GUIDELINES ON RESPONSIBLE USE OF ANTIMICROBIALS IN HUMAN HEALTH

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HISTORY

This is the first edition of these guidelines.

APPLICATION - (Guidelines for Healthcare Professionals)

This is a guide for all stakeholders having influence over the use of antimicrobials which is as an integral part of healthcare delivery to patients.

For implementation of this guide, stakeholders are advised to execute their respective responsibilities individually and in collaboration.

PURPOSE

The exposure of microorganisms to antimicrobial agents creates selective pressure that can lead to the development of resistance. Inappropriate use of antimicrobial agents accelerates the emergence and dissemination of resistance.

The goal of controlling antimicrobial resistance can only be achieved by combining strong infection prevention and control and the responsible use of antimicrobials. Infection prevention and control, including vaccination, contributes to a decrease in the number of infections, which leads to lower antimicrobial consumption and fewer opportunities for misuse & overuse.

These guidelines aim to reduce inappropriate use and promote responsible use of antimicrobials. The guidelines are complementary to infection prevention and control guidelines existing at the national level[1].

These guidelines are intended to be used to inform and assist activities to promote the responsible use of antimicrobials in humans. They target all stakeholders who are responsible for, or play a role in, antimicrobial use and whose contribution is necessary to ensure that antimicrobials are used appropriately. These guidelines include measures to be considered when developing and implementing strategies to promote the responsible use of antimicrobials and elements of good practice to be followed by healthcare professionals. They include good clinical practice and the resources, systems, and processes that should be considered when developing and implementing strategies for the responsible use of antimicrobials in human medicine.

These guidelines do not cover specific medical conditions or specific antimicrobials.

Contents

1. INTRODUCTION

The growing problem of Antimicrobial Resistance (AMR) has emerged as a major health crisis in almost all countries of the world including Pakistan, resulting in an alarming increase in the burden of infections due to multi-drug resistant organisms while limiting the choice of Antimicrobials for treatment [2].

The development of National Action Plan Pakistan is fulfilment of the commitment of the Government of Pakistan on WHA68.7 resolution on AMR. The work plan is aligned with objectives of the Global Action Plan and includes strategic and operational components as well as a framework for monitoring and evaluation [2].

These Guidelines are based on European Commission Guidelines which were referred for identifying key roles of healthcare professionals and other stakeholders to improve patient safety and fight AMR. A nationwide group effort is anticipated through harmonized role of the health sector in establishing Antimicrobial Stewardship Programs within healthcare settings [3].

2. DEFINITIONS

2.1. **An antimicrobial** is any substance of natural, semi-synthetic, or synthetic origin that in in-vivo concentrations kills or inhibits the growth of microorganisms by interacting with a specific target[4]. Antimicrobials with activity against bacteria are called antibacterial agents.

2.2. **An antibiotic** is a substance produced by, or derived (chemically produced) from a microorganism that selectively destroys or inhibits the growth of other microorganisms[5]. The term 'antibiotic' is often used to refer to antibacterial agents.

2.3. **Acquired antimicrobial resistance** is the resistance of a microorganism to an antimicrobial agent that was originally effective for treatment of infections caused by this microorganism.

2.4. **A multidrug-resistant organism** is a microorganism that is not susceptible to at least one agent in each of three or more antimicrobial categories[6] (or two or more antimicrobial categories for *Mycobacterium tuberculosis).*

2.5. **Antimicrobial therapy** *empiric antimicrobial therapy* is based on a reasonable informed clinical judgement regarding the most likely infecting organism, *documented antimicrobial* therapy is when the identity and antimicrobial susceptibility of the infecting organism is known as the result of appropriate diagnostic or reference testing.

2.6. **Antimicrobial prophylaxis** is the use of antimicrobials for the prevention of infections.

