>
<th>Total (n=300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ampicillin</td>
<td>Penicillin/amino-penicillin</td>
<td>237</td>
<td>79.8</td>
<td>297</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>3rd Cephalosporins B-lactam</td>
<td>236</td>
<td>78.9</td>
<td>299</td>
</tr>
<tr>
<td>Cefotaxim</td>
<td>4th Cephalosporins B-lactam</td>
<td>232</td>
<td>77.9</td>
<td>298</td>
</tr>
<tr>
<td>Cefapine</td>
<td>4th Cephalosporins B-lactam</td>
<td>231</td>
<td>77.3</td>
<td>299</td>
</tr>
<tr>
<td>Cefuroxime</td>
<td>2nd Cephalosporins B-lactam</td>
<td>224</td>
<td>74.9</td>
<td>299</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>3rd Cephalosporins B-lactam</td>
<td>216</td>
<td>72.2</td>
<td>299</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>4th Cephalosporins B-lactam</td>
<td>220</td>
<td>73.6</td>
<td>299</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>3rd Cephalosporins B-lactam</td>
<td>221</td>
<td>73.9</td>
<td>299</td>
</tr>
<tr>
<td>Cefoxime</td>
<td>2nd Cephalosporins B-lactam</td>
<td>210</td>
<td>70</td>
<td>300</td>
</tr>
<tr>
<td>Cefazoline</td>
<td>1st Cephalosporins B-lactam</td>
<td>207</td>
<td>69.7</td>
<td>299</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>3rd Cephalosporins B-lactam</td>
<td>167</td>
<td>58</td>
<td>288</td>
</tr>
<tr>
<td>Nitrofurazostatin</td>
<td>Nitrofurans</td>
<td>207</td>
<td>69.7</td>
<td>297</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>Fluoroquinolones</td>
<td>179</td>
<td>68.6</td>
<td>261</td>
</tr>
<tr>
<td>Ofloxacins</td>
<td>Fluoroquinolones</td>
<td>47</td>
<td>37</td>
<td>127</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>Fluoroquinolones</td>
<td>31</td>
<td>24.4</td>
<td>127</td>
</tr>
<tr>
<td>Sulphamethoxazole/Trimethoprim</td>
<td>Folate pathway inhibitors</td>
<td>189</td>
<td>66.2</td>
<td>299</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>Macrolides</td>
<td>178</td>
<td>59.9</td>
<td>297</td>
</tr>
<tr>
<td>Doxychycline</td>
<td>Tetracycline</td>
<td>169</td>
<td>59.5</td>
<td>284</td>
</tr>
<tr>
<td>Tetracycline-</td>
<td>Tetracycline</td>
<td>155</td>
<td>52</td>
<td>298</td>
</tr>
<tr>
<td>Ampicillin/ Sulbactam</td>
<td>B-lactamide inhibitor combinations</td>
<td>177</td>
<td>59</td>
<td>300</td>
</tr>
<tr>
<td>Amoxicillin-Clavulanic Acid</td>
<td>B-lactamide inhibitor combinations</td>
<td>167</td>
<td>58</td>
<td>288</td>
</tr>
<tr>
<td>Pipracillin/ Tazobactam</td>
<td>B-lactamide inhibitor combinations</td>
<td>147</td>
<td>49</td>
<td>297</td>
</tr>
<tr>
<td>Fosfomycin</td>
<td>Fosfomycin</td>
<td>48</td>
<td>57.1</td>
<td>84</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>Aminoglycosides</td>
<td>153</td>
<td>51.2</td>
<td>299</td>
</tr>
<tr>
<td>Amikacin</td>
<td>Aminoglycosides</td>
<td>72</td>
<td>40.9</td>
<td>176</td>
</tr>
<tr>
<td>Chloramphenicol</td>
<td>Phenics</td>
<td>64</td>
<td>52</td>
<td>123</td>
</tr>
<tr>
<td>Imipenem</td>
<td>Carbenapenes</td>
<td>98</td>
<td>33</td>
<td>297</td>
</tr>
</tbody>
</table>

Narrow spectrum of antibiotics used For Gram-negative bacteria

<table>
<thead>
<tr>
<th>Antibiotic name</th>
<th>Antibiotics /classes</th>
<th>Resistant No.</th>
<th>%</th>
<th>Total (n=300)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipracillin</td>
<td>Ureido-penicillin</td>
<td>105</td>
<td>63.3</td>
<td>166</td>
</tr>
<tr>
<td>Aztreonem</td>
<td>Monobactams</td>
<td>113</td>
<td>63.1</td>
<td>179</td>
</tr>
<tr>
<td>Mezlocillin</td>
<td>Ureido-penicillin</td>
<td>110</td>
<td>58.5</td>
<td>188</td>
</tr>
<tr>
<td>Colistin Sulphate</td>
<td>Poly-peptide</td>
<td>51</td>
<td>46.8</td>
<td>109</td>
</tr>
<tr>
<td>Nalidixic Acid</td>
<td>Quinolones</td>
<td>14</td>
<td>31.1</td>
<td>45</td>
</tr>
</tbody>
</table>

Narrow spectrum of antibiotics used For Gram-positive bacteria

<table>
<thead>
<tr>
<th>Antibiotic name</th>
<th>Antibiotics /classes</th>
<th>Resistant No.</th>
<th>%</th>
<th>Total (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methicillin</td>
<td>Penicillin-stable penicillin</td>
<td>60</td>
<td>85</td>
<td>70</td>
</tr>
<tr>
<td>Oxacillin</td>
<td>Penicillin-stable penicillin</td>
<td>71</td>
<td>63.9</td>
<td>111</td>
</tr>
<tr>
<td>Cloxacillin</td>
<td>Penicillin-stable penicillin</td>
<td>59</td>
<td>65.5</td>
<td>111</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>Macrolides</td>
<td>30</td>
<td>45.1</td>
<td>111</td>
</tr>
<tr>
<td>Penicillin</td>
<td>Penicillin</td>
<td>38</td>
<td>42.2</td>
<td>111</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>Lincosamides</td>
<td>28</td>
<td>25.2</td>
<td>111</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>Glycopeptides</td>
<td>31</td>
<td>28</td>
<td>111</td>
</tr>
<tr>
<td>Linzolid</td>
<td>Oxazolidinones</td>
<td>13</td>
<td>12.2</td>
<td>111</td>
</tr>
<tr>
<td>Rifampicin</td>
<td>Aminosycins</td>
<td>8</td>
<td>7.2</td>
<td>111</td>
</tr>
</tbody>
</table>

Antifungal agents

<table>
<thead>
<tr>
<th>Antifungal classes</th>
<th>No.</th>
<th>%</th>
<th>Total (n=36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fluconazole</td>
<td>Azoles-Triazole group</td>
<td>20</td>
<td>55.6</td>
</tr>
<tr>
<td>Nystatin</td>
<td>Polyenes group</td>
<td>11</td>
<td>30.6</td>
</tr>
<tr>
<td>Clotrimazole</td>
<td>Azoles-Imidazole group</td>
<td>10</td>
<td>27.8</td>
</tr>
<tr>
<td>Ketoconazole</td>
<td>Azoles-Imidazole group</td>
<td>7</td>
<td>19.4</td>
</tr>
<tr>
<td>Itraconazole</td>
<td>Azoles-Triazole group</td>
<td>6</td>
<td>16.7</td>
</tr>
<tr>
<td>Amphotericin - B</td>
<td>Polyenes group</td>
<td>2</td>
<td>5.6</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Isolated bacterial agents</th>
<th>MDR Range No. (%)</th>
<th>Antibiotics resistant (ABR) percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MET</td>
<td>FOX*</td>
</tr>
<tr>
<td>Staphylococcus aureus (n=66)</td>
<td>30(56.2%)</td>
<td>96.2</td>
</tr>
<tr>
<td>Enterococcus spp (n=35)</td>
<td>23(63.6%)</td>
<td>42.9</td>
</tr>
<tr>
<td>Staphylococcus epidermidis (n=14)</td>
<td>2(14.3%)</td>
<td>15.4</td>
</tr>
<tr>
<td>Staphylococcus pyogenes (n=26)</td>
<td>2(7.7%)</td>
<td>25.0</td>
</tr>
<tr>
<td>Staphylococcus saprophyticus (n=2)</td>
<td>1(50.0%)</td>
<td>100</td>
</tr>
<tr>
<td>Overall ABR percentages</td>
<td>85</td>
<td>71.6</td>
</tr>
</tbody>
</table>

Key words / CPM: Cephalosporin. N: not tested

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

<table>
<thead>
<tr>
<th>Isolated bacterial agents</th>
<th>MDR Rang No.(%)</th>
<th>Antibiotics resistant (ABR) %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ATM</td>
<td>FOX*</td>
</tr>
<tr>
<td>K. pneumoniae (n=60)</td>
<td>38(63%)</td>
<td>67.2</td>
</tr>
<tr>
<td>E. coli (n=45)</td>
<td>24(53.3)</td>
<td>61.9</td>
</tr>
<tr>
<td>Acinetobacter spp (n=53)</td>
<td>19(36.5%)</td>
<td>46.7</td>
</tr>
<tr>
<td>P. aeruginosa (n=50)</td>
<td>21(70%)</td>
<td>76.9</td>
</tr>
<tr>
<td>Enterobacter spp (n=8)</td>
<td>6(75%)</td>
<td>100</td>
</tr>
<tr>
<td>P. mirabilis (n=7)</td>
<td>3(60%)</td>
<td>71.4</td>
</tr>
<tr>
<td>C. freundii (n=6)</td>
<td>4(66.7%)</td>
<td>14.3</td>
</tr>
<tr>
<td>S. Paraynosa (n=2)</td>
<td>1(50%)</td>
<td>100</td>
</tr>
<tr>
<td>Overall ABR %</td>
<td>65.7</td>
<td>54.5</td>
</tr>
</tbody>
</table>

Key words: CRO: Cefotaxime. CPM: Cefepime. FOX: Cefoxitin. AMP: Ampicillin. AMC: Amoxycillin/Clavulanic Acid. LTZ: Loxitam. CEF: Cefadroxil. N: not tested

Overall MDR % 115(61.9%)
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 apprise 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
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.

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.

Workshops on AMR awareness to media professionals

Do one workshop per governorate per year to laboratories, veterinarians and agriculture specialist (Train the trainer)

**A.2.2 Raising AMR awareness through Internet**

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

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)**

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:**

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

AMR to be periodically discussed in highly watched talk shows

Public figure(s) associated with AMR

Politician(s) involved in AMR week

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.2.1** Mapping of laboratories 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.2.2** 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
B.4.5 - Report results of ABX use and resistance surveillance in agriculture and veterinary world
B.4.5 - 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
B.4.5 - Send a yearly report with recommendations to the animal drug registry about ABX purchasing in the country during the coming 2 years.

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.2.3.1 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 in 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.6.1 Nominate 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 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.4.3 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
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

<table>
<thead>
<tr>
<th>Strategic Objective 1 interventions</th>
<th>Activity / Sub-activity</th>
<th>Milestone / Date</th>
</tr>
</thead>
</table>
| 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 |
<table>
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<tbody>
<tr>
<td>A.2 Improving national AMR awareness among professionals from different sectors</td>
<td>A.2.1.5 Do one workshop per governorate per year to laboratories, veterinarians and agriculture specialists (Train the trainer)</td>
<td>A.2.1.5 Six months from time zero</td>
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<td>A.2.2 Raising AMR awareness through Internet</td>
<td>A.2.2.1 Three months from time “zero”</td>
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<td>A.2.2.1 Create a webpage for AMR on the official websites of MOH and MOA</td>
<td>A.2.2.2 One year from time zero</td>
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<td>A.2.2.2 Use existing webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)</td>
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<td>A.3 Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness</td>
<td>A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/Social media spots</td>
<td>A.3 Six months from time zero</td>
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<tr>
<td>A.4 Raising and improving public awareness using traditional media, social media and telecommunication companies</td>
<td>A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisement.</td>
<td>A.4 Two years from time zero</td>
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<td>A.4.2 AMR to be periodically discussed in highly watched talk shows</td>
<td>A.4.1 Six months from time zero</td>
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<td>A.4.3 Public figure(s) associated with AMR</td>
<td>A.4.2 One year from time zero</td>
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<td>A.4.4 Politician(s) involved in AMR</td>
<td>A.4.3 One year from time zero</td>
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<td>A.4.5 SMS through national telecommunication companies sent four times per year and during the global AMR awareness week</td>
<td>A.4.4 Two years from time zero</td>
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<td>A.4.5</td>
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<td>A.5 Raising/Improving AMR awareness in education curricula on the national level (guideline)</td>
<td>A.5.1 Sensitization about AMR and hygiene in school curricula</td>
<td>A.5 9 months from time zero</td>
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<td>A.5.1.1 Prepare a checklist including basic information about AMR that should be included in school curricula</td>
<td>A.5.1.1 Start 3 months from time zero, Ready at end of first year from time zero</td>
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<td>A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available</td>
<td>A.5.1.2 Start three months from time zero Ready at 6 months from time zero</td>
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<td>Strategic Objective 1 interventions</td>
<td>Activity / Sub-activity</td>
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<td><strong>A.5.2</strong> Inclusion of AMR awareness modules in curricula of human health-related specialties (medicine, dentistry, pharmacy, nursing)</td>
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<td></td>
<td><strong>A.5.2.1</strong> Prepare checklists for university curricula of these specialties each one separately</td>
<td><strong>A.5.2.1 &amp; A.5.2.2 2022</strong> Start 3 months from time zero Finalized 9 months from time zero</td>
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<td><strong>A.5.2.2</strong> Check curricula of health specialties to include information on AMR Include AMR education</td>
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<td><strong>A.5.3.1 2022</strong> Three months from time zero</td>
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<td><strong>A.5.3</strong> Inclusion of AMR awareness modules in curricula of veterinary school</td>
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<td><strong>A.5.3.1</strong> Prepare a checklist for the needed information on AMR for veterinary school curricula</td>
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<td><strong>A.5.3.2</strong> Fill the gap in AMR information in veterinary school curricula</td>
<td><strong>A.5.3.2 2022</strong> Six months from time zero</td>
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<td><strong>A.5.4.1</strong> Inclusion of AMR awareness modules in curricula of agriculture school</td>
<td><strong>A.5.4.1 &amp; A.5.4.2 2022</strong> Six months from time zero</td>
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<td><strong>A.5.4.2</strong> Checklist for the needed information on AMR for agriculture school curricula</td>
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<td><strong>A.5.4.2</strong> Fill the gap in AMR information in agriculture school curricula</td>
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<td><strong>A.6</strong> Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness activities</td>
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<td></td>
<td><strong>A.6.1</strong> 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)</td>
<td><strong>A.6 20221 year</strong></td>
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<td></td>
<td><strong>A.6.2</strong> Seek private funding from Pharmaceutical companies for awareness activities targeting public and professionals</td>
<td><strong>A.6.1 Starting end of first year from time zero</strong></td>
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<td></td>
<td><strong>A.6.2.1</strong> 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</td>
<td><strong>A.6.2 2022 6 months</strong></td>
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# 8.1. Operational plan and budget for axis A

