



EDSA EMSA EPSA Paper on the spread of Antimicrobial Resistance

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1. Introduction

Since their discovery, antibiotics have proved to be essential in the treatment of bacterial infections, reduction of complications following medical interventions, prevention of bacterial infections in dentistry, improvement of veterinary medicine and other non-therapeutic yet important societal purposes (e.g. food industry).

However, the effectiveness of antibiotics has become limited by the spread of drug-resistant bacterial strains. This spreading is influenced by a variety of factors, especially the inappropriate use of antibiotics. Given that the consequences of antibiotic drug-resistance are severe, a consortium of health students associations gathered to tackle the problem. The European Medical Students' Association (EMSA), the European Pharmaceutical Students' Association (EPSA) and the European Dental Students' Association (EDSA) partnered up by compiling this position paper and presenting the current opinion of healthcare students to relevant stakeholders. Urgent actions must be taken in light of the rise in antimicrobial resistance (AMR). Current actions must be substantially reinforced and new initiatives considered.



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2. Problem statement

2.1. Historical context of AMR

From the middle of the 20th century and the discovery and commercialisation of the first antibiotics, specific mechanisms of resistance have been found to many widely used antibiotics, which has resulted in a significant reduction in their effectiveness in many conditions. As a consequence, many bacterial strains have evolved to multi-drug resistant forms (MDR), for example, the threatening multi-drug resistant *Mycobacterium tuberculosis*, an aggressive pathogen found in both developing and industrialized countries, becoming refractory to the majority of available treatments. Other serious infections include nosocomial infections (linked to hospital environment), such as *Staphylococcus aureus*, *Clostridium difficile*, *Haemophilus influenzae*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Pseudomonas aeruginosa* and many other pathogens.

2.2. Latest data, statistics and studies

Recently, studies carried out by the European Centre for Disease Prevention and Control (ECDC)¹ showed that there is a general Europe-wide increase of antimicrobial resistance in the gram-negative pathogens (such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and bacteria associated with Red complex - *Porphyromonas gingivalis*, *Treponema denticola*, *Tannerella forsythia*)². Another recent study³ published by ECDC shows that for some patients with life-threatening infections (such as lung abscesses, septicaemia, endocarditis, peritonitis and meningitis), only a few treatment options are available, due to the alarming increase in AMR in Europe, concerning combined resistance of *E. coli* and *K. pneumoniae*. For both of these pathogens, more than a third of 29 countries that participated in the study showed an increasing trend in combined resistance over the last years (2005- 2011).

3. Further development

3.1. Antibiotics development

The number of new antibiotics developed in the last years by the industry has dropped while the incidence of new AMR bacteria has increased. Therefore, the efforts to handle the issue of the development of AMR should be stressed.

- The pharmaceutical industry should work together with governments and health authorities to ensure enhanced and effective development of innovative treatments capable of tackling AMR.
- Research should be administrated and structured by governments in governmental institutes as it is important to ensure progress in the development of new effective antibiotics.
- Increased collaboration between teaching institutes, faculties and the pharmaceutical industry should be also encouraged. Together, Medical, dental and pharmacy students offer huge pool of information and ideas, so there is a possibility for research projects to be directly linked to antibiotic development and be a point of focus for synergetic activities between universities and the pharmaceutical companies. EMSA, EPSA, EDSA and their partner organizations can promote such research fields to be possibly used as a main topic for thesis.



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- Increased developments to shorten the time for microbiological testing should be of focus to avoid the use of broad-spectrum antibiotics.

3.2. Workforce Training

The importance of consistent training in microbiology, antibiotic pharmacotherapy and drug development related topics should be reinforced both on a student and professional level.

- Raising awareness in the challenges of AMR in faculties should be done through state-of-the-art education, in the light of new developments in antimicrobial research. This should be accompanied by a strong practical component in interaction with other healthcare students, academics and even public health authorities.
- Continuous professional development activities on the AMR topic should be made available to healthcare professionals, especially young professionals, and encouraged through online courses, trainings or other means.

3.3. Antibiotics prescription

In the process of prescribing antibiotics, several aspects need increased supervision, so the number of antibiotics used in medicine is limited.