2.7. **Responsible use of antimicrobials** is use which benefits the patient while at the same time minimises the probability of adverse effects (including toxicity and the selection of pathogenic organisms, like *Clostridium difficile*) and the emergence or spread of antimicrobial resistance[7]. Other terms that have been used

with the same purpose includes judicious, prudent, rational, adequate, correct, and optimal.

2.8. **Antimicrobial stewardship** is an organisational or healthcare system-wide approach to promoting and monitoring rational use of antimicrobials to preserve their future effectiveness [8].

2.9. **Antimicrobial stewardship programmes** are coordinated programmes that implement interventions to ensure appropriate antimicrobial Prescribing [9].

2.10. **Prescribers** are healthcare professionals authorized to prescribe antimicrobials being a Registered Medical Practitioner (RMP). Moreover, the healthcare professionals as per rules may change from time to time.

3. GUIDELINES

3.1. National, Provincial, AJ & K and GB Governments:

National, provincial, AJ&K and GB governments, have the ultimate responsibility for developing, implementing, and supporting the policies, actions, and structures necessary to ensure responsible use of antimicrobials. Collaboration between government and other organisations including those responsible for delivering health care, regulators, and organisations responsible for professional education, is essential to the development and implementation of these policies.

National strategies to combat AMR in the form of National Action Plan on AMR Pakistan have been in place since 2017, in line with the WHO Global Action Plan on AMR[10].

Following key elements promote responsible use of antimicrobials in human medicine as part of multi-faceted interventions adapted to local conditions.

▶	Regulation of access and use of antimicrobials.	
▶	Antimicrobial prescribing and stewardship:	
	▶	Antimicrobial stewardship programmes at all levels of care (community, hospital, long-term).
	▶	Integration of national antimicrobial stewardship activities with infection prevention/ control and vaccination; all activities should be based on the national antimicrobial resistance plans developed in accordance with the cross sectoral '**One Health**' approach[11].
	▶	Qualitative and quantitative targets for improvement of antimicrobial prescribing.
	▶	Timely availability of standardised open data on antimicrobial consumption for benchmarking and on antimicrobial resistance for informing clinical guidance in the community and hospital sector. (maintenance of consumption / usage data of antimicrobials should be given due importance.
	▶	A mechanism (e.g. a national committee or platform and its subsidiaries in provincial governments) for the development, implementation and monitoring of clinical guidance for infections; such a mechanism should

		address diagnostics, treatment, management and infection prevention and control.
▶	Education of health professionals.	

Core components and measures for implementation:

Regulation of antimicrobials:	
▶	Limit the use of last-resort antimicrobials to safeguard their effectiveness, by establishing restrictive measures for use.
▶	Ensure that information on the risks of antimicrobial resistance and inappropriate use of antimicrobials is included in the SmPC and in-patient information leaflets.
▶	Review, or establish, the legal provisions on over-the-counter and without prescription availability of antimicrobials.
▶	Ensure compliance with the regulations with regards to the dispensing of antimicrobials by pharmacies without prescription.
▶	Consider the introduction of additional labelling of antimicrobial packages or information leaflets to highlight the risk of increasing antimicrobial resistance through irrational use.

Antimicrobial prescribing and stewardship:	
▶	Provide guidelines and tools for the implementation of antimicrobial stewardship programmes covering the community pharmacy, primary, secondary & tertiary healthcare facilities and hospitals.
▶	Ensure an appropriate number of experts in the field of antimicrobial stewardship through education of a sufficient number of specialists in infectious diseases and clinical microbiology and other professionals.
▶	Monitor and audit the appropriate use of antimicrobials, including the introduction of relevant quantity and quality indicators and systems for monitoring these indicators. Ensure regular feedback of the results to prescribers.
▶	Ensure the introduction and monitoring of electronic antimicrobial prescribing systems that are preferably able to link clinical indication, microbiological and consumption data.
▶	Ensure availability of adequate microbiology services and diagnostics, including rapid and point-of-care diagnostic tests.
▶	Fund, design, implement and assess the outcome of national awareness and educational campaigns on antimicrobial use by targeting health professionals and the general public (including children, teenagers, students, older people, and vulnerable groups).
▶	Promote behavioural interventions to reduce inappropriate antimicrobial prescribing.