<table>
<thead>
<tr>
<th>Objective-1</th>
<th>Activity /Sub- activity</th>
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<th>Source Of funding</th>
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<tbody>
<tr>
<td>A.1.1</td>
<td>Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td>A.1.1</td>
<td>A.1.1 One</td>
<td>A.1.1 time “zero”</td>
<td>A.1.1 MOH</td>
<td>A.1.1 -WHO-National Professional Officer [Dr. ----] -MOH-General Director [Dr. ----]</td>
<td>A.1.1 0.25 time employee (Secretarial functions) USD (incentive)</td>
<td>A.1.1 MOH/WHO</td>
<td>A.1.1 Focal person nominated [----]</td>
</tr>
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<td>A.1.2</td>
<td>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</td>
<td>A.1.2</td>
<td>A.1.2 MOH</td>
<td>A.1.2 time “zero”</td>
<td>A.1.2 MOH</td>
<td>A.1.2 -WHO-National Professional Officer [Dr. ----] -MOH-General Director [Dr. ----]</td>
<td>A.1.2 USD (incentive)</td>
<td>A.1.2 MOH/WHO</td>
<td>A.1.2 Technical group formed and posted on AMR website.</td>
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<tr>
<td>Objective-1</td>
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<td>A.1.3 Put the terms of TOR of this technical group according to NAP</td>
<td>A.1.3 Document</td>
<td>One</td>
<td>A.1.3 two months from time “zero”</td>
<td>A.1.3 -Focal person -MOH -WHO -MOA</td>
<td>A.1.3 -Focal person -MOH -WHO -MOA</td>
<td>A.1.3 USD</td>
<td>A.1.3 WHO</td>
<td>A.1.3 TOR of technical group posted on website</td>
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<tr>
<td></td>
<td>A.1.4 Slogan for AMR</td>
<td>A.1.4 Awareness technical working group (PAC)</td>
<td>One</td>
<td>A.1.4 three months from time “zero”</td>
<td>A.1.4 -MOH -WHO</td>
<td>A.1.4 -MOH -WHO</td>
<td>A.1.4 USD</td>
<td>A.1.4 WHO</td>
<td>A.1.4 Slogan is posted on AMR website</td>
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<td>A.2.1</td>
<td>Raising AMR awareness through syndicates, orders and scientific societies (CME, AMR periodic Informational SMS, etc.)</td>
<td>A.2.1.1 Schedule</td>
<td>One</td>
<td>A.2.1.1 two months from time “zero”</td>
<td>A.2.1.1 - DC&amp;S, MOH, WHO - MOA</td>
<td>A.2.1.1 - DC&amp;S, president (Dr. ----)</td>
<td>A.2.1.1 USD</td>
<td>A.2.1.1 WHO</td>
<td>A.2.1.1 Official schedule from DC&amp;S.</td>
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<tr>
<td>A.2.1.2</td>
<td>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.</td>
<td>A.2.1.2 Letters to syndicates/ orders</td>
<td>depending on number of syndicates/ orders</td>
<td>A.2.1.2 Six months from time “zero”</td>
<td>A.2.1.2 Order of physicians</td>
<td>A.2.1.2 - Focal person - DC&amp;S president (Dr. ) - President of the Order of physicians endorsed by the IHR technical committee</td>
<td>A.2.1.2 USD</td>
<td>A.2.1.2 WHO</td>
<td>A.2.1.2 Percentage of lectures involving ABX that contain the message in 2-3 slides</td>
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DC&S (Diseases Control & Surveillance) IN MOH
<table>
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<tr>
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<tr>
<td>A.2</td>
<td>Improving AMR awareness among professionals from different sectors</td>
<td>A.2.1.3</td>
<td>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</td>
<td>A.2.1.3</td>
<td>Letters to orders from MOH/ MOA to send SMS to health professionals</td>
<td>A.2.1.3</td>
<td>Focal person endorsed by a national multisectoral group</td>
<td>A.2.1.3 USD$</td>
<td>A.2.1.3 WHO / MOH</td>
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<tr>
<td>A.2.1.4</td>
<td>Workshops on AMR awareness to media professionals</td>
<td>A.2.1.4</td>
<td>Workshops</td>
<td>A.2.1.4</td>
<td>Beginning of November each year over 5 years</td>
<td>A.2.1.4</td>
<td>Hotel</td>
<td>A.2.1.4 USD/year</td>
<td>A.2.1.4 AMR Fund WHO UNSAFE</td>
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<tr>
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<td>A.2.1.5</td>
<td>Do one workshop</td>
<td>A.2.1.5 Workshops</td>
<td>12 per year</td>
<td>A.2.1.5 Six months from time zero</td>
<td>A.2.1.5 MOA</td>
<td>A.2.1.5 MOA - Head of Animal Health Service (Dr. ----)</td>
<td>A.2.1.5 USD per year TOTAL: USD12X5 = USD $$</td>
<td>A.2.1.5 - AMR Fund/WHO-MOA</td>
<td>A.2.1.5 Number of workshops per governorate per year</td>
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<tr>
<td>A.2.2</td>
<td>Raising AMR awareness through Internet</td>
<td>A.2.2.1 AMR blog present on websites of MOH and MOA</td>
<td>One</td>
<td>A.2.2.1 Three months from time “zero”</td>
<td>A.2.2.1 -MOH-MOA</td>
<td>A.2.2.1 -Focal Person -MOH-Director of Public Relations &amp; Health Education Dpts (Dr. -----)</td>
<td>A.2.2.1 USD -WHO MOH</td>
<td>A.2.2.1 AMR fund</td>
<td>A.2.2.1 AMR section is put on MOH/ MOA websites</td>
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(MOA) Ministry Of Agriculture
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<tr>
<td>A.2.2.2</td>
<td>Use existing Webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)</td>
<td>A.2.2.2 Webpages</td>
<td>Four</td>
<td>A.2.2.2 One year from time zero</td>
<td>A.2.2.2 MOH</td>
<td>A.2.2.2 Webpage designer</td>
<td>Out sourcing call for citations at WHO - MOH- National E-Health Program Director (Mrs. ---)</td>
<td>A.2.2.2 USD</td>
<td>A.2.2.2 WHO</td>
</tr>
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<td>A.3</td>
<td>Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness</td>
<td>A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/ Social media spots</td>
<td>A.3.1 One set of material</td>
<td>A.3.1 Six months from time zero</td>
<td>A.3.1 WHO</td>
<td>A.3.1 All broadcasting messages will be prepared and supported by WHO</td>
<td>A.3.1 USD</td>
<td>A.3.1 WHO</td>
<td>A.3.1 Broadcasting material available, they are tricyclic</td>
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<td>Objective-1</td>
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<td>A.4 Raising and improving public awareness using traditional media, social media and tele-communication companies</td>
<td>A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisement</td>
<td>A.4.1 Schedule</td>
<td>A.4.1 One</td>
<td>A.4.1 Six months from time zero</td>
<td>A.4.1 MOH</td>
<td>A.4.1 - MOH-Director of Public Relations &amp; Health Education Dpts (Dr. --)</td>
<td>A.4.1 USD per year TOTAL: USD</td>
<td>A.4.1 WHO</td>
<td>A.4.1 Schedules put and spots</td>
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<td>A.4.2 AMR to be periodically discussed in highly watched talk shows</td>
<td>A.4.2 Talk shows</td>
<td>A.4.2 Multiple</td>
<td>A.4.2 One year from time zero</td>
<td>A.4.2 MOH</td>
<td>A.4.2 -Focal person -AMR Committee members.</td>
<td>A.4.2 USD</td>
<td>A.4.2 WHO</td>
<td>A.4.2 Number of talk shows that discuss AMR per trimester</td>
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<td>A.4.3 Public figure(s) associated with AMR</td>
<td>A.4.3 Person</td>
<td>A.4.3 One or more</td>
<td>A.4.3 One year from time zero</td>
<td>A.4.3 MOH MOA</td>
<td>A.4.3 -DC&amp;S president (Dr. ---) MOH- -Director of Public Relations &amp; Health Education Dpts (Dr. --)</td>
<td>A.4.3 USD</td>
<td>A.4.3 WHO</td>
<td>A.4.3 Number of appearances in media/public to discuss the subject</td>
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<td>Objective -1</td>
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<td>A.4</td>
<td>Raising and improving public awareness using traditional media, social media and telecommunication companies</td>
<td>A.4.4 Politician(s) involved in AMR</td>
<td>A.4.4 Politicians public statements on TV, radio or social media</td>
<td>A.4.4 Three from three different political sides</td>
<td>A.4.4 Two years from time zero</td>
<td>A.4.4 TV, Radio, social media</td>
<td>A.4.4 -Focal person -MOH -WHO</td>
<td>A.4.4 USD</td>
<td>A.4.4 WHO</td>
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<td>A.4</td>
<td>Raising and improving public awareness using traditional media, social media and telecommunication companies</td>
<td>A.4.5 SMS through national telecommunication companies</td>
<td>A.4.5 SMS</td>
<td>A.4.5 four per year</td>
<td>A.4.5 Starting end of first year from time zero</td>
<td>A.4.5 -National telecommunication -MOH -MOA</td>
<td>A.4.5 USD/year Total USD</td>
<td>A.4.5 -MOH/Ministry of Communication/ MOA -WHO</td>
<td>A.4.5 SMS sent</td>
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<tr>
<td>A.5</td>
<td>Raising/Improving AMR awareness in education curricula on the national level</td>
<td>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</td>
<td>A.5.1.1 Documents Basic for schools (Based on One Health/E-health)</td>
<td>A.5.1.1 One</td>
<td>A.5.1.1 Start 3 months from time zero, Ready at end of first year from time zero</td>
<td>A.5.1.1 -Ministry of education -MOA -MOH</td>
<td>A.5.1.1 USD</td>
<td>A.5.1.1 Ministry of education/WHO</td>
<td>A.5.1 Percentage of school curricula that include the message</td>
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<td>A.5 Raising/Improving AMR awareness in education curricula on the national level</td>
<td>A.5.1.2 Check available school curricula and ask to fill in the gaps when AMR information according to checklist is not available</td>
<td>A.5.1.2 Report and letter</td>
<td>A.5.1.2 Three</td>
<td>A.5.1.2 Start three months from time zero Ready at 6 months from time zero</td>
<td>A.5.1.2 -Ministry of education -MOA -MOH</td>
<td>A.5.1.2 -WHO-National Professional Officer (Dr. ----) Ms ---- (private sector -CERD)</td>
<td>A.5.1.2 USD</td>
<td>A.5.1.2 WHO</td>
<td>A.5.2</td>
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<tr>
<td>A.5.2 Inclusion of AMR awareness modules in curricula of human health-related specialties (medicine, NCPHLS dentistry, pharmacy, nursing)</td>
<td>A.5.2.1 Prepare checklists for university curricula of these specialties each one separately</td>
<td>A.5.2.1 Checklists for different curricula of health specialties</td>
<td>A.5.2.1 Number of curricula of health specialties</td>
<td>A.5.2.1 Start 3 months from time zero Finalized 9 months from time zero</td>
<td>A.5.2.1 Universitie s WHO</td>
<td>A.5.2.1 Priva secto, WHO consultant, former D&amp;C&amp;S president (Dr. --)</td>
<td>A.5.2.1 USD</td>
<td>A.5.2.1 AMR fund WHO</td>
<td>A.5.2 Percentage of curricula of health specialties that include chapters about AMR/IPC according to checklist</td>
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<tr>
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<td>A.5.2.2</td>
<td>Check curricula of health specialties to include information on AMR Include AMR tricyclic education</td>
<td>A.5.2.2</td>
<td>One</td>
<td>A.5.2.2</td>
<td>Start 3 months from time zero Finalized 9 months from time zero</td>
<td>A.5.2.2 Universitie s</td>
<td>A.5.2.2 Private sector, WHO consultant, former DC&amp;S president (Dr. --- -)</td>
<td>A.5.2.2 USD*10= USD</td>
<td>A.5.2.2 AMR fund WHO</td>
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<td>A.5.3.1</td>
<td>Inclusion of AMR awareness modules in curricula of veterinary school</td>
<td>A.5.3.1</td>
<td>One</td>
<td>A.5.3.1</td>
<td>Three months from time zero</td>
<td>A.5.3.1 MOA</td>
<td>A.8.1 -MOA-Head of Animal Health Service (Dr. B Bazzal)</td>
<td>A.5.3.1 USD</td>
<td>A.5.3.1 AMR fund WHO</td>
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<td>A.5.3.2</td>
<td>Fill the gap in AMR information in veterinary school curricula</td>
<td>A.5.3.2</td>
<td>One</td>
<td>A.5.3.2</td>
<td>Six months from time zero</td>
<td>A.5.3.2 Veterinary School- Yemen University</td>
<td>A.5.3.2 -MOA-Head of Animal Health Service (Dr. --- )</td>
<td>A.5.3.2 USD</td>
<td>A.5.3.2 AMR fund WHO</td>
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*Indicates filled gaps.
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<td>Raising/ Improving AMR awareness in education curricula on the national level</td>
<td>A.5.4</td>
<td>Inclusion of AMR awareness modules in curricula of agriculture school</td>
<td>A.5.4.1 Checklist</td>
<td>A.5.4.1</td>
<td>One</td>
<td>A.5.4.1</td>
<td>MOA-Head of Poultry Husbandry Dpt (Eng. A Sirawan)</td>
<td>A.5.4.1 USD</td>
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<td>A.5.4.2</td>
<td>Fill the gap in AMR information in agriculture school curricula</td>
<td>A.5.4.2</td>
<td>Letter from the Ministries of Health, Education and Agriculture to agriculture schools</td>
<td>A.5.4.2</td>
<td>A.5.4.2</td>
<td>One</td>
<td>A.5.4.2</td>
<td>MOA-Head of Poultry Husbandry Dpt (Eng. --)</td>
<td>A.5.4.2 USD</td>
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<td>A.6</td>
<td>Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness</td>
<td>A.6.1</td>
<td>MOH and MOA should advice pharmaceutical companies (Human &amp; Veterinary) to include in every presentation related to antimicrobial use at least 3 slides (5%) concerning AMR (Send one letter from each ministry)</td>
<td>A.6.1</td>
<td>A.6.1</td>
<td>Four</td>
<td>A.6.1</td>
<td>MOH - MOA</td>
<td>A.6.1 -MOH-Director of Public Relations &amp; Health Education Dpts (Dr. --) -MOA-Head of Animal Health Service (Dr.) -MOA-Head of Poultry Husbandry Dpt (Eng.)</td>
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<tr>
<th>Objective-1</th>
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<td>A.6</td>
<td>Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness</td>
<td>A.6.2</td>
<td>A.6.2.1 Meeting</td>
<td>A.6.2.1 Three</td>
<td>A.6.2.1 MOH</td>
<td>A.6.2.1 Technical working group</td>
<td>A.6.2.1 USD</td>
<td>AMR Fund WHO</td>
<td>A.6.2.1</td>
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<td></td>
<td>Seek private funding from Pharmaceutical companies for awareness activities targeting public and professionals</td>
<td>A.6.2.1 Meeting</td>
<td>A.6.2.1 Three</td>
<td>A.6.2.1 MOH</td>
<td>A.6.2.1 Technical working group</td>
<td>A.6.2.1 USD</td>
<td>AMR Fund WHO</td>
<td>A.6.2.1</td>
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<td></td>
<td>Meeting with CEOs 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</td>
<td>A.6.2.1 Meeting</td>
<td>A.6.2.1 Three</td>
<td>A.6.2.1 MOH</td>
<td>A.6.2.1 Technical working group</td>
<td>A.6.2.1 USD</td>
<td>AMR Fund WHO</td>
<td>A.6.2.1</td>
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### 8.2. Monitoring and evaluation plan for axis A

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<th>Data source</th>
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<tbody>
<tr>
<td>A.1</td>
<td>Organization of the responsibilities for the execution of the tasks</td>
<td>A.1.1</td>
<td>Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td>A.1.1, A.1.2 Focal person nominated</td>
<td>A.1.1, A.1.2 Yes/No</td>
<td>A.1.1, A.1.2 Once/5 years</td>
<td>A.1.1, A.1.2 MOH WHO</td>
<td>A.1.1, A.1.2 Appointment</td>
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<td>A.1.2</td>
<td>Choose the members of the technical working group (Radio/TV Media, Social media expert, Technical, Pharmacist, ID, Microbiologist, Veterinarian, Agriculture, MOH representative, WHO) and nominate them</td>
<td>A.1.2 Awareness technical working group formed and posted on AMR website.</td>
<td>A.1.2 Yes/No</td>
<td>A.1.2 Once/5 years</td>
<td>A.1.2 MOH WHO</td>
<td>NA</td>
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<td></td>
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<td>A.1.3</td>
<td>Put the terms of reference of Awareness technical working group according to NAP</td>
<td>A.1.3 TOR of technical working group posted on website</td>
<td>A.1.3 Yes/No</td>
<td>A.1.3 Once/5 years</td>
<td>A.1.3 MOH WHO</td>
<td>NA</td>
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<td></td>
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<td>A.1.4</td>
<td>Slogan for AMR</td>
<td>A.1.4 Slogan is posted on AMR website</td>
<td>A.1.4 not applicable</td>
<td>A.1.4 Once/5 years</td>
<td>A.1.4 MOH WHO</td>
<td>A.1.4 NA</td>
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<td>A.2</td>
<td>Improving AMR awareness among professionals from different sectors</td>
<td>A.2.1</td>
<td>Raising AMR awareness through syndicates, orders and scientific societies (CME, AMR periodic informational SMS, etc.)</td>
<td>A.2.1.1 Official schedule from DC&amp;S</td>
<td>A.2.1.1 Having the commitment from DC&amp;S in giving these lectures.</td>
<td>A.2.1.1 every 6 months</td>
<td>DC&amp;S Document</td>
<td>A.2.1.1 No schedule available, talks concentrated in Yemen area, not to all professionals</td>
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<tr>
<td></td>
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<td>A.2.1.1</td>
<td>DC&amp;S scheduled lectures in national conferences of the medical pharmaceutical, nursing, veterinary, agricultural &amp; environmental fields across Yemen</td>
<td>A.2.1.1.1 DC&amp;S</td>
<td>A.2.1.1.1 Official schedule from DC&amp;S</td>
<td>A.2.1.1.1 Having the commitment from DC&amp;S in giving these lectures.</td>
<td>A.2.1.1.1 Number of lectures given per governorate per year</td>
<td>A.2.1.1.1 Document</td>
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<td></td>
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<td>A.2.1.2</td>
<td>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</td>
<td>A.2.1.2 Percentage of lectures involving ABX that contain the message in 2-3 slides</td>
<td>A.2.1.2 Reminder of AMR in all ABX lectures.</td>
<td>A.2.1.2 Number of lectures with the message/number of lectures audited*100</td>
<td>A.2.1.2 every year</td>
<td>A.2.1.2 NAP audit of lectures given</td>
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<td>Audit</td>
<td>A.2.1.2 NA</td>
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<td>A.2.1.3 Ask Orders of pharmacists, veterinarians, physicians, and dentists to send</td>
<td>A.2.1.3</td>
<td>Permanent reminding</td>
<td>A.2.1.3 Number of months where SMS were sent from each Order/total</td>
<td>A.2.1.3 every six months</td>
<td>A.2.1.3 Orders</td>
<td>A.2.1.3 Report from Orders</td>
<td>A.2.1.3</td>
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<td>monthly SMS as reminders to health professionals about the dangers of AMR and/or</td>
<td>-Percentage compliance to</td>
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<td>AMR News.</td>
<td>this request of Sending</td>
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<td>professionals</td>
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<td>-Number of months where SMS</td>
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<td>were sent from each Order/total</td>
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<td>number of months audited</td>
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<td>A.2.1.3.4 Workshops on AMR awareness to media professionals</td>
<td>A.2.1.4</td>
<td>Sensitize the media to propagate the message and gain their interest in bringing</td>
<td>A.2.1.4 Number of</td>
<td>A.2.1.4 Once per year</td>
<td>A.2.1.4 Data collection</td>
<td>A.2.1.4</td>
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<td>Percentage of target media</td>
<td>it up in their programs, sites, and newspapers</td>
<td>attendees /number of</td>
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<td></td>
<td></td>
<td>personnel whom attend these</td>
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<td>target media personnel</td>
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<td>workshops.</td>
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<td>A.2.1.5</td>
<td>Do one workshop per governorate per year to veterinarians and agriculture specialists (Train the trainer)</td>
<td>A.2.1.5 Number of workshops per governorate per year</td>
<td>A.2.1.5 Raise post-graduate AMR awareness among professionals</td>
<td>A.2.1.5 Number of workshops per governorate per year</td>
<td>A.2.1.5 Once/year</td>
<td>A.2.1.5 MOA WHO</td>
<td>A.2.1.5 Workshop</td>
<td>A.2.1.5</td>
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<tr>
<td>A.2.2.1</td>
<td>Create a webpage for AMR on the official websites of MOH and MOA</td>
<td>A.2.2.1 AMR section is put on MOH/ MOA websites</td>
<td>A.2.2.1 Increase visibility</td>
<td>A.2.2.1 Yes/No</td>
<td>A.2.2.1 Once/5 years</td>
<td>A.2.2.1 MOH MOA</td>
<td>A.2.2.1 Section on website</td>
<td>A.2.2.1</td>
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<td>A.2.2.2</td>
<td>Use existing webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)</td>
<td>A.2.2.2 Webpages available</td>
<td>A.2.2.2 Reach the young population and broaden the spectrum of people receiving the message</td>
<td>A.2.2.2 Yes/No Presence of webpages</td>
<td>A.2.2.2 Every three months</td>
<td>A.2.2.2 Awareness technical working group</td>
<td>A.2.2.2 Webpage</td>
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<td>A.3</td>
<td>Involving traditional (TV, radio) media and social media (Facebook, Instagram) in raising AMR awareness</td>
<td>A.3.1 Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/Social media spots</td>
<td>A.3.1 Broadcasting material available, Percentage of media type for which they are tricyclic</td>
<td>A.3.1 Yes/No For each type of media broadcasting messages have been prepared</td>
<td>A.3.1 every three months</td>
<td>A.3.1 Awareness technical working group</td>
<td>A.3.1 Counting</td>
<td>A.3.1 Few TV spots available regarding human health, not tricyclic</td>
</tr>
<tr>
<td>A.4</td>
<td>Raising and improving public awareness using traditional media, social media and telecommunication companies</td>
<td>A.4.1 Prepare a yearlong schedule for TV, Radio and social media advertisements</td>
<td>A.4.1 Schedules put and spots Emphasize the importance of the subject</td>
<td>A.4.1 Number of talk shows per 3 months that discuss AMR</td>
<td>A.4.1 every three months</td>
<td>A.4.1 Awareness technical working group</td>
<td>A.4.1 Schedule</td>
<td>A.4.1 Erratic, in few morning shows</td>
</tr>
<tr>
<td>A.4.2</td>
<td>AMR to be periodically discussed in highly watched talk shows</td>
<td>A.4.2 Number of talk shows that discuss AMR per trimester</td>
<td>A.4.2 Reach more people</td>
<td>A.4.2 Number of activities per trimester per governorate</td>
<td>A.4.2 every three months</td>
<td>A.4.2 Awareness technical working group</td>
<td>A.4.2 Talk show</td>
<td>A.4.2 NA</td>
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<td>A.4.3</td>
<td>Public figure(s) associated with AMR</td>
<td>A.4.3 Number of appearances in media/public to discuss the subject</td>
<td>A.4.3 Reach more people</td>
<td>A.4.3 Number of appearances</td>
<td>A.4.3 every three months</td>
<td>A.4.3 Awareness technical working group</td>
<td>A.4.3 Statement</td>
<td>A.4.3 NA</td>
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<tr>
<td>A.4 Raising and improving public awareness using traditional media, social media and telecommunication companies</td>
<td>A.4.4 Politician(s) involved in AMR</td>
<td>A.4.4 Number of appearances in media/public to discuss the subject</td>
<td>A.4.4 Reach more people</td>
<td>A.4.4 Number of appearances</td>
<td>A.4.4 every three months over 5 years</td>
<td>A.4.4 Awareness technical working group</td>
<td>A.4.4 Statement</td>
<td>A.4.4 NA</td>
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<td>A.4.5 SMS through national telecommunication companies sent four times per year and during the global AMR awareness week</td>
<td>A.4.5 SMS sent</td>
<td>A.4.5 Reach more people</td>
<td>A.4.5 Number of messages sent</td>
<td>A.4.5 every three months over 5 years</td>
<td>A.4.5 Awareness technical working group</td>
<td>A.4.5 Message</td>
<td>A.4.5 NA</td>
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<td>A.5 Raising/Improving AMR awareness in education curricula on the national level</td>
<td>A.5.1 Sensitization about AMR and hygiene in school curricula</td>
<td>A.5.1 Percentage of school curricula that include the message</td>
<td>A.5.1 Include AMR-related information in school curricula</td>
<td>A.5.1 number of curricula that included the message/total number of curricula * 100</td>
<td>A.5.1 Once/5 years</td>
<td>A.5.1 Ministry of education -WHO</td>
<td>A.5.1 Checking and filling the gaps</td>
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<td>A.5.2</td>
<td>Inclusion of AMR awareness modules in in curricula of human health-related specialties (medicine, dentistry, pharmacy, nursing)</td>
<td>A.5.2</td>
<td>Percentage of curricula of health specialties that include chapters about AMR according to checklist</td>
<td>A.5.2 number of curricula that included the message/ total number of curricula * 100</td>
<td>A.5.2 Once/5 years</td>
<td>A.5.2 - Ministry of education -Universities -MOH -WHO</td>
<td>A.5.2 Checking and filling the gaps</td>
<td>A.5.2 Partially available</td>
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<tr>
<td>A.5.3</td>
<td>Inclusion of AMR awareness modules in curricula of veterinary school</td>
<td>A.5.3</td>
<td>Veterinary school curricula include chapters about AMR</td>
<td>A.5.3 number of curricula that included the message</td>
<td>A.5.3 Once/5 years</td>
<td>A.5.3 - Ministry of education -Universities -WHO</td>
<td>A.5.3 Checking and filling the gaps</td>
<td>A.5.3 NA</td>
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<td>A.5</td>
<td>Raising/Improving AMR awareness in education curricula on the national level</td>
<td>A.5.4</td>
<td>Inclusion of AMR awareness modules in curricula of agriculture school</td>
<td>A.5.4.1 Agriculture school curricula include chapters about AMR/IPC</td>
<td>A.5.4 number of curricula that included the message</td>
<td>A.5.4 Once/5 years</td>
<td>A.5.4 -Ministry of education -Universities -MOA -WHO</td>
<td>A.5.4 Checking and filling the gaps</td>
</tr>
<tr>
<td>A.5.4.1</td>
<td>Checklist for the needed information on AMR for agriculture school Curricula</td>
<td>A.5.4.2 Fill the gap in AMR information in agriculture school curricula</td>
<td>A.6</td>
<td>Involvement of pharmaceutical companies in raising AMR awareness and provide finding for awareness activities</td>
<td>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)</td>
<td>A.6.1 Percentage of pharmaceutical companies presentations that include the message about AMR</td>
<td>A.6.1 involving pharmaceutical companies in raising AMR awareness among professionals in all health fields</td>
<td>A.6.1 number of presentations including message/total number of presentations *100</td>
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</tr>
<tr>
<td>A.6</td>
<td>Involvement of pharmaceuti cal companies in raising AMR awareness and provide finding for awareness activities</td>
<td>A.6.2</td>
<td>Percentage of pharmaceutical companies promoting antimicrobial s that are contributing into the budget of the awareness campaign</td>
<td>A.6.2.1 Number of companies contributing to the project/total number of companies promoting ABX</td>
<td>Once or more/5 years</td>
<td>MOH MOA</td>
<td>A.6.2.1 Meeting(s)</td>
<td>A.6.2.1 NA</td>
</tr>
<tr>
<td>A.6.2.1</td>
<td>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</td>
<td>A.6.2.1</td>
<td>Involving pharmaceutical companies in raising AMR awareness among professionals in all health fields</td>
<td>A.6.2.1 Number of companies promoting ABX</td>
<td>Once or more/5 years</td>
<td>MOH MOA</td>
<td>A.6.2.1 Meeting(s)</td>
<td>A.6.2.1 NA</td>
</tr>
</tbody>
</table>
### 9. Axis B: Surveillance

**Strategic Plan**

<table>
<thead>
<tr>
<th>Strategic Objective Interventions</th>
<th>Activity</th>
<th>Sub-activity</th>
<th>Date /Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1 Organization of the responsibilities for the execution of the tasks</td>
<td>B.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td>B.1.1.1 Empower <strong>ESU</strong> director as focal person</td>
<td>B.1.1.1 three months from time zero</td>
</tr>
<tr>
<td></td>
<td>B.1.1.1 Appointment of the members of the technical working group along with its TOR</td>
<td>B.1.2 Appointment of members of the technical working group along with its TOR</td>
<td>B.1.2 three months from time zero 2022</td>
</tr>
<tr>
<td>B.2 Reporting of AMR data to GLASS thus optimizing AMR surveillance in humans through:</td>
<td>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).</td>
<td>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</td>
<td>B.2.1.1 Three months from time zero 2022</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>B.2.2.1 Organize a nationwide <strong>workshop</strong> about GLASS and the plan of inclusion in GLASS and introduction to <strong>WHONET</strong></td>
<td>B.2.2.1 Three months from time zero 2022</td>
</tr>
</tbody>
</table>

**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

---

*ESU: Epidemiological Surveillance Unit*
<table>
<thead>
<tr>
<th>Strategic Objective interventions</th>
<th>Activity / Sub-activity</th>
<th>Date from operational plan</th>
<th>Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.2 Reporting of AMR data to GLASS thus optimizing AMR surveillance in humans through:</td>
<td>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.</td>
<td>B.2.2.2 End of first year from time zero: 5 laboratories Second year from time zero: 5 laboratories Each year 5 laboratories</td>
<td>2022</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>B.2.2.3 Three months from time zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.2.2.4 Do 6 laboratory visits for capacity building/year for 12 laboratories in different areas for building capacity and WHONET training</td>
<td>B.2.2.4 Three visits per lab each year for 6 laboratories starting year 1</td>
<td>2025-2026</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td>B.2.2.5 Six months from time zero</td>
<td>2022</td>
</tr>
<tr>
<td></td>
<td>B.2.3 Data Entry in GLASS Data collection from mature laboratories</td>
<td>B.2.3.1 Start end of 1st year from time zero</td>
<td>2022</td>
</tr>
<tr>
<td></td>
<td>B.2.3.2 Data cleaning and entry into GLASS</td>
<td>B.2.3.2 Start end of 1st year from time zero</td>
<td>2022</td>
</tr>
<tr>
<td>Strategic Objective interventions</td>
<td>Activity / Sub-activity</td>
<td>Date /Milestone</td>
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<tr>
<td><strong>B.3</strong> Periodic issuing of an epidemiologically representative national AMR surveillance report in <strong>humans</strong></td>
<td>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)</td>
<td><strong>B.3.1</strong> Once/year starting end of 1st year <strong>B.3</strong> 1 year</td>
<td></td>
</tr>
<tr>
<td><strong>B.4</strong> Optimize AMR surveillance in the <strong>agricultural, foodveterinary, and environmental</strong> fields</td>
<td>B.4.1 Research project about AMR surveillance in the veterinary field.</td>
<td><strong>B.4.1</strong> 6 months from time zero <strong>B.4</strong> 2 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).</td>
<td><strong>B.4.2</strong> 9 months from time zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields</td>
<td><strong>B.4.3</strong> 6 months from time zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td>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</td>
<td><strong>B.4.4</strong> Six months from time zero and completed nine months from time zero</td>
<td></td>
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<tr>
<td></td>
<td>B.4.5 -Report results of <strong>ABX use and resistance surveillance</strong> in <strong>agriculture and veterinary</strong> world -Send a yearly report with recommendations to the animal drug registry about ABX purchasing in the country during the coming 2 years</td>
<td><strong>B.4.5</strong> First report should be ready at end of year 2 from time zero</td>
<td></td>
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<tr>
<td>Strategic Objective interventions</td>
<td>Activity / Sub-activity</td>
<td>Date / Milestone</td>
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</tr>
<tr>
<td>B.5 Create/Appoint AMR reference lab (s)</td>
<td>B.5.1 Define TOR of AMR reference lab</td>
<td>B.5 9 months from time zero</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Map potential lab(s) across Yemen</td>
<td>B.5.1 3 months from time zero</td>
<td></td>
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<tr>
<td></td>
<td>B.5.2 Map potential lab(s) across Yemen</td>
<td>B.5.2 Start at time zero</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>Mapping finalized 3 months from time zero</td>
<td></td>
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<tr>
<td></td>
<td>B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr.</td>
<td>B.5.3 5 months from time zero</td>
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<tr>
<td></td>
<td>B.5.4 Nominate the reference lab(s)</td>
<td>B.5.4 6 months from time zero</td>
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<tr>
<td></td>
<td>B.5.5 MOH to sign a contract with the lab(s)</td>
<td>B.5.5 9 months from time zero</td>
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</tr>
<tr>
<td>B.6 Enhance research activities in AMR surveillance</td>
<td>B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobials.</td>
<td>B.6 1.5 years from time zero</td>
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<td></td>
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<td>B.6.1 1st agenda sent</td>
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<td></td>
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<td>1.5s year from time zero</td>
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</table>
9.1. Operational Plan budget for Axis B

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity/Sub-activity</th>
<th>Unit</th>
<th>Quantity</th>
<th>Date</th>
<th>Location</th>
<th>Responsible Entity</th>
<th>Cost</th>
<th>Source Of Funding</th>
<th>Indicator</th>
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<tbody>
<tr>
<td><strong>B.1</strong></td>
<td>Organization of the responsibilities for the execution of the tasks</td>
<td><strong>B.1.1</strong></td>
<td>Appointmnt of focal person in charge of following up the activities of the objectives of this axis</td>
<td><strong>B.1.1.1</strong></td>
<td>Appointmnet</td>
<td><strong>B.1.1.1</strong></td>
<td><strong>B.1.1.1</strong></td>
<td>-WHO- National Professional Officer</td>
<td><strong>DR</strong></td>
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<td>Empower ESU director as focal person.</td>
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<td></td>
<td>-MOH- General Director</td>
<td><strong>DR</strong></td>
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<tr>
<td><strong>B.1.2</strong></td>
<td>Appointment of the members of the Technical Working Group along with its TOR</td>
<td><strong>B.1.2</strong></td>
<td>Appointmnet</td>
<td><strong>B.1.2</strong></td>
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<td><strong>B.1.2</strong></td>
<td><strong>B.1.2</strong></td>
<td>-WHO- National Professional Officer</td>
<td><strong>DR</strong></td>
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<td>One</td>
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<td></td>
<td>-MOH- General Director</td>
<td><strong>DR</strong></td>
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<tr>
<td>Objective</td>
<td>Activity/Sub- activity</td>
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<td>Responsibility Entity</td>
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<tr>
<td>B.2.1</td>
<td>Mapping of labs that can potentially provide microbiologically reliable and epidemiologically representative data. These labs start reporting their data to the (GLASS).</td>
<td>B.2.1.1 List</td>
<td>One</td>
<td>B.2.1.1 Three months from time zero</td>
<td>B.2.1 MOH ESU</td>
<td>B.2.1.1 Focal person</td>
<td>B.2.1.1 USD</td>
<td>B.2.1.1 WHO</td>
<td>B.2.1.1 List available to technical working group</td>
</tr>
<tr>
<td><strong>B.2</strong> Reporting of AMR data to GLASS</td>
<td>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</td>
<td><strong>B.2.2</strong></td>
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<td></td>
<td><strong>B.2.2.1</strong> Workshops given every 5 years</td>
</tr>
<tr>
<td>B.2.2</td>
<td>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</td>
<td>B.2.2.1 Workshop</td>
<td>B.2.2.1 one every 5 years</td>
<td>B.2.2.1 Three months from time zero</td>
<td>B.2.2.1 WHO</td>
<td>B.2.2.1 -Technical working group -Focal Person</td>
<td>B.2.2.1 USD *5 = USD per workshop</td>
<td>B.2.2.1 AMR Fund WHO</td>
<td>B.2.2.1 Workshops given</td>
</tr>
<tr>
<td>Objective</td>
<td>Activity/Sub- activity</td>
<td>Unit</td>
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<td>B.2.2.3</td>
<td>Do a start up WHONET training for the 12 laboratories that were chosen for the coming 2 years every 2 years</td>
<td>B.2.2.3</td>
<td>One every two years</td>
<td>B.2.2.3</td>
<td>Three months from time zero</td>
<td>B.2.2.3</td>
<td>-Private sector, WHO consultant (Dr. ---)</td>
<td>B.2.2.3</td>
<td>USD *2=</td>
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<tr>
<td></td>
<td></td>
<td>Workshop</td>
<td></td>
<td>WHO</td>
<td></td>
<td></td>
<td>USD/year</td>
<td>AMR Fund WHO</td>
<td></td>
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<tr>
<td></td>
<td>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</td>
<td>B.2.2.4</td>
<td>Two visits per lab each year for 12 laboratories</td>
<td>B.2.2.4</td>
<td>Starting year 1</td>
<td>B.2.2.4</td>
<td>Technical working group</td>
<td>B.2.2.4</td>
<td>Two capacity building workshop per year 5 years: 10 workshop USD per workshop = USD</td>
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<tr>
<td></td>
<td></td>
<td>Laboratory visits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>USD</td>
<td>AMR Fund</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B.2.2.4 Number of laboratories that are passing the external QC / Total external QC tests sent*100 USD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>USD</td>
<td>AMR Fund</td>
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</table>


<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>B.2 Reporting of AMR data to GLASS</td>
<td>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.</td>
<td>B.2.2.5</td>
<td>B.2.2.5 Years 1 &amp; 2 = 50 sample/year *4 years = 120 samples</td>
<td>B.2.2.5 Six months from time zero</td>
<td>B.2.2.5 Reference laboratory (ies)</td>
<td>B.2.2.5 Technical working group</td>
<td>B.2.2.5 100 USD/specimen (24<em>12</em>100)<em>4 years = 120</em>100 144000 USD/ for 4 years</td>
<td>B.2.2.5 AMR Fund WHO</td>
<td>B.2.2.5 Number of laboratories having external QC</td>
</tr>
<tr>
<td>B.2.3 Data Entry in GLASS</td>
<td>B.2.3.1 Data collection from mature laboratories</td>
<td>B.2.3.1</td>
<td>B.2.3.1 Once/year</td>
<td>B.2.3.1 Start end of 1st year from time zero</td>
<td>B.2.3.1 ESU</td>
<td>B.2.3.1 ESU</td>
<td>B.2.3.1 USD *12= USD *5year Total USD USD</td>
<td>B.2.3.1 WHO/MOH</td>
<td>B.2.3 Number of laboratories reporting to GLASS</td>
</tr>
<tr>
<td>B.2.3.2 Data cleaning and entry into GLASS</td>
<td>B.2.3.2 Data cleaning and entry</td>
<td>B.2.3.2</td>
<td>B.2.3.2 Once/year</td>
<td>B.2.3.2 Start end of 1st year from time zero</td>
<td>B.2.3.2 ESU</td>
<td>B.2.3.2 ESU</td>
<td>B.2.3.2 ½ time Extra employee</td>
<td>B.2.3.2 MOH/WHO</td>
<td></td>
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<tr>
<td>Objective</td>
<td>Activity/Sub- activity</td>
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<tr>
<td>B.3</td>
<td>-Periodic issuing of an epidemiologically representative national AMR surveillance report in humans</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1</td>
<td>B.3.1 Epidemiologic report posted on AMR website yearly</td>
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<td></td>
<td>-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.)</td>
<td>Report</td>
<td>Once/year</td>
<td>Once/year</td>
<td>University hospitals</td>
<td>Technical working group or interested researchers assigned by technical working group</td>
<td>USD</td>
<td>WHO</td>
<td></td>
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<tr>
<td></td>
<td>-This report is posted on AMR webpages (MOH and MOA websites)</td>
<td></td>
<td>starting end of 1st year</td>
<td>starting end of 1st year</td>
<td>DC&amp;S</td>
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<tr>
<td>B.4</td>
<td>-Optimize AMR surveillance in the agricultural, food, veterinary, and environmental fields</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1</td>
<td>B.4.1 Surveillanc e report every 2 years</td>
</tr>
<tr>
<td></td>
<td>-Research project about AMR surveillance in the veterinary field.</td>
<td>Project</td>
<td>One</td>
<td>6 months from time zero</td>
<td>MOA Department of agriculture (AUY)</td>
<td>MOA-Head of Animal Health Service (Dr. ---) -MOA-Head of Poultry Husbandry Dpt (Eng. -----) -MOH-Head of Epidemiologic Monitoring Program (Dr. -)</td>
<td>USD</td>
<td>WHO</td>
<td></td>
</tr>
<tr>
<td>Objective</td>
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<tr>
<td>B.4.2</td>
<td>Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).</td>
<td>B.4.2 Organizational project</td>
<td>B.4.2 one</td>
<td>B.4.2 9 months from time zero</td>
<td>B.4.2 MOA</td>
<td>B.4.2 - MOA-Head of Animal Health Service (Dr. ---) - MOA-Head of Poultry Husbandry Dpt (Eng.)</td>
<td>B.4.2 USD</td>
<td>B.4.2 AMR fund</td>
<td>B.4.2 None</td>
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<tr>
<td>B.4.3</td>
<td>Put a list of AMR priority organisms and related resistance genes for surveillance in these fields</td>
<td>B.4.3 List</td>
<td>B.4.3 One</td>
<td>B.4.3 6 months from time zero</td>
<td>B.4.3 - MOA - MOH - WHO</td>
<td>B.4.3 - MOA-Head of Animal Health Service (Dr. ---) - Technical working group</td>
<td>B.4.3 USD</td>
<td>B.4.3 AMR fund</td>
<td>B.4.3 None</td>
</tr>
<tr>
<td>Objective</td>
<td>Activity/Sub-activity</td>
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<tr>
<td>B.4.4</td>
<td>B.4.4 -Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Sana'a for the analysis of surveillance specimens in agricultural, food, veterinary, and environmental fields -Suggestion of a plan of the microbiology work in this surveillance</td>
<td>B.4.4</td>
<td>Three</td>
<td>B.4.4 -Six months from time zero and completed nine months from time zero</td>
<td>B.4.4 -YARI -Sana'a chamber of manufacturing and commerce -AUY laboratory</td>
<td>B.4.4-Technical working group -YARI - Sana'a chamber of manufacturing and commerce - AUY laboratory</td>
<td>B.4.4 USD per visit Total: 3 visits USD</td>
<td>B.4.4 AMR Fund</td>
<td>B.4.4 Report about the capacity of these laboratories to do AMR surveillance in the veterinary world</td>
</tr>
<tr>
<td>B.4.5</td>
<td>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</td>
<td>B.4.5 Report</td>
<td>B.4.5 Once every 2 years</td>
<td>B.4.5 -First report should be ready at end of year 2 from time zero</td>
<td>B.4.5 MOA -MOA-Head of Animal Health Service [Dr.-] -Technical working group</td>
<td>B.4.5 USD/report (Every 2 years) Total USD years</td>
<td>B.4.5 AMR Fund</td>
<td>B.4.5 Quantity of purchased ABX that are listed in the “restricted use list” in the veterinary world</td>
<td></td>
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<tr>
<td>Objective</td>
<td>Activity/Sub-activity</td>
<td>Unit</td>
<td>Quantity</td>
<td>Date</td>
<td>Location</td>
<td>Responsibl e Entity</td>
<td>Cost</td>
<td>Source Of Funding</td>
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<tr>
<td>B.5.1</td>
<td>Define TOR of AMR reference lab</td>
<td>B.5.1 Document</td>
<td>B.5.1 ONE</td>
<td>B.5.1 3 months from time zero</td>
<td>B.5.1 ESU MOH</td>
<td>B.5.1 Technical working group</td>
<td>B.5.1 USD</td>
<td>B.5.1 WHO</td>
<td>Reference laboratory/laboratories appointed and</td>
</tr>
<tr>
<td>B.5.2</td>
<td>Map potential lab(s) across Yemen</td>
<td>B.5.2 List</td>
<td>B.5.2 One</td>
<td>B.5.2 Start at time zero Mapping finalized 3 months from time zero</td>
<td>B.5.2 ESU MOH Potential laboratories</td>
<td>B.5.2 Technical working group</td>
<td>B.5.2 USD</td>
<td>B.5.2 WHO</td>
<td></td>
</tr>
<tr>
<td>B.5.3</td>
<td>Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr. ---</td>
<td>B.5.3 Visit done by EMRO consultant</td>
<td>B.5.3 one to each potential reference laboratory</td>
<td>B.5.3 5 months from time zero</td>
<td>B.5.3 EMRO</td>
<td>B.5.3 USD</td>
<td>B.5.3 EMRO</td>
<td></td>
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<tr>
<td>B.5.4</td>
<td>Nominate the reference lab(s)</td>
<td>B.5.4 Nomination</td>
<td>B.5.4 One nomination of one or more laboratories</td>
<td>B.5.4 6 months from time zero</td>
<td>B.5.4 EMRO WHO MOH</td>
<td>B.5.4 USD</td>
<td>B.5.4 USD</td>
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<tr>
<th>Objective-2</th>
<th>Activity/Sub- activity</th>
<th>Unit</th>
<th>Quantity</th>
<th>Date</th>
<th>Location</th>
<th>Responsiblity Entity</th>
<th>Cost</th>
<th>Source Of Funding</th>
<th>Indicator</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>B.5.5 MOH to sign a contract with the lab(s)</td>
<td>B.5.5 Contract</td>
<td>B.5.5 one or more depending on number of chosen reference laboratories</td>
<td>B.5.5 9 months from time zero</td>
<td>B.5.5 MOH</td>
<td>B.5.5 - MOH- General Director Dr.</td>
<td>B.5.5 USD</td>
<td>B.5.5 WHO</td>
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</tr>
<tr>
<td>B.6</td>
<td>Enhance research activities in AMR surveillanc e</td>
<td>B.6.1 Agenda</td>
<td>B.6.1 One/2 years</td>
<td>B.6.1 1st agenda sent 1.5 years from time zero</td>
<td>B.6.1 MOH WHO ESU Universities</td>
<td>B.6.1 Technical working group ESU</td>
<td>B.6.1 USD</td>
<td>B.6.1 WHO</td>
<td>B.6.1 Research agenda listed on AMR website</td>
</tr>
</tbody>
</table>
### 9.2. Monitoring and evaluation plan