▶	Explore motivational and system change approaches to optimise antimicrobial prescribing.
▶	Introduce appropriate disposal systems in the community setting and inform the general public on the correct disposal methods for antimicrobial drugs.
▶	Ensure availability of national clinical guidance for prophylaxis and management of infections based on national antimicrobial resistance patterns for the community, long-term care facilities, and hospitals.
▶	Ensure that national clinical guidance is reviewed and revised when there is a significant change in antimicrobial resistance, or if there is new evidence on the management of infections, or at regular intervals (e.g. every 2 to 3 years); national clinical guidance should take into consideration the last valid ***Summary of Product Characteristics*** of a medicinal product (SmPC).
▶	Develop clinical pathways and provide decision support tools to encourage appropriate testing and management.
▶	Ensure accessibility of the guidelines to all prescribers by ensuring wide distribution, training, and promotion.

Actions in Education:	
▶	Make sure that the competency of all healthcare professionals is guaranteed by continuous professional development activities on appropriate antimicrobial use.
▶	Ensure that antimicrobial stewardship is included in all specialty training curricula for clinical specialties.
▶	Include training on responsible antimicrobial use in medical, pharmacy, dentistry, nursing, and midwifery schools. This training should include a strong practical component as part of an inter-professional approach.
▶	Introduce education on responsible antimicrobial use, antimicrobial resistance, vaccination, and hygiene in primary and secondary education.

3.2. Healthcare facilities (resources, systems and processes):

Healthcare facilities are on the frontline for the implementation of policies and procedures, and for the provision of surveillance and monitoring data, which are necessary to ensure responsible antimicrobial use.

Healthcare facilities should focus on the following elements:	
▶	Establish and provide the necessary funding and resources for antimicrobial stewardship programmes in each healthcare facility, linked with the infection prevention and control programme and /or the patient safety programme.
▶	Ensure timely access to clinical microbiology laboratory services and transmission of results.
▶	Promote the uptake of rapid diagnostic tools.

▶	Utilise validated rapid and/or point-of-care diagnostics for defined patient groups to complement clinical assessment and optimise antimicrobial treatment when available.
▶	Ensure information technology support for antimicrobial stewardship activities, including electronic prescription and introduce electronic decision support systems as tools to improve antimicrobial prescribing.
▶	Contribute to facility-wide, national, provincial, AJ&K and GB surveillance systems, studies and prevalence surveys of antimicrobial resistance and antimicrobial consumption, including molecular epidemiological investigations.

In community /primary care:	
▶	Ensure that antimicrobial stewardship activities are in place, under the coordination and with active involvement of the healthcare professionals in these settings, as dictated by the level of care, identified areas of antimicrobial overuse and misuse, and by national and local provisions
▶	Establish a multi-faceted approach including elements such as clinic-based education, patient information leaflets and posters, pharmacist counselling of patients on antimicrobial treatment, prescriber feedback and clinician training in communication skills.
▶	Ensure sufficient time for consultation to allow for proper assessment and counselling of patients.

In hospitals, the elements of antimicrobial stewardship programmes should include	
▶	An antimicrobial committee or similar formal organisational structure with senior management support.
▶	An antimicrobial stewardship team including ideally a clinician with training, expertise and professional involvement in the diagnosis, prevention and treatment of infections (if possible, an infectious disease specialist), a hospital pharmacist and a microbiologist (if possible a clinical microbiologist). The composition of the team is dictated by the hospital size and level of care and by national, provincial, AJ&K and GB provisions.
▶	Guidelines for the diagnosis and management of infections and for perioperative antimicrobial prophylaxis.
▶	Documentation in the patient records of indication, drug choice, dose, dosage form, route and duration of treatment.
▶	A policy for preauthorisation and or post-prescription review of selected antimicrobial prescriptions.
▶	Microbiology laboratory services for acute care hospitals should be provided on a 24/7 basis for critical specimens.