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity /Sub-activity</th>
<th>Indicator</th>
<th>Purpose</th>
<th>Calculation</th>
<th>Frequency</th>
<th>Data source</th>
<th>Method</th>
<th>baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1</td>
<td>Organization of the responsibilities for the execution of the tasks</td>
<td>B.1.1</td>
<td>Appointment of focal person charge of following up the activities of the objectives of this axis</td>
<td>B.1.1.1 Focal person Onominated</td>
<td>B.1.1.1 Yes/No</td>
<td>B.1.1.1 MOH</td>
<td>B.1.1.1 Letter</td>
<td>B.1.1.1 Partially, unofficially</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B.1.1.1.1 Empower ESU director as focal person</td>
<td>B.1.1.1 Follow up on the activities of this axis</td>
<td>B.1.1.1 Yes/No</td>
<td>B.1.1.1 MOH</td>
<td>B.1.1.1 Letter</td>
<td>B.1.1.1 Partially, unofficially</td>
<td></td>
</tr>
<tr>
<td>B.1.2</td>
<td>Appointment of the members of the technical working group along with its TOR</td>
<td>B.1.2</td>
<td>Technical working group assigned</td>
<td>B.1.2 Yes/No</td>
<td>B.1.2 MOH</td>
<td>B.1.2 Letter</td>
<td>B.1.2 NA</td>
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</tr>
<tr>
<td>B.2</td>
<td>Reporting of AMR data to GLASS</td>
<td>B.2.1</td>
<td>Mapping of labs that can potentially provide microbiologically reliable and epidemiologically</td>
<td>B.2.1.1 List available to technical working group and that will be sequentially entered into GLASS after capacity building</td>
<td>B.2.1.1 Yes/No</td>
<td>B.2.1.1 MOH</td>
<td>B.2.1.1 Listing</td>
<td>B.2.1.1 NA</td>
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<tr>
<td></td>
<td></td>
<td>B.2.1.1</td>
<td>Mapping of potential laboratories and in order to have an epidemiologically representative sample</td>
<td></td>
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</table>

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<table>
<thead>
<tr>
<th>Objective2</th>
<th>Activity Sub-activity</th>
<th>Indicator</th>
<th>Purpose</th>
<th>Calculation</th>
<th>Frequency</th>
<th>Data source</th>
<th>Method</th>
<th>baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.2.2</td>
<td>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</td>
<td>B.2.2.1 Workshop given</td>
<td>B.2.2.1 Introduction to GLASS and the plan, mainly because recruitment of the laboratories is based on voluntary enrollment into the project</td>
<td>B.2.2.1 Yes/No</td>
<td>B.2.2.1 Once/5 years</td>
<td>B.2.2.1 WHO MOH</td>
<td>B.2.2.1 workshop</td>
<td>B.2.2.1 Done partially</td>
</tr>
<tr>
<td>B.2.2.1</td>
<td>Organize a nationwide workshop about GLASS and the plan of inclusion in GLASS and introduction to WHONET</td>
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<tr>
<td>B.2.2.2</td>
<td>-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</td>
<td>B.2.2.2 List of laboratories that will immediately report is listed on website -Schedule for other laboratories is put</td>
<td>B.2.2.2 Schedule is put. Yes/No</td>
<td>B.2.2.2 Once/year</td>
<td>B.2.2.2 -WHO -Chosen laboratories</td>
<td>B.2.2.2 Laboratory visits</td>
<td>B.2.2.2 NA</td>
<td></td>
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<tr>
<td>Objective</td>
<td>activity sub-activity</td>
<td>Indicator</td>
<td>Purpose</td>
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<td>Objective</td>
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<tr>
<td>B.2.2.3</td>
<td>Do a start up WHONET training for the 12 laboratories that were</td>
<td>B.2.2.3</td>
<td>Workshop is done chosen for the coming 2 years every 2 years</td>
<td>B.1.1.4</td>
<td>B.2.2.3</td>
<td>B.2.2.3</td>
<td>B.2.2.3</td>
<td>B.2.2.3</td>
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<tr>
<td></td>
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<td></td>
<td>WHONET training for laboratories that will report to GLASS</td>
<td>Yes/No</td>
<td>Once every two years</td>
<td>WHO MOH</td>
<td>Workshop</td>
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<tr>
<td>B.2.3</td>
<td>Data Entry in GLASS</td>
<td>B.2.3</td>
<td>Number of laboratories reporting to GLASS</td>
<td>B.2.3</td>
<td>B.2.3</td>
<td>B.2.3</td>
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<tr>
<td>B.2.3.1</td>
<td>Data collection from mature laboratories</td>
<td>B.2.3</td>
<td></td>
<td>Number of laboratories reporting to GLASS</td>
<td>Once/Year</td>
<td>B.2.3.1</td>
<td>Data collection and entry</td>
<td>B.2.3.1</td>
</tr>
<tr>
<td>B.2.3.2</td>
<td>Data cleaning and entry into GLASS</td>
<td>B.2.3</td>
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</tbody>
</table>

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. The purpose is to do WHONET training for laboratories that will report to GLASS. The calculation is Yes/No, and the frequency is once every two years. The data source is WHO MOH, and the method is Workshop.

B.2.2.4

Do 3 laboratory visits for capacity building/year for 6 laboratories in different areas for building capacity and WHONET training. The calculation is Number of laboratories that are passing the external QC / Total external QC tests sent*100, and the frequency is once/year. The data source is -Chosen laboratories, and the method is Laboratory visits.

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. The purpose is to measure the progress of the capacity building. The calculation is Number of quality control specimens sent/year, and the frequency is once/year. The reference laboratory(ies) is Send the quality control specimens and collect them. A 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.2.3.1

Reach epidemiological representativeness

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 epidemiologically representative.
<table>
<thead>
<tr>
<th>Objective2</th>
<th>activity sub-activity</th>
<th>Indicator</th>
<th>Purpose</th>
<th>Calculation</th>
<th>Frequency</th>
<th>Data source</th>
<th>Method</th>
<th>Baseline</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.3</td>
<td>Periodic issuing of an epidemiologically representative national AMR surveillance report in humans</td>
<td>B.3.1</td>
<td>Improve awareness in scientific society</td>
<td>B.3.1 Compilation of WHONET data</td>
<td>Once/5 years</td>
<td>B.3.1 University hospital(s)</td>
<td>B.3.1 Project</td>
<td>B.3.1 NA</td>
</tr>
<tr>
<td></td>
<td>-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)</td>
<td>B.3.1</td>
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<tr>
<td>B.4</td>
<td>Optimize AMR surveillance in the agricultural, food, veterinary, and environmental fields</td>
<td>B.4.1</td>
<td></td>
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<td></td>
<td>B.4.1 Project</td>
<td>B.4.1 NA</td>
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<tr>
<td></td>
<td>Research project about AMR surveillance in the veterinary field.</td>
<td>B.4.1</td>
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<tr>
<td></td>
<td>B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).</td>
<td>B.4.2</td>
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<tr>
<td>B.4.3</td>
<td>Put a list of AMR priority organisms and related resistance genes for surveillance in these fields</td>
<td>B.4.3 None</td>
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<tr>
<td>B.4.4</td>
<td>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</td>
<td>B.4.4 Report about the capacity of these laboratories to do AMR surveillance in the veterinary world</td>
<td>B.4.4 Yes/No</td>
<td>B.4.4 once/5 years</td>
<td>B.4.4 Report</td>
<td>B.4.4 NA</td>
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<tr>
<td>B.4.5</td>
<td>Report results of ABX use and resistance surveillance in agriculture and veterinary world</td>
<td>B.4.5 Quantity of purchased ABX that are listed in the “restricted use list” in the veterinary world</td>
<td>B.4.5 MOA</td>
<td>B.4.5 Once every 2 years</td>
<td>B.4.5 Report</td>
<td>B.4.5 NA</td>
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<td>Objective2</td>
<td>activity sub-activity</td>
<td>Indicator</td>
<td>Purpose</td>
<td>Calculation</td>
<td>Frequency</td>
<td>Data source</td>
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<tr>
<td>B.5</td>
<td>Create/ Appoint AMR reference lab(s)</td>
<td>B.5.1 Define TOR of AMR reference lab</td>
<td>B.5 Reference laboratory/laboratories appointed and contracts done</td>
<td>B.5 Have a reference for difficult situations and catch alarming and emerging resistance trends</td>
<td>B.5 Once/Year</td>
<td>B.5 -WHO MOH</td>
<td>B.5 Appointment</td>
<td>B.5 NA</td>
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<td></td>
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<td>B.5.2 Map potential lab(s) across Yemen</td>
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<td>B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr ----</td>
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<td>B.5.4 Nominate the reference lab(s)</td>
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<td>B.5.5 MOH to sign a contract with the lab(s)</td>
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<tr>
<td>B.6</td>
<td>Enhance research activities in AMR surveillance</td>
<td>B.6.1 Put and broadcast an AMR Research Agenda including research for alternative agents to antimicrobials</td>
<td>B.6.1 Research agenda listed on AMR website</td>
<td>B.6.1 Involve and update concerned facilities in research activities in surveillance</td>
<td>B.6.1 Once/2 years</td>
<td>B.6.1 MOH WHO ESU</td>
<td>B.6.1 Agenda</td>
<td>B.6.1 NA</td>
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</tbody>
</table>
## 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

<table>
<thead>
<tr>
<th>Strategic Objective 3 interventions</th>
<th>Activity / Sub-activity</th>
<th>Milestone</th>
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</thead>
<tbody>
<tr>
<td>C.1 Organization of the responsibilities for the execution of the tasks</td>
<td>C.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td>C.1 2022 three months from “time zero”</td>
</tr>
<tr>
<td></td>
<td>C.1.2 Appointment of the members of the technical group along with its TOR</td>
<td></td>
</tr>
<tr>
<td>C.2 Optimize IPC practices in (Hospitals, LTCFs and PHCC)</td>
<td>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</td>
<td>C.2 3 years C.2.1.1 three months from “time zero”</td>
</tr>
<tr>
<td></td>
<td>C.2.1.2 Inclusion of the checklist of the guidelines in <em>accreditation standards</em></td>
<td>C.2.1.2 six months from “time zero”</td>
</tr>
<tr>
<td></td>
<td>C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation</td>
<td>C.2.1.3 three years from “time zero”</td>
</tr>
<tr>
<td></td>
<td>C.2.1.4 Syndicate of hospitals recommends periodic IPC <em>training</em> and <em>workshops</em> to employees hosted by scientific societies, universities, etc</td>
<td>C.2.1.4 2022-2023 1.5 years from “time zero”</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>C.2.2.1 three months from “time zero”</td>
</tr>
<tr>
<td></td>
<td>C.2.2.2 Inclusion of IPC checklist in the MOH <em>licensing</em> criteria of these facilities</td>
<td>C.2.2.2 six months from “time zero”</td>
</tr>
<tr>
<td></td>
<td>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</td>
<td>C.2.3.1 six months from “time zero” C.2.3.2 nine months from “time zero”</td>
</tr>
<tr>
<td>Strategic Objective 3 interventions</td>
<td>Activity / Sub-activity</td>
<td>Milestone</td>
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<tr>
<td>C.3</td>
<td><strong>Enhance IPC education different majors</strong></td>
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<tr>
<td></td>
<td>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)</td>
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<td>C.3.1.1 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)</td>
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<td>C.3.1.1 Check the current situation of IPC in the ongoing veterinary curriculum</td>
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<td>C.3.1.1 two years from “time zero”</td>
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<td>C.3.2 Include IPC-related educational modules in <strong>veterinary schools curricula</strong></td>
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<td>C.3.2.2 Review of IPC in regional and global veterinary curricula</td>
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<td>C.3.3 IPC-related educational modules in curricula of three schools (Agriculture, Nutrition, Environment)</td>
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<td>C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)</td>
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<td>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</td>
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<td>Strategic Objective 3 interventions</td>
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<td><strong>C.4</strong> Advanced IPC training for IPC professionals</td>
<td>C.3.3.3 Include the recommended tricyclic AMR and IPC in curricula when not available</td>
<td>C.3.3.3 2 years from “time zero”</td>
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<td>C.4.1 Put TOR for IPC professionals in different healthcare facilities. Put prerequisite training/experience of IPC physicians, officers, and nurses</td>
<td>C.4 3 months C.4.1.1 3 months</td>
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<td>C.4.1.1 Include in the national IPC Guidelines the TOR of the professionals</td>
<td>C.4.2.1 3 months</td>
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<td>C.4.2 Make training available and affordable in universities and professional societies</td>
<td>C.4.2.1 3 months</td>
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<td>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</td>
<td>C.4.2.1 3 months</td>
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<td><strong>C.5</strong> National Process Indicators in IPC</td>
<td>C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process</td>
<td>C.5 Four years from “time zero” C.5.1 One year from “time zero”</td>
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<td>C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, et)</td>
<td>C.5.2 Four years from “time zero”</td>
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<td><strong>C.6</strong> Survey of Nosocomial Infections in hospitals</td>
<td>C.6.1 Conduct a point prevalence study on nosocomial infections in Yemen's hospitals</td>
<td>C.6 2 years C.6.1 2 years</td>
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<td><strong>C.7</strong> IPC in the veterinary world</td>
<td>C.7.1 Review the OIE biosafety recommendations</td>
<td>C.7 6 months C.7.1 3 months</td>
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<td>C.7.2 Check the availability in of these recommendations in local veterinary laws</td>
<td>C.7.2 5 months</td>
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<td>C.7.3 Monitor the application of these laws</td>
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<td>C.7.3.1 MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world</td>
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## 10.1. Operational plan and budget

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<tr>
<td>C.1</td>
<td>Organization of the responsibilities for the execution of the tasks</td>
<td>C.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td>C.1 Appointment</td>
<td>C.1 One person and one technical group</td>
<td>C.1 three months from “time zero”</td>
<td>C.1 MOH</td>
<td>One full time employee</td>
<td>C.1 AMR Fund</td>
<td>C.1 Appointment letter with job description</td>
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<td>C.1.2 Appointment of the members of the IPC TWG along with its TOR</td>
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<td>C.2</td>
<td>Improve IPC practices in Hospitals</td>
<td>C.2.1.1 Document</td>
<td>C.2.1.1 one</td>
<td>C.2.1.1 three months from “time zero”</td>
<td>C.2.1.1 -MOH -DC&amp;S -WHO</td>
<td>C.2.1.1 IPC expert</td>
<td>C.2.1.1 USD</td>
<td>C.2.1.1 AMR Fund</td>
<td>C.2.1.1 Guidelines on MOH site</td>
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<td>C.2</td>
<td>Inclusion of the checklist of the guidelines in accreditation standards</td>
<td>C.2.1.2 Checklist</td>
<td>C.2.1.2 one</td>
<td>C.2.1.2 six months from “time zero”</td>
<td>C.2.1.2 -MOH -DC&amp;S -WHO</td>
<td>C.2.1.2 -IPC expert -MOH -Project Coordinator (Dr.)</td>
<td>C.2.1.2 USD</td>
<td>C.2.1.2 AMR Fund</td>
<td>C.2.1.2 Letter from team to IPC Officer</td>
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<td>C.2</td>
<td>Follow up and feedback on IPC practices in hospitals after each accreditation</td>
<td>C.2.1.3 Report</td>
<td>C.2.1.3 one every 5 years</td>
<td>C.2.1.3 three years from “time zero”</td>
<td>C.2.1.3 MOH</td>
<td>C.2.1.3 -IPC coordinator or temporary consultant Accreditation on team</td>
<td>C.2.1.3 USD</td>
<td>C.2.1.3 Syndicate of hospitals</td>
<td>C.2.1.3 Percentage of hospitals with acceptable results for IPC in accrediting</td>
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<tr>
<td>Objective</td>
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<td>Syndicate of hospitals recommend s periodic IPC training and workshops to employees hosted by scientific societies, universities , etc.</td>
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<td>Inclusion of IPC checklist in the MOH licensing criteria of these facilities</td>
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<td>C.2</td>
<td>Optimize IPC practices in Hospitals, HCC</td>
<td>C.2.3 Improve IPC practices in HCC</td>
<td>C.2.3.1 Guidelines</td>
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<td>C.2.3.1 six months from “time zero”</td>
<td>C.2.3.1 Private Sector (Dean of School of Nursing - -- University) (Dr.---)</td>
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<td>C.2.3.1 AMR fund WHO</td>
<td>C.2.3.1 Guidelines on website</td>
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<td>C.2.3.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities</td>
<td>C.2.3.2 Checklist</td>
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<td>C.2.3.2 nine months from “time zero”</td>
<td>C.2.3.2 MOH</td>
<td>C.2.3.2 Private Sector (Dean of School of Nursing - -- University) (Dr.---)</td>
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<td>C.3</td>
<td>Enhance IPC education different majors</td>
<td>C.3.1 Include IPC-related educational modules in human- health related majors (physicians, nurses, midwives, physiotherapists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)</td>
<td>C.3.1 -Basic recommendations to be included -IPC Letters from Ministry of education to different teaching establishments</td>
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<td>C.3.1 one year from “time zero”</td>
<td>C.3.1 Ministry of Education MOH</td>
<td>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</td>
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<td>C.3.3 IPC module to be included in the three curricula of sent from respective ministries as recommendation to the schools</td>
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<td>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</td>
<td>C.4.1.1 Part of IPC guidelines</td>
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<td>C.4.1.1 Same as guidelines</td>
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<td>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</td>
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<td>C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process</td>
<td>C.5.1 Research project</td>
<td>C.5.1 One</td>
<td>C.5.1 One year from “time zero”</td>
<td>C.5.1 MOH ICD&amp;S Hospitals</td>
<td>C.5.1 -Private sector, WHO consultant, former DC&amp;S president (Dr: ——) -Private sector, former DC&amp;S president (Dr—i) -Private sector (---) -ESU</td>
<td>C.5.1 USD</td>
<td>C.5.1 Fund raising</td>
<td>C.5.1 Results are posted on AMR website</td>
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<td>C.5.2 Research project</td>
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<td>C.5.2 USD</td>
<td>C.5.2 Fund raising</td>
<td>C.5.2 Percentage of hospitals that report results of process indicators</td>
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<td>C.6.1 Survey</td>
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<td>C.6.1 2 years</td>
<td>C.6.1 Yemeni Hospitals</td>
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<td>C.6.1 Results of study published</td>
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<td>C.7 IPC in the veterinary world</td>
<td>C.7.1 Review the OIE biosafety recommendations</td>
<td>C.7.1 Report</td>
<td>C.7.1 one</td>
<td>C.7.1 3 months</td>
<td>C.7.1 MOA</td>
<td>C.7.1 Technical working group</td>
<td>C.7.1 USA</td>
<td>C.7.1 WHO</td>
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<td>C.7.2 Check the availability in of these recommendations in local veterinary laws</td>
<td>C.7.2 Report</td>
<td>C.7.2 one</td>
<td>C.7.2 5 months</td>
<td>C.7.2 MOA</td>
<td>C.7.2 -Technical working group -MOA-Head of Animal Health Service [Dr. ----]</td>
<td>C.7.2 USD</td>
<td>C.7.2 AMR Fund</td>
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<td>C.7.3 Monitor the application of these laws</td>
<td>C.7.3 Letter</td>
<td>C.7.3 one</td>
<td>C.7.3 6 months</td>
<td>C.7.3 MOH</td>
<td>C.7.3 Technical working group</td>
<td>C.7.3 USD</td>
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### 10.2. Monitoring and evaluation plan objective 3

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<td>C.1</td>
<td>Organization of the responsibiliti es for the execution of the tasks</td>
<td>C.1.1</td>
<td>Appointment of focal person n charge of following up the activities of the objectives of this axis</td>
<td>C.1 Letter</td>
<td>C.1 NA</td>
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<td>C.1 NA</td>
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<td>Appointment of the members of the technical group along with its TOR</td>
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<td>C.2</td>
<td>Optimize IPC practices in Hospitals, long term care facilities and PHCC</td>
<td>C.2.1</td>
<td>Improve IPC practices in Hospitals</td>
<td>C.2.1.1 Guidelines on MOH site</td>
<td>C.2.1.1 Update and standardization of IPC</td>
<td>C.2.1.1 International guidelines</td>
<td>C.2.1.1 Scientific review</td>
<td>C.2.1.1 In progress</td>
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<td>C.2.1.2</td>
<td>Inclusion of the checklist of the guidelines in accreditation standards</td>
<td>C.2.1.2 Audit IPC during the accreditation audit in hospitals</td>
<td>C.2.1.2 Yes/No</td>
<td>C.2.1.2</td>
<td>Once/5 years</td>
<td>C.2.1.2 Accrreditaton checklists</td>
<td>C.2.1.2 Letter Meeting Accreditation committee</td>
<td>C.2.1.2 Partial</td>
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<td>C.2.1.3</td>
<td>Percentage of hospitals with acceptable results for IPC in accreditation</td>
<td>C.2.1.3 Increase the number of hospitals that are compliant with national IPC guidelines.</td>
<td>C.2.1.3 (Number of compliant hospitals/Total number of audited hospitals) x100</td>
<td>C.2.1.3</td>
<td>Once/3 years</td>
<td>C.2.1.3 Accreditation audit results</td>
<td>C.2.1.3 Checklist in accreditation audit</td>
<td>C.2.1.3 Not started yet</td>
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<td>C.2.1.4</td>
<td>Syndicate of hospitals recommends periodic IPC training and workshops to employees hosted by scientific societies, universities,etc</td>
<td>C.2.1.4 Number of IPC workshops per year</td>
<td>C.2.1.4 Have qualified HCW in charge of IPC, and have more efficient programs in hospitals</td>
<td>C.2.1.4</td>
<td>Once/5 years</td>
<td>C.2.1.4 International standards</td>
<td>C.2.1.4 Scientific review</td>
<td>C.2.1.4 Workshops are being done but not followed up</td>
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<td>Optimize IPC practices in Hospitals, long term care facilities and PHCC</td>
<td>C.2.2</td>
<td>Improve IPC practices in long-term care facilities</td>
<td>C.2.2.1 Updated guidelines on website</td>
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<td>Ministry of social affairs Guidelines</td>
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<td>C.2.2.1</td>
<td>Standardize IPC in long term</td>
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<td>C.2.2.2.1</td>
<td>To review and update guidelines of IPC in long-term care facilities that are available in Ministry of Social Affairs</td>
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<td>Inclusion of IPC checklist in the MOH licensing criteria of these facilities</td>
<td>C.2.2.2 Checklist of IPC in accreditation standards</td>
<td>Yes /no</td>
<td>Once</td>
<td>Ministry of social affairs -MOH -Ministry of social affairs</td>
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<td>Inclusion of IPC checklist in the MOH licensing criteria of these facilities</td>
<td>C.2.2.2 Improve application of IPC in these facilities</td>
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<td>C.2.3</td>
<td>Improve IPC practices in PHCC</td>
<td>C.2.3.1 Guidelines on website</td>
<td>Yes/No</td>
<td>Once per 6 months</td>
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<td>C.2.3.1.1</td>
<td>Establish guidelines on IPC in the PHCC</td>
<td>C.2.3.1 Standardize IPC in PHCC</td>
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<td>C.2.3.2 Checklist of IPC in accreditation standards.</td>
<td>Yes/No</td>
<td>Once per 6 months</td>
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<td>C.3.1</td>
<td>Include IPC- related educational modules in human-health related majors (physicians, nurses, midwives, physiotherapists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)</td>
<td>C.3.1</td>
<td>Percentage of health curricula that contain IPC modules</td>
<td>C.3.1</td>
<td>Include IPC in basic education of health professionals</td>
<td>C.3.1</td>
<td>Once/5 years</td>
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<td>C.3.2</td>
<td>Include IPC- related educational modules in veterinary schools curricula</td>
<td>C.3.2.1</td>
<td>Check the current situation of IPC in the ongoing veterinary Curriculum</td>
<td>C.3.2.1</td>
<td>None</td>
<td>C.3.2.2</td>
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<td>C.3.2.2</td>
<td>Review of IPC in regional and global veterinary curricula</td>
<td>C.3.2.2</td>
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<td>C.3.2.3</td>
<td>Prepare a proposal for veterinary school for deficit in curricula improvement, if need be.</td>
<td>C.3.2.3</td>
<td>Improve IPC education in veterinary school</td>
<td>C.3.2.3 Yes/No</td>
<td>C.3.2.3 Once</td>
<td>Veterinary school MOA</td>
<td>C.3.2.3 Check if proposal sent</td>
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<td>C.3.3</td>
<td>IPC-related educational modules in curricula of three schools (Agriculture, Nutrition, Environment)</td>
<td>C.3.3</td>
<td>Number of university programs that include IPC according to recommendation/Total number of audited programs</td>
<td>C.3.3 Once/year</td>
<td>C.3.3 The 3 schools</td>
<td>C.3.3 Checking</td>
<td>C.3.3 In a superficial way</td>
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<td>C.3.3.1</td>
<td>Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)</td>
<td>C.3.3</td>
<td>Improve IPC education in Agriculture, Nutrition, Environment Schools</td>
<td>C.3.3 Once/year</td>
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<td>C.3.3.2</td>
<td>Review global and regional recommendations on IPC in curricula of agriculture, nutrition and environment, and formulate what should be included in them</td>
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<td>C.3.3.3</td>
<td>Include the recommended tricyclic AMR and IPC in curricula when not available</td>
<td>C.3.3</td>
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<td>C.4.1</td>
<td>Put TOR for IPC</td>
<td>C.4.1.1</td>
<td>To standardize the work and follow-up on the performance</td>
<td>Yes/No</td>
<td>Once</td>
<td>MOH</td>
<td>Checking</td>
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<td>professionals in different healthcare facilities. -Put prerequisite training/experience of IPC physicians, officers, and nurses</td>
<td>C.4.1.1</td>
<td>TOR of IPC professionals are included in the IPC guidelines</td>
<td>C.4.1.1</td>
<td>MOH WHO</td>
<td>MOH</td>
<td>Checking</td>
<td>C.4.1.1</td>
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<td>Include in the national IPC Guidelines the TOR of the professionals</td>
<td>C.4.1.1</td>
<td>To standardize the work and follow-up on the performance</td>
<td>Yes/No</td>
<td>Once</td>
<td>MOH</td>
<td>Checking</td>
<td>C.4.1.1</td>
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<td>C.4.2</td>
<td>Make training available and affordable in universities and professional societies</td>
<td>C.4.2.1</td>
<td>None</td>
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<td><strong>C.5</strong> National Process Indicators in IPC</td>
<td>C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process</td>
<td>C.5.1 Results are posted on AMR website</td>
<td>C.5.1 Have a baseline evaluation</td>
<td>C.5.1 Percentage of hospitals that do have milestones of IPC</td>
<td>C.5.1 Once</td>
<td>C.5.1 Hospitals that are epidemiologically representative</td>
<td>C.5.1 Project</td>
<td>C.5.1 NA</td>
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<td>C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, etc)</td>
<td>C.5.2 Percentage of hospitals that report results of process indicators</td>
<td>C.5.2 Improve application of IPC principles</td>
<td>C.5.2 For each process indicator 5 hospitals that have a follow up of the indicator</td>
<td>C.5.2 Once/3 years</td>
<td>C.5.2 Hospitals that are epidemiologically representative</td>
<td>C.5.2 Project</td>
<td>C.5.2 NA</td>
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<tr>
<td><strong>C.6</strong> Survey of Nosocomial Infections in hospitals</td>
<td>C.6.1 Conduct a point prevalence study on nosocomial infections in Yemeni hospitals</td>
<td>C.6.1 Results of study published</td>
<td>C.6.1 To join the WHO point prevalence HAI study, and benchmark with global data</td>
<td>C.6.1 NA</td>
<td>C.6.1 Once</td>
<td>C.6.1 Hospitals MOH</td>
<td>C.6.1 Study</td>
<td>C.6.1 NA</td>
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<td><strong>C.7</strong> IPC in the veterinary world</td>
<td>C.7.1 Review the OIE biosafety recommendations</td>
<td>C.7.1 None</td>
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<td>Check the availability in of these recommendations in local veterinary laws</td>
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<td>Monitor the application of these laws</td>
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<td>IPC in the veterinary world</td>
<td>MOH recommends to MOA to follow up on the related activities of IPC in Veterinary world</td>
<td>C.7.3</td>
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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 for applications other than human and animal health

<table>
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<tr>
<th>Strategic objective 4 interventions</th>
<th>Activity / Sub-activity</th>
<th>Milestone / Date (operational plan)</th>
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<tr>
<td>D.1 Organization of the responsibilities for the execution of the tasks</td>
<td>D.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td>D.1 three months from time zero D.1.1 three months from time zero</td>
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<tr>
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<td>D.1.2 Appointment of the members of the technical working group along with its TOR</td>
<td>D.1.2 three months from time zero</td>
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<tr>
<td>D.2 Improve ABX quality control</td>
<td>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</td>
<td>D.2 One year from time zero D.2.1 One year from time zero</td>
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<tr>
<td>D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans</td>
<td>D.3.1 Define CIAM D.3.1.1 Literature search</td>
<td>D.3 Six months from time zero D.3.1.1 Three months from time zero</td>
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<td>D.3.1.2 Formulate the list</td>
<td>D.3.1.2 Six months from time zero</td>
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<tr>
<td>D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data</td>
<td>D.4.1 Workshops on metrics for ABX use measurement</td>
<td>D.4 5 years D.4.1 Six months from time zero and 1 year from time zero</td>
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CIAM: Critically Important Antimicrobials
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<th>Strategic objective 4 interventions</th>
<th>Activity / Sub-activity</th>
<th>Milestone / Date (operational plan)</th>
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</table>
| **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

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<tr>
<th>Strategic objective</th>
<th>Activity / Sub-activity</th>
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<td>D.5.2.4 1.5 years from time zero</td>
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<td>D.5.3 Inclusion of AMS programs among hospital accreditation standards</td>
<td>D.5.3.1 Three months from time zero</td>
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<td>D.5.4 Auditing the AMS practices during MOH accreditation with feedback to hospitals</td>
<td>D.5.4 2021 and after each accreditation audit for 5 years</td>
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<td>D.5.5 six months from time zero</td>
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<td>D.6</td>
<td>D.6.1 Nominate a task group for the meeting between MOH including Dr. ------ and the Order of Pharmacists</td>
<td>D.63 month</td>
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<td>D.7</td>
<td>D.7.1 Banning importation and use of CIAM in the veterinary field</td>
<td>D.7 Two years from time zero</td>
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<td>D.7.1.2 The veterinary drug office will not import these agents</td>
<td>D.7.1.2 one year from time zero</td>
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<td>D.7.2 Check if CIAM are used in agriculture and environment</td>
<td>D.7.2.1 nine months from time zero</td>
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<td>D.7.2.1 -Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list.</td>
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<td>D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel.</td>
<td>D.7.2.2 two years from time zero</td>
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<td>D.7.2.3 Get results of ABX residues in food items being done in Yemen</td>
<td>D.7.2.3 three months from time zero</td>
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| 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.7.5 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 |
|                                   | D.7.5 Research project in Agriculture school                                           |                                                        |
### 11.1. Operational plan and budget objective 4