▶	The availability of facility-specific cumulative susceptibility reports for common bacterial pathogens against antibiotics that are recommended in the relevant treatment guidelines.
▶	An audit of perioperative antimicrobial prophylaxis indication, choice, timing and duration.
▶	An annual report on antimicrobial stewardship activities which includes an evaluation of effectiveness, reported to the management.
▶	Monitoring of quality indicators and quantity metrics of antimicrobial use with feedback to prescribers and prescriber actions agreed.

In long term care:	
▶	Ensure that antimicrobial stewardship activities are in place and are given dedicated time and management support, under the coordination and with active involvement of the healthcare professionals in these settings, as dictated by national and local provisions.
▶	Establish a multi-faceted approach which includes elements such as education of nursing and medical staff, audits of antimicrobial use, feedback to the prescribers, and targeting identified areas of antimicrobial overuse and misuse.

3.3. Infectious disease specialists:

Infectious disease specialists are involved in the clinical assessment, investigation, diagnosis and treatment of patients with infections, which also includes the optimal use of antimicrobials. They also provide consultation on the prevention and treatment of healthcare-associated infections, e.g. infections in intensive care units and surgical site infections and therefore play a central role in the responsible use of antimicrobials in the hospital.

Depending on setting, training and national provisions, there may be some overlap in the roles outlined in this section with those outlined above for clinical microbiologists.

Infectious disease specialists should:	
▶	Be available for consultation on diagnostic evaluation and treatment of infectious diseases including difficult-to-treat pathogens and complicated infections, as well as appropriate antimicrobial use.
▶	As full members of the antimicrobial stewardship team, take on responsibilities that include coordination, planning, post-prescription review and feedback.

3.4. Prescribers:

Prescribers are ultimately responsible for the decision to use antimicrobials in patient care. They also choose the type of antimicrobials used in patient care. Prescribers should therefore be provided with training, guidelines and information in order to be able to exercise prudence in the prescribing of antimicrobials. Information should also be given how prescribers can assess and manage patient expectations. Prescribers working in the

community, hospitals, dental practice, or other settings, should be familiar with any specific guidance applicable to the situation in which they are working.

Prescribers should:	
▶	Ensure that they are familiar with the relevant guidelines, the last valid *summary of product characteristics* (SmPC) and prescribing advice before prescribing an antimicrobial.
▶	Keep themselves up to date regarding antimicrobial prescribing; this can be achieved by attending training courses, being aware of guidelines, and following guidelines.
▶	Seek and take advice from specialists regarding antimicrobial prescribing.
▶	When making the decision to prescribe an antimicrobial, prescribers should do the following: ▶ Make a diagnosis during an in-person patient consultation before prescribing antibiotics, except in special circumstances. ▶ Ensure that appropriate microbiological samples are taken before starting antimicrobial treatment. ▶ Avoid antibacterial treatment when there is only evidence of viral infection or of a self-limiting bacterial infection. ▶ Avoid treatment for colonisation without evidence of infection after relevant clinical examination and diagnostic testing unless there is a clear indication in the guidelines.
▶	Use antimicrobial prophylaxis only when indicated in relevant guidelines. ▶ Avoid antimicrobial combinations unless there is a clear indication outlined in the guidelines.
▶	If antimicrobial treatment is not considered necessary, give the patient advice about the expected natural history of the illness, the limited or absent benefit of antimicrobial treatment, and the potential unwanted side effects of antimicrobials such as diarrhoea and rash, recommendations for symptom management, as well as advice about actions in case of worsening clinical condition (safety netting).

When prescribing antimicrobials, prescribers should:	
▶	Select an antimicrobial in accordance with relevant guidelines, at an appropriate dose and dosage form, for the shortest effective duration and with appropriate route of administration (preferably oral if possible).
▶	Consider relevant host factors: age, gender, comorbidities (e.g. immunodeficiency), renal and hepatic function, pregnancy, breastfeeding, allergies, presence of prosthetic material, potential drug interactions, body mass index and risk factors for antimicrobial resistance (e.g. history of recent antimicrobial use, history of recent travel).

▶	Promote allergy testing for patients with a history of allergic reaction to beta-lactams, penicillins etc. as a measure to promote use of first-line antimicrobials in non-allergic patients.
▶	Select an antimicrobial with a spectrum of activity as narrow as possible. Ensure timely administration of antimicrobial treatment for patients with severe infections. Examples: sepsis, severe community-acquired pneumonia.
▶	If possible, inform the patient and/or responsible caregiver about the reason for antimicrobial treatment and potential side effects and ensure that the patient understands the dosage, dosage form, storage conditions and duration of treatment; this improves adherence and increases treatment success
▶	Address the patient's expectations, questions and preferences as an essential component of patient-centred care and an effective intervention to promote the responsible use of antimicrobials.
▶	Reassess antimicrobial treatment and consider modification (e.g. de-escalation, discontinuation or switch to oral treatment) after 48–72 hours in hospitals and, in specific circumstances, in other settings in accordance with guidelines.

In the community, prescribers should:	
▶	Refrain from prescribing antibacterials for viral or self-limiting bacterial infections.
▶	Consider delayed antimicrobial prescribing with appropriate safety netting for adults or children in specific circumstances and in accordance with guidelines. Example: delayed antimicrobial prescribing for acute otitis media or acute rhinosinusitis.
▶	Evaluate symptoms and use scoring systems or symptom checking lists to guide the need for diagnostic testing, antimicrobial treatment and urgent referral.

In the hospitals, prescribers should:	
▶	Document in the patient chart: indication, drug choice, dose, dosage form, route and duration of treatment.
▶	Follow guidance for perioperative antimicrobial prophylaxis.
▶	Enhance timely and adequate source control for surgical infections and discourage using only antimicrobials instead of surgical treatment when there is a clear indication for surgical treatment.
▶	Evaluate the need for parenteral antimicrobials and switch to oral antimicrobials when possible, all in accordance with available clinical criteria.
▶	Therapeutic drug monitoring is recommended for adjustment of the dosing regimen in accordance with guidelines and in specific circumstances.

3.5. Pharmacists:

Pharmacists in community and hospital settings have expertise in therapeutic goods and are the gatekeepers to the use of antimicrobials. As such, pharmacists can act as an important source of advice and information for patients and prescribers on the safe, rational and effective use of antimicrobials (including on side effects, adherence, adverse drug reactions, cautions & contra-indications, interactions, storage & disposal and rationale for treatment). To this end, they need to be provided with appropriate training, guidelines, and information in order to be able to exercise prudence in the prescribing of antimicrobials and manage patient expectations.

In the hospital setting, a pharmacist should be a member of the antimicrobial stewardship team and actively involved in antimicrobial management in the multidisciplinary care team. The role of the pharmacist includes assessing the prescription in accordance with local policies for antimicrobial use; reviewing the antimicrobial duration; counselling on the use of restricted antimicrobials; giving advice on dose, dosage form, preparation and administration (especially for special patient cohorts such as children); and advising patients on the proper use of antimicrobials. Pharmacists should also be involved in monitoring antimicrobial use.