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<th>Responsible Entity</th>
<th>Cost</th>
<th>Source Of Funding</th>
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<td>D.1.1 Letter</td>
<td>D.1.1 One</td>
<td>D.1.1 three months from time zero</td>
<td>MOH</td>
<td>D.1.1 -WHO-National Professional Officer [Dr.] -MOH-General Director [Dr.]</td>
<td>D.1.1 USD</td>
<td>D.1.1 WHO</td>
<td>D.1.1 Focal person nominated</td>
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<td>D.1.2</td>
<td>Appointment of the members of the technical working group along with its TOR</td>
<td>D.1.2 Letter</td>
<td>D.1.2 One</td>
<td>D.1.2 three months from time zero</td>
<td>MOH</td>
<td>D.1.2 - WHO-National Professional Officer [Dr.] -MOH-General Director [Dr.]</td>
<td>D.1.2 USD</td>
<td>D.1.2 WHO</td>
<td>D.1.2 Technical working group assigned</td>
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<td>D.2</td>
<td>Improve ABX quality control</td>
<td>D.2.1</td>
<td>Network</td>
<td>One year from time zero</td>
<td>D.2.1 MOH</td>
<td>D.2.1 -MOH-Head of Preventive Medicine and Communicable Diseases Dpts (Dr. --)</td>
<td>MOH</td>
<td>WHO MOH</td>
<td>D.2.1 Number of generic antibiotics that are tested by the pharmacovigilance programs</td>
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<td>D.3</td>
<td>Control the use of critically important antimicrobial molecules (CIAM) in humans</td>
<td>D.3.1</td>
<td>Literature search survey</td>
<td>D.3.1.1 List</td>
<td>D.3.1.1 Three months from time zero</td>
<td>D.3.1.1 MOH MOA</td>
<td>D.3.1.1 -Private sector, WHO consultant, former DC&amp;S president (Dr. --)</td>
<td>USD</td>
<td>WHO MOH</td>
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<td>D.3.1.2 Formulate the list of CIAM</td>
<td>D.3.1.2 National list of CIAM</td>
<td>D.3.1.2 One</td>
<td>D.3.1.2 Six months from time zero</td>
<td>D.3.1.2 -MOH -MOA</td>
<td>D.3.1.2 -MOA- Head of Animal Health Service (Dr. ---)</td>
<td>D.3.1.2 USD</td>
<td>D.3.1.2 AMR Fund</td>
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<td>D.4</td>
<td>Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data</td>
<td>D.4.1 Workshops on metrics for ABX use measurement</td>
<td>D.4.1 Workshops</td>
<td>D.4.1 Six</td>
<td>D.4.1 Six months from time zero and 1 year from time zero</td>
<td>D.4.1 3 in Sana’a, 1 in Aden, 1 in the , 1 in Alhodiedah the Hadramout and 1 in Ibb</td>
<td>D.4.1 Focal person</td>
<td>D.4.1 USD (6 workshops)</td>
<td>D.4.1 Percentage of hospitals that sent attendees</td>
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<td>Objective</td>
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<td>D.4.2</td>
<td>Compilation of data from hospitals</td>
<td>D.4.2.1 List</td>
<td>One</td>
<td>Three months from time zero</td>
<td>MOH</td>
<td>D.4.2.1 -MOH-Head of pharmacy service (Dr.-MOH-Head of Epidemiological Surveillance Program)</td>
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<td>D.4.2.1</td>
<td>Determine the epidemiologically representative sample of hospitals for surveillance of ABX</td>
<td>D.4.2.1 List</td>
<td>One</td>
<td>Three months from time zero</td>
<td>MOH</td>
<td>D.4.2.1 -MOH-Head of pharmacy service (Dr.-MOH-Head of Epidemiological Surveillance Program)</td>
<td>USD</td>
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<td>D.4.2.2</td>
<td>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</td>
<td>D.4.2.2 Hospital data assessment Four times per year over 5 years</td>
<td>D.4.2.2 Hospital data assessment Four times per year over 5 years</td>
<td>D.4.2.2 -MOH-AMS expert</td>
<td>D.4.2.2 USD per year for 5 years = USD</td>
<td>D.4.2.2 AMR fund</td>
<td>None</td>
<td>D.4.2.2 None</td>
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<td>D.4</td>
<td>Sentinel Surveillance of ABX (CIAM) consumptio from a network of hospitals and benchmark with international data</td>
<td>D.4.2.3 Surveillance of ABX use in Yemeni hospitals by auto reporting DDDs</td>
<td>D.4.2.3 Report</td>
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<td>D.4.2.3 -MOH -WHO</td>
<td>D.4.2.3 -MOH-Head of pharmacy service (Dr. -MOH-Head of Epidemiological Surveillance Program (Dr. -))</td>
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<td>D.5</td>
<td>Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs</td>
<td>D.5.1 Workshops on AMS twice per year</td>
<td>D.5.1 Workshops</td>
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<td>D.5.1 -MOH -WHO -DC&amp;S</td>
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<td>D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to Standardize</td>
<td>D.5.2.1 List</td>
<td>D.5.2.1 six months from time zero</td>
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<td>D.5.2.1 -WHO -DC&amp;S</td>
<td>D.5.2.1 -Private sector, (Dr. -Private sector, WHO consultant two (Dr. -)</td>
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<td>D.5.2.2 Prepare the missing guidelines</td>
<td>D.5.2.2 List</td>
<td>D.5.2.2 One</td>
<td>D.5.2.2 Finalize within 1 year from time zero</td>
<td>D.5.2.2 Focal person will distribute the tasks according to the list.</td>
<td>D.5.2.2 Included in D.5.2.1</td>
<td>D.5.2.2 AMR fund</td>
<td><strong>D.5.2.2 Percentage of guidelines endorsed by respective scientific societies</strong></td>
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<td>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</td>
<td>D.5.2.3 Schedule</td>
<td>D.5.2.3 One</td>
<td>D.5.2.3 Starting 1 year from time zero and finalized 3 years from time zero</td>
<td>D.5.2.3 MOH -Focal person -DC&amp;S president (Dr. ...)</td>
<td>D.5.2.3 Workshops 3 times per year (USD per workshop) <em>3</em>5=USD</td>
<td>D.5.2.3 AMR fund</td>
<td><strong>D.5.2.3 Percentage of guidelines endorsed by respective scientific societies</strong></td>
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<td>D.5.2.4 Post these guidelines on the AMR/AMS website</td>
<td>D.5.2.4 Guidelines</td>
<td>D.5.2.4 to be assigned later</td>
<td>D.5.2.4 1.5 years from time zero</td>
<td>D.5.2.4 MOH -Focal person -IT consultant</td>
<td>D.5.2.4 None</td>
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<td><strong>D.5.2.4 Number of guidelines posted on AMR/AMS website.</strong></td>
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<td>D.5.3</td>
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<td>D.5.3.1 AMS checklist in accreditation</td>
<td>D.5.3.1 One</td>
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<td>D.5.3.1 MOH</td>
<td>D.5.3.1</td>
<td>D.5.3.1 USD</td>
<td>D.5.3.1 WHO</td>
<td>D.5.3.1 AMS and its checklist available in accreditation standards</td>
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<td>D.5.4</td>
<td>Auditing the AMS practices during MOH accreditation with feedback to hospitals.</td>
<td>D.5.4 Report</td>
<td>D.5.4 One</td>
<td>D.5.4 2021 and after each accreditation audit for 5 years</td>
<td>D.5.4 MOH</td>
<td>D.5.4 MOH accreditation team</td>
<td>D.5.4 USD</td>
<td>D.5.4 WHO</td>
<td>D.5.4 Number of feedback given/number of hospitals</td>
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<td>D.5.5 AMS on website</td>
<td>D.5.5 One</td>
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<td>D.5.5 MOH-MOA</td>
<td>D.5.5 IT consultant</td>
<td>D.5.5 USD</td>
<td>D.5.5 AMR fund</td>
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<td>D.6.1</td>
<td>Nominate a task group for the meeting between MOH including Dr. ---- and the Order of pharmacists</td>
<td>D.6.1 Group</td>
<td>D.6.1 one</td>
<td>D.6.1 3 months</td>
<td>D.6.1 MOH</td>
<td>Technical working group</td>
<td>D.6.1 USD</td>
<td>WHO</td>
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<td>D.6.2</td>
<td>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</td>
<td>D.6.2 Meeting</td>
<td>D.6.2 One</td>
<td>D.6.2 To be finalized 3 months from time zero</td>
<td>D.6.2 MOH -Order of Pharmacists</td>
<td>Dr.---\ General \Director</td>
<td>D.6.2 USD</td>
<td>WHO</td>
<td>Agenda for collaboration put</td>
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**Notes:**
- MOH: Ministry of Health
- DC&S: Development & Cooperation Services
- WHO: World Health Organization
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<td>D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors</td>
<td>D.7.1 Banning importation and use of CIAM in the veterinary field</td>
<td>D.7.1.1 Letter</td>
<td>D.7.1.1 One</td>
<td>D.7.1.1 Will be sent 12 months from time zero</td>
<td>D.7.1 MOA</td>
<td>D.7.1 MOA-Head of Animal Health Service (Dr. --)</td>
<td>D.7.1 USD</td>
<td>D.7.1 AMR fund</td>
<td>D.7.1 DDD of CIAM molecules imported per year</td>
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<td>D.7.1.1 The CIAM list will be sent to the minister to ban their importation for veterinary use</td>
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<td>D.7.1.2 The veterinary drug office will not import these agents</td>
<td>D.7.1.2 Memo</td>
<td>D.7.1.2 One</td>
<td>D.7.1.2 one year from time zero</td>
<td>D.7.1.2 MOA</td>
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<td>D.7.2 Check if CIAM are used in agriculture and environment</td>
<td>D.7.2.1 List</td>
<td>D.7.2.1 One</td>
<td>D.7.2.1 12 months from time zero</td>
<td>D.7.2.1 MOA</td>
<td>D.7.2 MOA-Head of Poultry Husbandry Dpt (Eng. --)</td>
<td>D.7.2 USD</td>
<td>D.7.2 AMR fund</td>
<td>D.7.2.1 Report on antimicrobials officially imported for agriculture use</td>
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<td>D.7.2.1 Review the list of drugs and pesticides officially imported in agriculture.</td>
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<td>D.7.2.1 Check if CIAM are included in this list.</td>
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<tr>
<td>D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors</td>
<td>D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel</td>
<td>D.7.2.2</td>
<td>One</td>
<td>D.7.2.2 two years from time zero</td>
<td>D.7.2.2 MOA</td>
<td></td>
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<td>D.7.2.2 None</td>
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<td></td>
<td>D.7.2.3 Get results of ABX residues in food items being done in Yemen</td>
<td>D.7.2.3</td>
<td>One</td>
<td>D.7.2.3 three months from time zero</td>
<td>D.7.2.3 MOA</td>
<td>D.7.2.3 -MOA- Head of Animal Health Service (Dr.--)</td>
<td>D.7.2.3 USD</td>
<td>D.7.2.3 None</td>
<td>D.7.2.3 None</td>
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<td></td>
<td>D.7.3 Surveillance of importation of regularly used ABX to Yemen</td>
<td>D.7.3.1</td>
<td>One</td>
<td>D.7.3.1 Six months from time zero</td>
<td>D.7.3.1 MOA</td>
<td>D.7.3.1 -MOA- Head of Animal Health Service (Dr.--)</td>
<td>D.7.3.1 USD</td>
<td>D.7.3.1 None</td>
<td>D.7.3.1 Presence of annual data of imported veterinary ABX on registry</td>
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<tr>
<td>Objective 4</td>
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<tr>
<td>D.7 Control and regulate the use of ABX in veterinary, agriculture, food production and environment sectors</td>
<td>D.7.4 Research study about ABX consumption</td>
<td>D.7 4.1 Project</td>
<td>D.7 4.1 One</td>
<td>D.7 4.1 starting at time zero for one year</td>
<td>D.7 4.1-SU-MOA</td>
<td>D.7 4.1-SU-coordinator of Masters degree in Food Safety and Analys (Dr.--)-Private sector, WHO consultant, former DC&amp;S president (Dr. --)-MOA-Head of Animal Health Service (Dr. --)</td>
<td>D.7 4.1 USD SU</td>
<td>D.7 4.1 SU WHO MOH</td>
<td>D.7 4.1 Percentage and list</td>
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<tr>
<td>Objective 4</td>
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<tr>
<td>D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors</td>
<td>D.7.4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)</td>
<td>D.7.4.2 Project</td>
<td>D.7.4.2 One</td>
<td>D.7.4.2 Two years from time zero</td>
<td>D.7.4.2 MOA, Agriculture school (SU) - DC&amp;S - MOA - Head of Poultry Husbandry Dpt (Eng.)</td>
<td>D.7.4.2 SU, MOA - DC&amp;S - Member - SU-Dpt of Agriculture (Dr. --)</td>
<td>D.7.4.2 USD</td>
<td>D.7.4.2 Research SU WHO MOH</td>
<td>D.7.4.2 Report on the national use of ABX in poultry farms</td>
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<tr>
<td>D.7.5 Research study about unofficial importation of ABX to Yemen</td>
<td>D.7.5 Project</td>
<td>D.7.5 One</td>
<td>D.7.5 Two years from time zero</td>
<td>D.7.5 MOA, Agriculture school (SU)</td>
<td>D.7.5 SU-Dpt of Agriculture (Dr. --)</td>
<td>D.7.5 USD</td>
<td>D.7.5 SU Research WHO MOH</td>
<td>D.7.5 Report on the unofficial ABX importation used in veterinary world</td>
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### 11.2. Monitoring and evaluation plan OF Axis D

<table>
<thead>
<tr>
<th>Objective</th>
<th>Activity Sub-activity</th>
<th>Indicator</th>
<th>Purpose</th>
<th>Calculation</th>
<th>Frequency of Data collection</th>
<th>Data Source</th>
<th>Method</th>
<th>Baseline</th>
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<tbody>
<tr>
<td>D.1</td>
<td>Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td>D.1.1 Focal person nominated</td>
<td>D.1 Follow up of activities and to be in charge of some of them</td>
<td>D.1 Yes/No</td>
<td>D.1 Once/5 years</td>
<td>D.1 MOH</td>
<td>D.1 Letter</td>
<td>D.1 NA</td>
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<tr>
<td>D.1.2</td>
<td>Appointment of the members of the technical working group along with its TOR</td>
<td>D.1.2 Technical working group assigned</td>
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<td>D.2</td>
<td>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</td>
<td>D.2.1 Number of generic antibiotics that are tested by the pharmacovigilance programs</td>
<td>D.2.1 Evaluate post-marketing efficacy and safety of generic ABX that are licensed by MOH and used in Yemen</td>
<td>D.2.1 No of reports/month (Including Zero report)</td>
<td>D.2.1 Once/5 years</td>
<td>D.2.1 AMS website</td>
<td>D.2.1 Network</td>
<td>D.2.1 NA</td>
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<tr>
<td>D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans</td>
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<td><strong>Objective</strong> 4</td>
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<td>D.3 Define CIAM</td>
<td>D.3.1 List of CIAM posted on AMR/AMS website</td>
<td>D.3.1 Make sure it is prepared and accessed by all</td>
<td>D.3.1 Yes/No</td>
<td>D.3.1 Once/5 years</td>
<td>D.3.1 Literature search</td>
<td>D.3.1 Search</td>
<td>D.3.1 NA</td>
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<td>D.3.1.1 Literature search</td>
<td>D.3.1.2 Formulate the list</td>
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<td>D.4 Sentinel Surveillance of ABX (CIAM) consumption from a network of hospitals and benchmark with international data</td>
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<tr>
<td>D.4.1 Workshops on metrics for ABX use measurement</td>
<td>D.4.1 Percentage of hospitals that sent attendees</td>
<td>D.4.1 To standardize measurement in Yemen</td>
<td>D.4.1 Number of hospitals that sent attendees/ number of invited hospitals* 100</td>
<td>D.4.1 Once/5 years</td>
<td>D.4.1 Workshop</td>
<td>D.4.1 Workshop</td>
<td>D.4.1 NA</td>
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<tr>
<td>D.4.2 Compilation of data from hospitals</td>
<td>D.4.2.1 The list is available</td>
<td>D.4.2.1 Establish epidemiologically representative surveillance of AMR</td>
<td>D.4.2.1 Yes/No</td>
<td>D.4.2.1 Once/5 years</td>
<td>D.4.2.1 MOH-ESU</td>
<td>D.4.2.1 Epidemiologic sampling</td>
<td>D.4.2.1 NA</td>
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<td>D.4.2.2</td>
<td>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</td>
<td>D.4.2.2</td>
<td>None</td>
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<tr>
<td>D.4.2.3</td>
<td>Surveillance of ABX use in Yemeni hospitals by auto reporting DDDs</td>
<td>D.4.2.3</td>
<td>Report on ABX use for 2019/2020 posted on website</td>
<td>D.4.2.3</td>
<td>-Baseline evaluation and follow up -In preparation for national outcome AMS indicators</td>
<td>D.4.2.3</td>
<td>Yes/No</td>
<td>D.4.2.3</td>
</tr>
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<tr>
<td>D.5 Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs</td>
<td>D.5.1 Workshops on AMS twice per year</td>
<td>D.5.1 Number of workshops on AMS per year</td>
<td>D.5.1 Standardization of AMS and follow up of indicators.</td>
<td>D.5.1 Number of workshops twice per year</td>
<td>D.5.1 Yearly</td>
<td>D.5.1 AMS focal person</td>
<td>D.5.1 Workshop</td>
<td>D.5.1 Sporadic availability</td>
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<td></td>
<td>D.5.2 Preparation and dissemination of national treatment guidelines on infectious diseases to standardize the strategies of ABX use based on local epidemiology</td>
<td>D.5.2.1 D.5.2.2 Number of guidelines published and posted on AMR/AMS website</td>
<td>D.5.2.1 D.5.2.2 Standardize ABX prescription habits among professionals</td>
<td>D.5.2.1 D.5.2.2 Number of guidelines published and posted on AMR/AMS website</td>
<td>D.5.2.1 Once/5 years</td>
<td>D.5.2.1 International guidelines plus local epidemiology from surveillance reports</td>
<td>D.5.2.1 Writing</td>
<td>D.5.2.1 The available national guidelines are in complete</td>
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<td>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</td>
<td>D.5.2.3 Percentage of guidelines endorsed by respective scientific societies</td>
<td>D.5.2.3 Improve application of these guidelines by professionals</td>
<td>D.5.2.3 (Number of scientific target societies that endorse these guidelines/ Number of target societies) *100</td>
<td>D.5.2.3 Once/5 years</td>
<td>D.5.2.3 Scientific societies</td>
<td>D.5.2.3 Meetings Lectures Workshops</td>
<td>D.5.2.3 NA</td>
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<tr>
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<td>D.5.2.4</td>
<td>Post these guidelines on the AMR/AMS website</td>
<td>D.5.2.4 Number of guidelines posted on AMR/AMS website</td>
<td>D.5.2.4 Improve the visibility of these guidelines</td>
<td>D.5.2.4 Yes/No</td>
<td>D.5.2.4 Once/5 years reviewing and updating guidelines if needed</td>
<td>D.5.2.4 AMS Website</td>
<td>D.5.2.4 Posting on MOH website</td>
<td>D.5.2.4 NA</td>
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<tr>
<td>D.5.3.1</td>
<td>Inclusion of AMS programs among hospital accreditation standards</td>
<td>D.5.3.1 AMS and its checklist available in accreditation standards</td>
<td>D.5.3.1 Standardization</td>
<td>D.5.3.1 Yes/No</td>
<td>D.5.3.1 Once/5 years</td>
<td>D.5.3.1 Accreditation standards</td>
<td>D.5.3.1 Checking</td>
<td>D.5.3.1 NA</td>
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<tr>
<td>D.5.4</td>
<td>Auditing the AMS practices during MOH accreditation with feedback to hospitals.</td>
<td>D.5.4 Number of feedback given/number of hospitals</td>
<td>D.5.4 Improve AMS work in hospitals</td>
<td>D.5.4 Every 3 years depending on the frequency of accreditation renewal</td>
<td>D.5.4 Accreditation audit results analysis</td>
<td>D.5.4 data analysis and report</td>
<td>D.5.4 NA</td>
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<tr>
<td>D.5.5</td>
<td>Development of AMS webpage in the MOH website</td>
<td>D.5.5 AMS section present on AMR/MOH website</td>
<td>D.5.5 Improve visibility of AMS and make guidelines available to all professionals</td>
<td>D.5.5 -Yes/No -Report of anonymous hospitals -National indicators results</td>
<td>D.5.5 -Once/5 years -Yearly reports</td>
<td>D.5.5 MOH Website</td>
<td>D.5.5 Checking</td>
<td>D.5.5 NA</td>
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<td>D.6</td>
<td>Organize the dispensing of antimicrobials in the community pharmacies</td>
<td>D.6.1 Nominate a task group for the meeting between MOH including Dr. W Ammar and the Order of pharmacists</td>
<td>D.6.1 None</td>
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<td>D.6.2</td>
<td>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</td>
<td>D.6.2 Agenda for collaboration put</td>
<td></td>
<td>D.6.2 Discuss and put a plan that is acceptable by pharmacists about dispensing of ABX over-the-counter</td>
<td>D.6.2 Once</td>
<td></td>
<td>D.6.2 Meeting</td>
<td>Previous work with pharmacists at lower levels that did not lead to official action</td>
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<tr>
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<td>D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors</td>
<td>D.7.1 Banning importation and use of CIAM in the veterinary field</td>
<td>D.7.1 Establish baseline and follow up of the quantity</td>
<td>D.7.1 Report on 2022 and 2023 data and type of ABX used in the country per year.</td>
<td>D.7.1 Once for 2022/2023 then every year</td>
<td>D.7.1 Veterinary drug office</td>
<td>D.7.1 Research project for 1 year</td>
<td>D.7.1 NA</td>
<td>D.7 Control and regulate the use of ABX in the veterinary,</td>
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<td>D.7.1.1 The CIAM list will be sent to the minister to veterinary field</td>
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<td>D.7.2 DDD of CIAM molecules imported per year ban their importation for veterinary use</td>
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<td>D.7.1.2 The veterinary drug office will not import these agents</td>
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<td>D.7.2 Check if CIAM are used in agriculture and environment</td>
<td>D.7.2.1 Review the list of drugs and pesticides officially imported in agriculture.</td>
<td>D.7.2.1 To check the extent of the use CIAM in agriculture</td>
<td>D.7.2.1 Report</td>
<td>D.7.2.1 Once/year</td>
<td>D.7.2.1 MOA</td>
<td>D.7.2.1 Research project for 1 year</td>
<td>D.7.2.1 NA</td>
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<td>D.7.2.1 Check if CIAM are included in this list.</td>
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<td>D.7.2.2 Check if any of these molecules are used in agriculture or environment from outside the official import channel</td>
<td>D.7.2.2 None</td>
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<td>D.7.2.3 Get results of ABX residues in food items being done in Yemen</td>
<td>D.7.2.3 None</td>
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<td>D.7.3.1 NA</td>
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<td>D.7.3.1 Form a registry of imported ABX in veterinary world</td>
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<td>D.7.4 Research study about ABX consumption</td>
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<td>D.7.4.1 Research project by one of Masters Student at Beirut Arab University (SU)</td>
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<tr>
<td>D.7 Control and regulate the use of ABX in the veterinary, agriculture, food production and environment sectors</td>
<td>D.7 4.2 Research project in Agriculture school (Quantify the use of ABX in poultry farms nationally)</td>
<td>D.7 4.2 Report on the national use of ABX in poultry farms</td>
<td>D.7 4.2 Determine baseline ABX use in poultry in Yemen.</td>
<td>D.7 4.2 Yes/No</td>
<td>D.7 4.2 Once</td>
<td>D.7 4.2 Poultry farms</td>
<td>D.7 4.2 Partially available not standardized surveillance</td>
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<tr>
<td>D.7.5 Research study about unofficial importation of ABX to Yemen</td>
<td>D.7.5 Report on the unofficial ABX importation used in veterinary world</td>
<td>D.7.5 Evaluate the ABX purchases outside the official routing</td>
<td>D.7.5 Yes/No</td>
<td>D.7.5 Once</td>
<td>D.7.5 Veterinary pharmacies</td>
<td>D.7.5 Market research</td>
<td>D.7.5 NA</td>
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</table>
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*