Pharmacists should:	
▶	Only dispense antimicrobials with prescription, unless specific provisions allow for regulated dispensation in specific circumstances.
▶	Ensure that the patient and/or the care giver understands the dose, dosage form, storage conditions and duration of treatment as this can improve adherence and increase treatment success.
▶	Promote appropriate disposal of leftover antimicrobials.
▶	Notify adverse-events related to antimicrobials in accordance with Pharmacovigilance Guidelines.
▶	Participate in public health campaigns at national, provincial, AJ& K and GB levels promoting the responsible use of antimicrobials.
▶	Provide advice to patients and health professionals with regard to contraindications, drug interactions and food–drug interactions.

3.6. Nurses:

The role of nurses within the clinical team is critical because of their regular contacts with patients and their role in administering medicines. Nurses make sure that antimicrobials are taken according to the prescription; they also monitor the response to antimicrobials (including potential adverse effects). In general, nurses are responsible for the administration of antimicrobials and for monitoring the patient, patient safety and reporting ADRs.

The role of nurses is also critical.

Nurses should:	
▶	Be actively involved in antimicrobial management as part of the multidisciplinary care team.
▶	Ensure timely administration of antimicrobials according to prescription.
▶	Provide advice and educate the patient on the proper use of antimicrobials.
▶	Utilise protocols and tools that enable you to independently detect patients with severe infections and then trigger diagnostic and treatment algorithms.
▶	Remind the clinician to reassess the antimicrobial treatment after 48 to 72 hours.

3.7. Infection control practitioners:

Infection control practitioners play an essential role in the prevention and control of infections, many of which are associated with the inappropriate antimicrobial use. Infection control practitioners can therefore support the responsible use of antimicrobials through the provision of advice and peer review.

Infection control practitioners should:	
▶	Ensure coordination and collaboration between antimicrobial stewardship programmes and infection prevention and control programmes by highlighting the essential aspects of appropriate antimicrobial use in the prevention and control of healthcare-associated infections.

3.8. Public / patients:

The knowledge, attitudes and behaviour of the public and patients can be of profound importance in establishing and ensuring the responsible use of antimicrobials, both in terms of expectations and normative pressures that these can exert on healthcare professionals and peers, and their adherence to medication regimen.

The general public and patients should:	
▶	Inform themselves and, where needed, seek information from healthcare providers about appropriate antimicrobial use, antimicrobial resistance and adverse reactions to antimicrobials.
▶	Use antimicrobials only when prescribed and comply with the dosage regimen.
▶	Refrain from using antimicrobials which have not been prescribed such as leftover antimicrobials, antimicrobials prescribed for another person, or antimicrobials obtained without a prescription
▶	Return leftover antimicrobials to pharmacies and local collection, in accordance with local disposal regulations

3.9. Professional associations and scientific societies:

Professional associations and scientific societies represent the healthcare professionals and promote the professional and scientific development of their members, thus influencing clinical and laboratory practice.

Professional associations and scientific societies should:	
▶	Cooperate closely with the regulatory authorities in all relevant domains to ensure that the proposed measures to promote the responsible use of antimicrobials are evidence-based and feasible.
▶	Promote responsible use of antimicrobials among their members through activities that include guideline development and training.
▶	Support information and awareness raising activities to promote responsible use of antimicrobials.
▶	Avoid conflicts of interest and commercial consideration.
▶	Promote and conduct relevant research.

3.10. Research funders:

Research is essential to reduce the current levels of, and rising trends in, antimicrobial resistance. In particular, translational research is needed to identify options for improving the ways in which we use existing antimicrobials. Research is also needed to explore how the risk of developing antimicrobial resistance can be mitigated.

Research funders and those responsible for research policy should:	
▶	Promote research that assesses and compares behavioural change interventions for antimicrobial prescribing, considering cultural differences, in order to improve our understanding how rational antimicrobial prescribing practices can be achieved.
▶	Promote research on interventional studies for antimicrobial prescribing.
▶	Promote research on the potential of specific antimicrobials and antimicrobial classes to create a selective pressure toward antimicrobial resistance in microbiota.
▶	Promote clinical research studies on existing antimicrobials, clinical studies on other therapeutic goods (including vaccines) pharmacokinetic/

	pharmacodynamics studies, ensuring that studies sufficiently consider sex/gender and age factors across the lifespan.
▶	Promote research on diagnostic tools, including rapid and point-of-care diagnostics to support evidence-based guidelines for the role of diagnostics in appropriate antimicrobial prescribing.
▶	Promote research studies in antimicrobial therapeutic drug monitoring in special populations (e.g. critically ill patients, burned patients, paediatric patients, patients receiving continuous renal replacement therapy).
▶	Promote research on educational and awareness interventions which target the public and patients.
▶	Support activities to enable research to be translated into practice, systematic reviews and meta-analyses, and the use of research results to inform clinical guideline development and decision-making.

3.11. Pharmaceutical industry:

The pharmaceutical industry is a key partner in the overall effort to ensure the responsible use of antimicrobials.

Pharmaceutical industry should:	
▶	Ensure that marketing and promotional activities to healthcare professionals are in accordance with the DRAP Act 2012 e.g. the advertising of a therapeutic good to healthcare professionals must comply with the particulars listed in the summary of product characteristics and should encourage the rational use of the medicinal product.
▶	Ensure that financial incentives within companies are aligned with the stewardship principles laid out above.
▶	Ensure the monitoring of resistance and off-label use after launching new compounds in accordance with post-marketing obligations under DRAP Act 2012.
▶	Engage with national and international policymakers and regulators to support the development of policies that promote appropriate antimicrobial prescribing, including the design of novel reimbursement systems, adaptation of pack size and other processes that contribute to the goals of access and conservation.

3.12. Diagnostic industry:

Diagnostic testing, including testing in microbiology laboratories but also point-of-care and novel diagnostics, provides essential information to avoid unnecessary antimicrobial use and optimise antimicrobial selection.

Diagnostic industry should:	
▶	Address the different needs for diagnostics including point of care testing and surveillance.
▶	Collaborate with scientific societies and public health in the development of evidence-based guidelines on the use of tests for the diagnosis of infection, including novel diagnostics and point-of-care tests.
▶	Support studies on the effect of novel diagnostics on the responsible use of antimicrobials, and on the cost-effectiveness of diagnostics.

3.13. International collaboration

International cross-sectoral, inter-governmental and inter-organizational collaboration and coordination is required to establish standards, systems and procedures necessary to ensure the responsible use of antimicrobials, the sharing of best practices, and the support capacity development.

International collaboration should contribute to the following:	
▶	Facilitate the coordination of response to cross-border threats relating to antimicrobial resistant organisms.
▶	Design, implement and monitor antimicrobial stewardship interventions and campaigns to support appropriate antimicrobial use and reduce inappropriate antimicrobial use.
▶	Establish mechanisms for sharing best practice interventions on appropriate antimicrobial use and their impact on relevant qualitative and quantitative outcomes.
▶	Enable cooperation on the surveillance of antimicrobial consumption and antimicrobial resistance using a harmonised methodology with the aim of providing timely information regarding cross-border threats from resistant organisms, as well as providing valid and internationally comparable information on resistance and consumption.
▶	Harmonisation of clinical breakpoints and methods for antimicrobial susceptibility testing.

▶	Support the development of good evidence-based clinical practice guidelines that address the most common infections and are adaptable to local resistance patterns and available registered antibacterials.
▶	Facilitate access to essential antimicrobials and diagnostic tests by supporting market availability and tackling shortages.
▶	Encourage, at the national level, the development of standards and adoption of selective reporting of microbiology results to optimise antimicrobial prescribing.
▶	Support the development of evidence-based guidelines on the use of rapid and point-of-care diagnostics.
▶	Promote and financial support of research and development of new antimicrobials and new point-of-care tests.
▶	Facilitate cross-sectoral collaboration in the animal health, food production and healthcare sectors regarding the surveillance of, and policies for, antimicrobial use.

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