<table>
<thead>
<tr>
<th>Strategic Objective 5 interventions</th>
<th>Activity / Sub-activity</th>
<th>Milestone/ Date (from operational plan)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.0 Organization of the responsibilities for the execution of the tasks</td>
<td>E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td>E.0 three months from time zero</td>
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<tr>
<td></td>
<td>E.0.2 Nominate members of the technical working group</td>
<td>E.0.2 three months from time zero</td>
</tr>
<tr>
<td>E.1 AMR budget planning</td>
<td>E.1.1 Budget for each activity of the plan has been studied</td>
<td>E.1 Finalized February 2021</td>
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<td>E.1.1.1 Budget for every sub-activity is put in the NAP</td>
<td>E.1.1.1 Ready at “time zero”</td>
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<tr>
<td></td>
<td>E.1.2 Overall budget of the plan has been assessed</td>
<td>E.1.2 20th December 2022</td>
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<tr>
<td></td>
<td>E.1.2 Meeting between Dr. Dr. - WHO and Dr. MOH finalize the budget</td>
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<td>E.2 Looking for sources of funding for NAP</td>
<td>E.2.1 Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP</td>
<td>E.2 Nine months from “time zero”</td>
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<tr>
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<td>E.2.1.1 Financing from WHO discussed</td>
<td>E.2.1.1 six months from “time zero”</td>
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<td>E.2.1.2 Financing from MOH discussed</td>
<td>E.2.1.2 six months from “time zero”</td>
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<td>E.2.1.3 Financing from MOA discussed</td>
<td>E.2.1.3 1st Jan 2023</td>
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<td>E.2.1.4 Financing from NGO (FAO, Foundations Merieux) discussed</td>
<td>E.2.1.4 six months from “time zero”</td>
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<tr>
<td>Strategic Objective 5 interventions</td>
<td>Activity / Sub-activity</td>
<td>Mile stone/ Date (from operational plan)</td>
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</tbody>
</table>
| 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.3.2 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 Nine months from “time zero”  
  E.3.1.1 Three months from “time zero”  
  E.3.1.2 Six months from “time zero”  
  E.3.1.3 Nine months from “time zero”  
  E.3.2.1 Three months from “time zero”  
  E.3.2.2 Three months from “time zero” |
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<th>Activity / Sub-activity</th>
<th>Mile stone/ Date (from operational plan)</th>
</tr>
</thead>
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<tr>
<td>E.4 Establishing communication with public and private sector for collaboration to NAP</td>
<td>E.4.1 Establish a network of researchers in public and private sectors E.4.1.1 DC&amp;S to host yearly workshop for researchers to discuss AMR research</td>
<td>E.4 One year from “time zero” E.4.1.1 three months from “time zero”</td>
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<td></td>
<td>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</td>
<td>E.4.2.1 Three months from “time zero” E.4.2.2 Six months from “time zero”</td>
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<td>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</td>
<td>E.4.3.1 Nine months from “time zero” E.4.3.2 One year from “time zero”</td>
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### 12.1. Operational plan and budget Objective 5

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<td>E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td>E.0.1 Letter</td>
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<td>E.0.1 MOH</td>
<td>E.0.1 WHO-National Professional Officer (Dr.--)</td>
<td>E.0.1 USD</td>
<td>E.0.1 WHO</td>
<td>E.0.1 Focal person nominated</td>
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<td>E.0.2</td>
<td>E.0.2 Nominate members of the technical working group</td>
<td>E.0.2 Letter</td>
<td>E.0.2 One</td>
<td>E.0.2 three months from time zero</td>
<td>E.0.2 MOH</td>
<td>WHO-National Professional Officer (Dr.--)</td>
<td>E.0.2 USD</td>
<td>E.0.2 WOH</td>
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<td>Budget for each activity of the plan has been studied</td>
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<td>Budget for every sub-activity</td>
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<td>Meeting between Dr. --- and Dr. --- to finalize the budget</td>
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<td>Meeting</td>
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<td>One</td>
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<td>Meeting</td>
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<td>20th December 2023</td>
<td>E.1.2</td>
<td>WHO Beirut</td>
<td>WHO National Professional Officer (Dr. ---)</td>
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<td>AMR Plan</td>
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<td>E.2.1</td>
<td>Meeting with WHO, MOH, MOA, NGOs to check for investment in NAP</td>
<td>E.2.1.1 Meeting</td>
<td>E.2.1.1 one</td>
<td>E.2.1.1 six months from “time zero”</td>
<td>E.2.1.1 WHO</td>
<td>E.2.1.1 -Focal person -Technical working group</td>
<td>E.2.1 USD</td>
<td>WHO</td>
<td>E.2.1 Percentage of budget is available</td>
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<td>Financing from WHO discussed</td>
<td>E.2.1.2 Meeting with Dr.</td>
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<td>E.2.1.2.1</td>
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<td>E.2.1.3 Meeting with MOA general director</td>
<td>E.2.1.3 one</td>
<td>E.2.1.3 3rd Jan 2022</td>
<td>E.2.1.3 MOA</td>
<td>E.2.1.3 -Focal person -Technical working group</td>
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<td>E.2.1.3.1</td>
<td>Financing from NGO (FAO, Fondation) discussed</td>
<td>E.2.1.4 Meetings with agencies</td>
<td>E.2.1.4 3-4</td>
<td>E.2.1.4 six months from “time zero”</td>
<td>E.2.1.4 Agencies</td>
<td>E.2.1.4 -Focal person -Technical working group</td>
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<td>E.2.2</td>
<td>Look for other funding sources (agencies or bodies or countries)</td>
<td>E.2.2.1 Team</td>
<td>E.2.2.1 One</td>
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<td>E.2.2.1 Three months from “time zero”</td>
<td>E.2.2.1 -MOH -WHO</td>
<td>E.2.2.1 Technical working group</td>
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<td>E.2.2.2</td>
<td>Allocate a professional that will prepare proposals for funding</td>
<td>E.2.2.2 Proposal</td>
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<td>E.2.2.2 Six months from “time zero”</td>
<td>E.2.2.2 -WHO -MOH -MOA</td>
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<td>E.2.2.3</td>
<td>The allocated professional prepares the general proposal</td>
<td>E.2.2.3 Person</td>
<td>E.2.2.3 One</td>
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<td>E.2.2.3 Three months from “time zero”</td>
<td>E.2.2.3 -WHO -MOH -MOA</td>
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<td>E.2.2.4</td>
<td>Send proposals to agencies or organizations that are potential funders</td>
<td>E.2.2.4 Proposal</td>
<td>E.2.2.4 One</td>
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<td>E.2.2.4 Nine months from “time zero”</td>
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<td>USD</td>
<td>AMR fund</td>
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E.2 Looking for sources of funding for NAP

E.2.2 Number of proposals sent to organizations that are potential funders
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<th>Activity/Sub- activity</th>
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<td>E.2</td>
<td>Looking for sources of funding for NAP</td>
<td>E.2.3</td>
<td>Include private organizations interested in AMR into the NAP</td>
<td>E.2.3.1 List</td>
<td>E.2.3.1 Three months from “time zero”</td>
<td>E.2.3.1 Person in charge mapping of potential funders</td>
<td>E.2.3.1 USD</td>
<td>E.2.3.1 AMR fund</td>
<td>E.2.3 Number of private organizations that are collaborating with NAP</td>
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<td>E.3</td>
<td>Mapping of organizatio ns for potential collaboratio n in the investigatio n of natural sources of biodivisity and biorepositories as sources of new antimicrobi al molecules</td>
<td>E.3.1</td>
<td>Mapping of international organizations /countries for potential collaboration in the investigation of natural sources of biodiversity and bio-repositories</td>
<td>E.3.1.1 Person</td>
<td>E.3.1.1 3 three months from “time zero”</td>
<td>E.3.1.1 Person in charge mapping of potential funders</td>
<td>E.3.1.1 Included in E.2.2.4</td>
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<td>E.3.1 Number international of organizations collaborating on this issue</td>
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<td>E.3.1.2 List</td>
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<td>E.3.1.2 Person in charge of mapping organizational funds</td>
<td>E.3.1.2 Person in charge of mapping organizations and funds</td>
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<td>Mapping of organizations for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules</td>
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<td>Approach these organizations through showing them the achieved research in Yemen as well as potential for benefit sharing with these organizations</td>
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<td>-MOH</td>
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<td>Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules</td>
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<td>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</td>
<td>Meeting</td>
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<td>Create a section of AMR Website where local studies, posters, articles, projects in biodiversity are posted</td>
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<td>Establish a network of researchers in public and private sectors</td>
<td>Workshop</td>
<td>One</td>
<td>three months from “time zero”</td>
<td>DC&amp;S</td>
<td>-Private sector, WHO consultant, former DC&amp;S president (Dr. - President of DC&amp;S (Dr. --))</td>
<td>USD/</td>
<td>DC&amp;S</td>
<td>Number of studies that are posted on AMR website about biodiversity in research for ABX</td>
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<td>E.4.1.1</td>
<td>DC&amp;S to host yearly workshop for researchers to discuss AMR researches</td>
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<tr>
<td>E.4.2</td>
<td>Mapping of potential Private partners to Encourage research</td>
<td>E.4.2.1</td>
<td>E.4.2.1</td>
<td>E.4.2.1</td>
<td>E.4.2.1</td>
<td>E.4.2.1</td>
<td>E.4.2.1</td>
<td>E.4.2</td>
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<td>Nominate the person who will do the mapping</td>
<td>Person</td>
<td>One</td>
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<td></td>
<td>Person in charge of NAP</td>
<td>part of website budget</td>
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<td>E.4.2.2</td>
<td>Produce a list of potential partners</td>
<td>List</td>
<td>One</td>
<td>Six months from “time zero”</td>
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<td>Included in 2.3.1</td>
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<td>Establish communication and collaboration with private partners</td>
<td>E.4.3.1</td>
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<td>E.4.3.1</td>
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<td>E.4.3.1.1</td>
<td>Preparation of specific proposals for collaboration with specific partners</td>
<td>Proposal</td>
<td>One</td>
<td>Nine months from “time zero”</td>
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<td>Proposal specialist</td>
<td>Focal person</td>
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<td>E.4.3.2</td>
<td>Establish communication and collaboration with these private partners</td>
<td>Communication</td>
<td>Number of potential partners</td>
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<td>Focal person</td>
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### 12.2. Monitoring and evaluation plan For Axis E

<table>
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<tr>
<th>Objective</th>
<th>Activity Sub-activity</th>
<th>Indicator</th>
<th>Purpose</th>
<th>Calculation</th>
<th>Frequency</th>
<th>Data source</th>
<th>Method</th>
<th>Baseline</th>
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<tbody>
<tr>
<td>E.0</td>
<td>Organization of the responsibilities for the execution of the tasks</td>
<td>E.0.1 Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td>E.0.1 Focal person nominated</td>
<td>E.0 Yes/No</td>
<td>E.0 Once/5 years</td>
<td>E.0 -MOH -WHO -MOA</td>
<td>E.0 Letter</td>
<td>E.0 NA</td>
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<td></td>
<td></td>
<td>E.0.2 Nominate members of the technical working group</td>
<td>E.0 Organization of the responsibilities for the execution of the tasks</td>
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<td>E.0.2 Technical working group assigned</td>
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<tr>
<td>E.1</td>
<td>AMR budget planning</td>
<td>E.1.1 Budget for each activity of the plan has been studied</td>
<td>E.1.1 Budget finalized</td>
<td>E.1 Yes/No</td>
<td>E.1 Once/5 years</td>
<td>E.1 -WHO -Private sector, WHO consultant, former DC&amp;S president (DR....)</td>
<td>E.1 Calculation</td>
<td>E.1 NA</td>
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<tr>
<td></td>
<td></td>
<td>E.1.1.1 Budget for every sub-activity is put in the NAP</td>
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<tr>
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<td></td>
<td>E.1.2 Overall budget of the plan has been assessed</td>
<td>E.1 Mandatory</td>
<td></td>
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<td></td>
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<td>E.1.2.2 Meeting between Dr. WHO and Dr. MOH to finalize the budget</td>
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<td>Objective</td>
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<td>Frequency</td>
<td>Data source</td>
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<td>Baseline</td>
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<tr>
<td>E.2</td>
<td>Looking for sources of funding for NAP</td>
<td>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</td>
<td>E.2.1 Percentage of budget is available</td>
<td>E.2.1 Vision of financial needs</td>
<td>E.2.1 Once/5 years</td>
<td>E.2.1 -WHO -MOH -MOA</td>
<td>E.2.1 Meetings</td>
<td>E.2.1 NA</td>
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<tr>
<td>E.2</td>
<td>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</td>
<td>E.2.2 Number of proposals sent to organization that are potential funders</td>
<td>E.2.2 Attract Funds</td>
<td>E.2.2 Number of proposals sent to organization that are potential funders</td>
<td>E.2.2 Once/5 years</td>
<td>E.2.2 -WHO -MOH -MOA</td>
<td>E.2.2 Mapping organization and sending proposal</td>
<td>E.2.2 NA</td>
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<td>Objective5</td>
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<td>Indicator</td>
<td>Purpose</td>
<td>Calculation</td>
<td>Frequency</td>
<td>Data source</td>
<td>Method</td>
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<tr>
<td>E.2 Looking for sources of funding for NAP</td>
<td>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</td>
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<tr>
<td>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</td>
<td>E.2.3 Number of private organizations 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 organizations that are collaborating with NAP</td>
<td></td>
<td>E.2.3 Once/5 years</td>
<td></td>
<td>E.2.3 -WHO -MOH -MOA</td>
<td>E.2.3 Mapping organization and sending proposal</td>
<td>E.2.3 NA</td>
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<tr>
<td>Objective5</td>
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<td>Indicator</td>
<td>Purpose</td>
<td>Calculation</td>
<td>Frequency</td>
<td>Data source</td>
<td>Method</td>
<td>Baseline</td>
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<tr>
<td>E.3 Mapping of organization/s for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules</td>
<td>E.3.1 Mapping of international organization/countries for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules</td>
<td>E.3.1 Number international of</td>
<td>E.3.1 This field needs multinational collaboration</td>
<td>E.3.1 Number international of</td>
<td>E.3.1 Once/5 years</td>
<td>E.3.1 -WHO -MOH -MOA</td>
<td>E.3.1 Mapping organization/s and</td>
<td>E.3.1 NA</td>
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<tr>
<td></td>
<td>E.3.1.1 Nominate the person who will be in charge of doing this mapping and having a list of these organizations</td>
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<td></td>
<td>E.3.1.2 Do the mapping plus list</td>
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<tr>
<td></td>
<td>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</td>
<td></td>
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<tr>
<td></td>
<td>organization/s collaborating on this issue</td>
<td>. This is to have win-win collaboration</td>
<td>organization/s collaborating on this issue</td>
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<th>Objective5</th>
<th>Activity Sub-activity</th>
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<th>Frequency</th>
<th>Data source</th>
<th>Method</th>
<th>Baseline</th>
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</thead>
<tbody>
<tr>
<td>E.3 Mapping of organization s for potential collaboration in the investigation of natural sources of biodiversity and biorepositories as sources of new antimicrobial molecules</td>
<td>E.3.2</td>
<td>Mapping of existing or ongoing local research that deals with biodiversity as source of antimicrobial molecules</td>
<td>E.3.2</td>
<td>Number of local research bodies that support biodiversity as a source of antimicrobial molecules</td>
<td>E.3.2</td>
<td>Establish continuity of the work nationwide and communication among researchers</td>
<td>E.3.2</td>
<td>Once/5 years</td>
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<tr>
<td></td>
<td>E.3.2.1</td>
<td>Communication 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</td>
<td>E.3.2</td>
<td>Number of local research bodies that support biodiversity as a source of antimicrobial molecules</td>
<td>E.3.2</td>
<td>Establish continuity of the work nationwide and communication among researchers</td>
<td>E.3.2</td>
<td>-WHO -MOH -DC&amp;S</td>
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<tr>
<td></td>
<td>E.3.2.2</td>
<td>Create a section of AMR Website where local studies, posters, articles, projects in biodiversity are posted</td>
<td>E.3.2</td>
<td>Once/5 years</td>
<td>E.3.2</td>
<td>NA</td>
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<tr>
<td>E.4 Establishing communication with public and private sector for collaboration to NAP</td>
<td>E.4.1</td>
<td>Establish a network of researchers in public and private sectors</td>
<td>E.4.1</td>
<td>Number of studies that are posted on AMR website about biodiversity in research for ABX</td>
<td>E.4.1</td>
<td>Establish continuity of the work nationwide and communication among researchers</td>
<td>E.4.1</td>
<td>Once/5 years</td>
</tr>
<tr>
<td></td>
<td>E.4.1.1</td>
<td>DC&amp;S to host yearly workshop for researchers to discuss AMR research</td>
<td>E.4.1</td>
<td>Number of studies that are posted on AMR website about biodiversity in research for ABX</td>
<td>E.4.1</td>
<td>Once/5 years</td>
<td>E.4.1</td>
<td>-DC&amp;S</td>
</tr>
<tr>
<td>Objective</td>
<td>Activity Sub-activity</td>
<td>Indicator</td>
<td>Purpose</td>
<td>Calculation</td>
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<tr>
<td>E.4.2</td>
<td>Mapping of potential private partners to encourage research</td>
<td>E.4.2 Number of private partners that are collaborating to research</td>
<td>E.4.2 Bring funds from private sector</td>
<td>E.4.2 Number of private partners that are collaborating to research</td>
<td>E.4.2 Once/5 years</td>
<td>E.4.2 WHO-MOH-DC&amp;S</td>
<td>E.4.2 Mapping</td>
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<td>Nominate the person who will do the mapping</td>
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<td>Produce a list of potential partners</td>
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<td>E.4.3</td>
<td>Establish communication and collaboration with private partners</td>
<td>E.4.3 Number of private partners that are collaborating to AMR</td>
<td>E.4.3 Bring funds from private sector</td>
<td>E.4.3 Number of private partners that are collaborating to AMR</td>
<td>E.4.3 Once/5 years</td>
<td>E.4.3 WHO-MOH-DC&amp;S</td>
<td>E.4.3 Communication</td>
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<td>E.4.3.1</td>
<td>Preparation of specific proposals for collaboration with specific partners</td>
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### 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.1.1 Nominate a focal person in charge of following up the activities of the objectives of this axis</td>
<td></td>
<td></td>
<td>2022-2026</td>
<td>3000* one person*12 months= 36,000 USD</td>
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<tr>
<td>A.1.2 Choose the members of the Awareness TWG</td>
<td>10 PERSONS</td>
<td>2022-2026</td>
<td>15,600</td>
<td>300<em>10person</em>12month= 36,000 USD</td>
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<tr>
<td>A.1.4 Slogan for AMR</td>
<td>A.1.4 one</td>
<td>A.1.4 two months from time “zero”</td>
<td>5000</td>
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<tr>
<td>A.2.1.1 DC&amp;S, University OF medicine scheduled lectures in national conferences of the medical, pharmaceutical, nursing, veterinary, agricultural and environmental fields across Yemen</td>
<td>A.2.1.1 One</td>
<td>A.2.1.1 two months from time “zero”</td>
<td>10000</td>
<td></td>
</tr>
<tr>
<td>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. 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</td>
<td>A.2.1.2 depending on number of syndicates/orders</td>
<td>A.2.1.2 Six months from time “zero”</td>
<td>10000</td>
<td></td>
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<tr>
<td>A.2.1.3 Workshops on AMR awareness to media professionals</td>
<td>Workshops Five</td>
<td>A.2.1.3 three</td>
<td>36 months from time zero</td>
<td>12000</td>
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<tr>
<td>A.2.1.4 Workshops on AMR awareness to media professionals</td>
<td>Workshops 12</td>
<td>A.2.1.4 Once/ year /5 years</td>
<td>15000 *5= 75,000</td>
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<tr>
<td>A.2.1.5 Do one workshop Per governorate per year to veterinarians and agriculture specialists (Train thetrainer)</td>
<td>Workshops 12</td>
<td>A.2.1.5 12 per year</td>
<td>A.2.2.1 One</td>
<td>A.2.2.1 Three months from time “zero”</td>
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<tr>
<td>A.2.2.1 Create a webpage for AMR on the official websites of MOH and MOA</td>
<td>A.2.2.1One</td>
<td>A.2.2.1 Three months from time “zero”</td>
<td>A.2.2.1 20,000</td>
<td></td>
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</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
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<tr>
<td>A.2.2.2</td>
<td>A.2.2.2</td>
<td>Four</td>
<td>A.2.2.2</td>
<td>10,000</td>
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<tr>
<td>Use existing Webpages of MOH and WHO and relevant societies on different social networks (Facebook, YouTube, Twitter, Instagram)</td>
<td>Four</td>
<td>One year from time zero</td>
<td></td>
<td></td>
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<tr>
<td>A.3.1</td>
<td>A.3.1</td>
<td>One set of material</td>
<td>A.3.1</td>
<td>25,000</td>
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<tr>
<td>Prepare broadcasting material that includes all sectors of the One health approach for Radio/TV/ Social media spots</td>
<td>One set of material</td>
<td>Six months from time zero</td>
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<tr>
<td>A.4.1</td>
<td>A.4.1</td>
<td>12/ year</td>
<td>A.4.1</td>
<td>180000</td>
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<tr>
<td>Prepare a yearlong schedule for TV, Radio and social media advertisement</td>
<td>12/ year</td>
<td>Six months from time zero</td>
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<tr>
<td>A.4.5</td>
<td>A.4.5</td>
<td>Four per year</td>
<td>A.4.5</td>
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<tr>
<td>SMS through national telecommunication companies sent <strong>four times per year</strong> and during the global AMR awareness week</td>
<td>Four per year</td>
<td>Starting end of first year from time zero</td>
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<td>A.5.1.1</td>
<td>A.5.1.1</td>
<td>One</td>
<td>A.5.1.1</td>
<td>10,000</td>
</tr>
<tr>
<td>Prepare a checklist <strong>Guidelines</strong> Including basic Information about AMR that should be included in school curricula</td>
<td>One</td>
<td>Start 3 months from time zero, Ready at end of first year from time zero</td>
<td></td>
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<tr>
<td>A.5.2.1</td>
<td>A.5.2.1</td>
<td>Based on Number of curricula of health specialties</td>
<td>A.5.2.1</td>
<td>100,000</td>
</tr>
<tr>
<td>Prepare checklists for university curricula of these specialties each one separately</td>
<td>Based on Number of curricula of health specialties</td>
<td>Start 3 months from time zero, Finalized 9 months from time zero</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.5.3.1</td>
<td>A.5.3.1</td>
<td>One</td>
<td>A.5.3.1</td>
<td>10,000 *5= 50,000</td>
</tr>
<tr>
<td>Check curricula of health specialties to include information on AMR Include AMR tricyclic education</td>
<td>One</td>
<td>Start 3 months from time zero Finalized 9 months from time zero</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Global action plan strategy

**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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.5.3.1</td>
<td>A.5.3.1</td>
<td>Three months from time zero</td>
<td>A.5.3.1</td>
<td>6000</td>
</tr>
<tr>
<td>Prepare a checklist for the needed information on AMR for veterinary school curricula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.5.3.2</td>
<td>A.5.3.2</td>
<td>One</td>
<td>A.5.3.2</td>
<td>5,000</td>
</tr>
<tr>
<td>Fill the gap in AMR information in veterinary school curricula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.5.4.1</td>
<td>A.5.4.2</td>
<td>One</td>
<td>A.5.4.2</td>
<td>6,000</td>
</tr>
<tr>
<td>Checklist for the needed information on AMR for agriculture school curricula</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A.6.2.1</td>
<td>A.6.2.1</td>
<td>Three</td>
<td>A.6.2.1</td>
<td>12,000</td>
</tr>
<tr>
<td>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</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Grant for five years</strong></td>
<td></td>
<td></td>
<td></td>
<td>1,228,000 USD</td>
</tr>
</tbody>
</table>
**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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.1.1 Appointment of focal person charge of following up the activities of the objectives of this axis</td>
<td>One person</td>
<td>2022-2026</td>
<td>3000* one person*12 months= 36,000 USD</td>
<td></td>
</tr>
<tr>
<td>B.1.2 Appointment of the members of the technical working group along with its TOR</td>
<td>10 persons</td>
<td>2022-2026</td>
<td>300<em>10person</em>12month= 36,000 USD</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>Workshop</td>
<td>B.2.2.1 one every 5 years</td>
<td>B.2.2.1 Three months from time zero</td>
<td>B.2.2.1 10,000 *5 = 50,000</td>
</tr>
<tr>
<td>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</td>
<td>Workshop</td>
<td>B.2.2.3 One every two years</td>
<td>B.2.2.3 Three months from time zero</td>
<td>B.2.2.3 15,000*2= 30,000</td>
</tr>
<tr>
<td>B.2.2.4 Do 3 laboratory visits for capacity building/year for 6 laboratories in different areas for building capacity and WHONET training</td>
<td>Workshop</td>
<td>B.2.2.4 Two visits per lab each year for 12 laboratories</td>
<td>B.2.2.4 starting year</td>
<td>2 Vists*12 lab.*5 years *10,000= 600,000</td>
</tr>
<tr>
<td>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</td>
<td>B.2.2.5 Years 1 &amp;2 = 50sample/year *4 years 120 samples</td>
<td>B.2.2.5 Six months from time zero</td>
<td>B.2.2.5 100 USD/specimen (24<em>12</em> 100)*4 years= 144000 USD/for 4 years</td>
<td></td>
</tr>
<tr>
<td>B.2.3.1 Data collection from mature laboratories</td>
<td>B.2.3.1 Once/year</td>
<td>B.2.3.1 Start end of 1st year from time zero</td>
<td>B.2.3.1 5000<em>12= 60,000</em>5year Total 300,000</td>
<td></td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.4.2 Design an epidemiologically representative sample for AMR surveillance (cattle, poultry, companion animals).</td>
<td>B.4.2</td>
<td>B.4.2 9 months from time zero</td>
<td>B.4.2</td>
<td>10,000</td>
</tr>
<tr>
<td>B.4.3 Put a list of AMR priority organisms and related resistance genes for surveillance in these fields</td>
<td>B.4.3</td>
<td>B.4.3 6 months from time zero</td>
<td>B.4.3</td>
<td>5000</td>
</tr>
<tr>
<td>B.4.4 - Assessment of YARI, agriculture laboratory, and the chamber of manufacturing and commerce in Sana'a for the analysis of surveillance specimens in agricultural, food, veterinary, and environmental fields - Suggestion of a plan of the microbiology work in this surveillance</td>
<td>B.4.4 Three Visits</td>
<td>B.4.4 Six months from time zero and completed nine months from time zero</td>
<td>B.4.4</td>
<td>10,000 USD per visit Total: 3 visits= 30,000</td>
</tr>
<tr>
<td>- 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</td>
<td>B.4.5 Once every 2 years</td>
<td>B.4.5 First report should be ready at end of year 2 from time zero</td>
<td>B.4.5</td>
<td>10,000/report (Every 2years) Total30,000</td>
</tr>
<tr>
<td>B.5.3 Task force to visits the potential lab(s) (WHO EMRO) to be discussed with Dr.</td>
<td>B.5.3</td>
<td>B.5.3 5 months from time zero</td>
<td>B.5.3</td>
<td>5000*12 60,000</td>
</tr>
</tbody>
</table>

**Total Grant for five years**

1,331,000 USD
<table>
<thead>
<tr>
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<th>Work Shop</th>
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<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td></td>
<td>C.1 One person</td>
<td>C.1 three months from “time zero”</td>
<td>36,000</td>
</tr>
<tr>
<td>C.1.2 Appointment of the members of the IPC TWG along with its TOR</td>
<td></td>
<td>10 persons</td>
<td></td>
<td>36,000</td>
</tr>
<tr>
<td>C.2.1 Improve IPC practices in Hospitals</td>
<td></td>
<td>C.2.1.1 five</td>
<td>C.2.1.1 three months from “time zero”</td>
<td>50,000</td>
</tr>
<tr>
<td>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</td>
<td></td>
<td>C.2.1.2 one</td>
<td>C.2.1.2 six months from “time zero”</td>
<td></td>
</tr>
<tr>
<td>C.2.1.2 Inclusion of the checklist of the guidelines in accreditation standards</td>
<td></td>
<td>C.2.1.3 one</td>
<td>C.2.1.3 three years from “time zero”</td>
<td></td>
</tr>
<tr>
<td>C.2.1.3 Follow up and feedback on IPC practices in hospitals after each accreditation</td>
<td></td>
<td>C.2.1.4 workshops</td>
<td>C.2.1.4 one every 5 years</td>
<td></td>
</tr>
<tr>
<td>C.2.1.4 Syndicate of hospitals recommend periodic IPC training and workshops to employees hosted by scientific societies, universities, etc.</td>
<td></td>
<td>C.2.2.1 five</td>
<td>C.2.2.1 three months from “time zero”</td>
<td></td>
</tr>
<tr>
<td>C.2.2 Improve IPC practices in hospital</td>
<td></td>
<td>C.2.2.2 one</td>
<td>C.2.2.2 one every 5 years</td>
<td></td>
</tr>
<tr>
<td>C.2.2.1 To review and update guidelines of IPC in hospital that are available in Ministry of Social Affairs</td>
<td></td>
<td>C.2.2.3 one</td>
<td>C.2.2.3 one every 5 years</td>
<td></td>
</tr>
<tr>
<td>C.2.2.2 Inclusion of IPC checklist in the MOH licensing criteria of these facilities</td>
<td></td>
<td>C.2.3.1 one</td>
<td>C.2.3.1 one every 5 years</td>
<td></td>
</tr>
<tr>
<td>C.2.3.1 Establish guidelines on IPC in the PHCC</td>
<td></td>
<td>C.2.3.1.1 one</td>
<td>C.2.3.1.1 one every 5 years</td>
<td></td>
</tr>
<tr>
<td>C.3.1 Include IPC-related educational modules in human-health related majors (physicians, nurses, midwives, physiotherapists, pharmacists, dentists, lab technicians, radiologists, nutrition, medical and paramedical schools)</td>
<td></td>
<td>C.3.1 one per year</td>
<td>C.3.1 one year from “time zero”</td>
<td>75,000</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.3.2 Include IPC-related educational modules in veterinary schools curricula</td>
<td>C.3.2.1</td>
<td>One</td>
<td>C.3.2.1 three months from “time zero”</td>
<td>C.3.2.1 25,000</td>
</tr>
<tr>
<td>Check the current situation of IPC in the ongoing veterinary curriculum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.3.2.2 Review of IPC in regional and global veterinary curricula</td>
<td></td>
<td>C.3.2.2 three months from “time zero”</td>
<td>C.3.2.2 10,000</td>
<td></td>
</tr>
<tr>
<td>C.3.2.3 Prepare a proposal for veterinary school for deficit in curricula improvement</td>
<td>C.3.2.3 six months from “time zero”</td>
<td>C.3.2.3 10000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.3.3.1 Mapping of IPC in three university curricula (Agriculture, Nutrition, Environment)</td>
<td>C.3.3.1 six months from “time zero”</td>
<td>C.3.3.1 30,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>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</td>
<td>C.3.3.2 six months from “time zero”</td>
<td>C.3.3.2 10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.3.3.3 Include the recommended AMR and IPC in curricula when not available</td>
<td>C.3.3.3 2 years from “time zero”</td>
<td>C.3.3.3 10,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.4.2 Make training available and affordable in universities and professional societies</td>
<td>C.4.2.1 One</td>
<td>C.4.2.1 3 months</td>
<td>C.4.2.1 10000</td>
<td></td>
</tr>
<tr>
<td>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</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>WORK SHOP</th>
<th>frequency</th>
<th>YEAR</th>
<th>FUND/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.5.1 Baseline evaluation of current situation at a national level (research project) and make it a continuous process</td>
<td>C.5.1 One</td>
<td>C.5.1 One year from “time zero”</td>
<td>C.5.1 100,000</td>
<td></td>
</tr>
<tr>
<td>C.5.2 National indicators to be incrementally applied with time (hand hygiene, PPE, isolation, other standard precautions, etc)</td>
<td>C.5.2 One</td>
<td>C.5.2 Four years from “time zero”</td>
<td>C.5.2 30,000</td>
<td></td>
</tr>
<tr>
<td>C.6.1 Conduct a point prevalence study on nosocomial infections in Yemeni hospitals</td>
<td>C.6.1 one</td>
<td>C.6.1 2 years</td>
<td>C.6.1 20,000</td>
<td></td>
</tr>
<tr>
<td>C.7.1 Review the OIE biosafety recommendations</td>
<td>C.7.2 one</td>
<td>C.7.2 5 months</td>
<td>C.7.2 10,000</td>
<td></td>
</tr>
</tbody>
</table>

**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 for applications other than human and animal health

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.1.1 Appointment of focal person in charge of following up the activities of the objectives of this axis</td>
<td></td>
<td>One person</td>
<td>2022-2026</td>
<td>3000* one person*12 months= 18,000 USD</td>
</tr>
<tr>
<td>D.1.2 Appointment of the members of the technical working group along with its TOR</td>
<td></td>
<td>4 persons</td>
<td>2022-2026</td>
<td>300<em>10 person</em>12month= 24,000 USD</td>
</tr>
<tr>
<td>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 Pharmacists</td>
<td>D.2.1</td>
<td>One</td>
<td>D.2.1</td>
<td>D.2.1 20,000</td>
</tr>
<tr>
<td>D.3 Control the use of critically important antimicrobial molecules (CIAM) in humans</td>
<td>D.3.1.1</td>
<td>One</td>
<td>D.3.1.1</td>
<td>D.3.1.1 20,000</td>
</tr>
<tr>
<td>D.3.1.2 Formulate the list of CIAM</td>
<td>D.3.1.2</td>
<td>One</td>
<td>D.3.1.2</td>
<td>D.3.1.2 10,000</td>
</tr>
<tr>
<td>D.4 Sentinel Surveillance of ABX(CIAM) consumption from a network of hospitals and benchmark with international data Workshops on metrics for ABX use measurement</td>
<td>Workshops</td>
<td>D.4.1 Six</td>
<td>D.4.1</td>
<td>D.4.1 60,000</td>
</tr>
<tr>
<td>D.4.2.1 Determine the epidemiologically representative sample of hospitals for surveillance of ABX</td>
<td>D.4.2.1</td>
<td>One</td>
<td>D.4.2.1</td>
<td>D.4.2.1 15,000</td>
</tr>
<tr>
<td>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</td>
<td>D.4.2.2</td>
<td>Four per year over 5 years</td>
<td>D.4.2.2 One year and three months from time zero and continue yearly for 5 years</td>
<td>D.4.2.2 10,000 USD per year for 5 years =50,000</td>
</tr>
<tr>
<td>D.4.2.3 Surveillance of AB X use in Yemeni hospitals by auto reporting DDDs</td>
<td>D.4.2.3</td>
<td>Once per year</td>
<td>D.4.2.3</td>
<td>D.4.2.3 12,000</td>
</tr>
<tr>
<td>D.5.1 Workshops on Antimicrobial stewardship AMS twice per year</td>
<td>Workshops</td>
<td>D.5.1 two per year over 5 years</td>
<td>D.5.1</td>
<td>D.5.1 100000 <em>2</em>5= 100,000</td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>WORK SHOP</th>
<th>frequency</th>
<th>YEAR</th>
<th>FUND/ USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.5</td>
<td>Preparation and dissemination of national treatment guidelines on infectious diseases to Standardize</td>
<td>D.5.2</td>
<td>D.5.2.1</td>
<td>yearly for 5 years</td>
</tr>
<tr>
<td></td>
<td>Put a list of essential guidelines the strategies of ABX use based on local epidemiology</td>
<td></td>
<td>D.5.2.1 six months from time zero</td>
<td>D.5.2.1 Three guidlines 45,000</td>
</tr>
<tr>
<td>D.5.2.3</td>
<td>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</td>
<td></td>
<td>D.5.2.3 Starting 1 year from time zero and finalized 3 years from time zero</td>
<td>D.5.2.3 Workshops 3 times per year (10000 USD per workshop) 10000<em>3</em>5=150,000</td>
</tr>
<tr>
<td>D.5</td>
<td>Prepare hospitals and build their capacity for Antimicrobial stewardship (AMS) programs</td>
<td></td>
<td>D.5.4</td>
<td>D.5.4</td>
</tr>
<tr>
<td></td>
<td>Auditing the AMS practices during MOH accreditation with feedback to hospitals</td>
<td></td>
<td>One</td>
<td>One</td>
</tr>
<tr>
<td></td>
<td>Development of AMS webpage in the MOH website</td>
<td></td>
<td>D.5.5</td>
<td></td>
</tr>
<tr>
<td>D.6.1</td>
<td>Nominate a task group for the meeting between MOH including Dr. ---- and the Order of pharmacists</td>
<td>Meeting</td>
<td>D.6.1</td>
<td>D.6.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>one</td>
<td>3 months</td>
</tr>
<tr>
<td>D.6.2</td>
<td>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</td>
<td>Meeting</td>
<td>D.6.2</td>
<td>D.6.2 To be finalized 3 months from time zero</td>
</tr>
<tr>
<td>D.7.1.1</td>
<td>The CIAM list will be sent to the minister to ban their importation for veterinary use</td>
<td></td>
<td>D.7.1.1</td>
<td>Will be sent 12 months from time zero</td>
</tr>
<tr>
<td>D.7.2.1</td>
<td>-Review the list of drugs and pesticides officially imported in agriculture. -Check if CIAM are included in this list</td>
<td></td>
<td>D.7.2.1</td>
<td>12 months from time zero</td>
</tr>
<tr>
<td>D.7.2</td>
<td>Check if CIAM are used in agriculture and environment</td>
<td></td>
<td>D.7.2</td>
<td>12 months from time zero</td>
</tr>
</tbody>
</table>
### 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

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<thead>
<tr>
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<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>D.7.4.1</td>
<td>D.7 4.1</td>
<td>D.7 4.1 starting at time zero for one per year</td>
<td>D.7 4.1</td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>five</td>
<td>D.7 4.2 two years from time zero</td>
<td>D.7 4.2</td>
<td>30,000</td>
</tr>
<tr>
<td>D.7.5</td>
<td>D.7.5 two</td>
<td>D.7.5 Two years from time zero</td>
<td>D.7.5</td>
<td>30,000</td>
</tr>
<tr>
<td>D.7.5.1</td>
<td>D.7.5.1 two</td>
<td>D.7.5.1 Two years from time zero</td>
<td>D.7.5.1</td>
<td>30,000</td>
</tr>
<tr>
<td><strong>Total Grant for five years</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>744,000 USD</strong></td>
</tr>
</tbody>
</table>

### 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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Work Shop</th>
<th>Frequency</th>
<th>Year</th>
<th>Fund/ Usd</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.0.1</td>
<td>one</td>
<td>2022-2026</td>
<td>3000* one person*12 months=30,000 USD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E.0.2</td>
<td>Three</td>
<td>2022-2026</td>
<td>100<em>3 person</em>12 month=18,000 USD</td>
<td></td>
</tr>
<tr>
<td>E.2</td>
<td>E.2.2.2</td>
<td>E.2.2.2 Six months from “time zero”</td>
<td>E.2.2.2</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>E.2.2.4 Nine months from “time zero”</td>
<td>E.2.2.4</td>
<td>6000</td>
</tr>
<tr>
<td>E.2.2.4</td>
<td>E.2.2.4</td>
<td>E.2.2.4</td>
<td>E.2.2.4</td>
<td>6000</td>
</tr>
<tr>
<td>E.2.3.1</td>
<td>E.2.3.1</td>
<td>E.2.3.1</td>
<td>E.2.3.1</td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>One</td>
<td>Three months from “time zero”</td>
<td>Three months from “time zero”</td>
<td>Three months from “time zero”</td>
</tr>
<tr>
<td>Objective number</td>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>--------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective 1</td>
<td>1,228,000 USD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective 2</td>
<td>1,331,000 USD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Objective 3</td>
<td>652,000 USD</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Objective 4</td>
<td>744,000 USD</td>
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<td></td>
</tr>
<tr>
<td>Objective 5</td>
<td>99,000 USD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SUB TOTAL grand</td>
<td>4,054,000 USD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For national focal point for 5 years</td>
<td>36,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>For AMR surveillance program and reference labs</td>
<td>6700* 15=100,500USD</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>15 desktop computer CORE-i8</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15 desktop and</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 cupboard</td>
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<td></td>
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<tr>
<td>45 chair</td>
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</tr>
<tr>
<td>15 printer</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>15 internet router</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Total grand</td>
<td>4,190,500 USD</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

14. References


Mohanna M. (2010); the prevalence of self-medication with antibiotic in children presented to the outpatient department at Sam hospital, Sana’a city Yemen. OMJ. 25, 41-43 doi:10.5001/omj.2010.10