- Regulations and surveillance systems should ensure a better compliance to “prescription-only” guidelines through all the bodies in the healthcare system. Prescription-only guidelines should be adopted in all national guidelines in Council of Europe members.
- The prescription of antibiotics should follow qualified standards in application, microbiological analyses, diagnosis, hygiene standards and ethics. The prescription should be based on clinical findings from microbiological analyses and not different interests of relevant stakeholders.
- Thorough examination of the patient can reduce the amount of inaccurate prescribing with broad spectrum antibiotics. This requires a higher will of the prescriber to do sufficient examination, and a reduction of inaccurate prescribing as a result of reaching a too quick conclusion of symptom-causing disease relation.
- Doctors should not be allowed to both prescribe and sell/ dispense antibiotics at the same time.
- Actions like those taken by ECDC in coordinating and administrating the use of antibiotics should be extended and intensified, according to the latest findings in microbial research. European institutions and governments should support this, with particular focus on general medicine and the geographical periphery. The actions should be extended to countries within the whole European geographical region, not limited only to the members of the European Union.

3.3.1 Prescription guidelines

The use of antibiotics in Europe should be scientifically and evidence based. For that reason EMSA, EPSA and EDSA strongly recommend the development of guidelines to perform the best medical treatment with antibiotic therapy from the scientific point of view, in all countries belonging to the Council of Europe.

- The coordination of developing and publishing of guidelines should be lead by a specific entity such as the ECDC.



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- Cooperation between countries can facilitate the process of developing national guidelines, as this system is already implemented in some countries (e.g. Ireland⁴).
- Content of the guidelines should be defined by organizations of specialists from the specific medical field covered by the guidelines and should undergo periodical reviewing.
- Guidelines should be made easily and freely available to all health professionals, using multiple distribution channels, e.g. websites of professional chambers, booklets sent to healthcare practitioners, presentations at universities and congresses.
- Implementation and follow-up of the process is of high importance to allow a better control of antibiotics prescription by doctors.
- Implementation should focus especially on peripheral geographic regions and general medicine field.
- International cooperation is crucial, because unlike national health policies, AMR respects no borders.

3.4. Antibiotics dispensing

Regulations and surveillance systems should ensure a better compliance to “prescription-only” guidelines in all the bodies in the healthcare system, including the dispensing sector.

- Pharmacies and medicine distributors should ensure immediate or fast supply of all types of antibiotics available in pharmacies (including uncommonly used antibiotics) to maximize access to medicines for patients.
- Pharmacists and other health professionals should maintain regular, bilateral contact in case of guidelines exceptions or drug interactions/ adverse effects/ dosing.
- Pharmacists should ensure that the patient receives complete information about the drug treatment and the importance of respecting the therapeutic plan, when dispensing the drugs.
- Pharmacists should take all measures to ensure patient compliance to the antibiotic treatment: counselling, follow-up, as well as further assistance for the disabled.

3.5. Antibiotics Use and Adherence

Starting with the diagnosis and prescription from the doctor, to dispensing and counselling from the pharmacist, the cycle of the antibiotic ends with the patient’s treatment and for that reason, increased surveillance in this part will help improve the accuracy of antibiotic use and the patient compliance.

- Doctors should take all necessary measures to ensure patient compliance to the antibiotic treatment: explaining the nature of the disease, presenting the change in symptomatology, using common vocabulary, focusing on requirements for efficiency and consequences of non-adherence and ensuring that patients understood the message, following informed consent standards of communication.
- Pharmacists should take all measures to ensure patient compliance to the antibiotic treatment by extensive counselling (explaining the nature of the disease, presenting the change in symptomatology, using common vocabulary, focusing on requirements for efficiency and consequences of non-adherence, food and drugs interactions) and follow-up on patients.
- Pharmacists should actively contribute to reductions of self-medication of the population with antibiotics, through an extensive counselling.



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4. General prevention

General prevention measures focus primarily on providing a better education to the population by the healthcare professionals and on increasing the interprofessional collaboration to maximize the development and efficiency of regulations and drug treatment.

4.1 Public Education

Different action points can be implemented both on a national but also European level to increase the public education about bacterial infections, use of antibiotics, antibiotic resistance and prevention of the latter.

- Public health campaigns such as the ones carried out during the European Antibiotic Awareness Day (EAAD) developed by ECDC should be more frequent, engage more means of promotion and active participation from patients.
- Public health campaigns on local/ national/ European level should involve both students and professionals from all healthcare fields, to strengthen their collaboration.
- Public health campaigns should increase focus on educating patients about bacterial infections, use of antibiotics and AMR prevention.
- Actions targeting the general public should address the means of preventing the spread of microbial resistance (for instance sexual education to prevent the spread of gonorrhoea).
- Basic level of microbiology knowledge and hygiene measures should be covered in early stages of scholar education, to ensure a better understanding of microbial infections and mechanisms of resistance.

4.2. Further prevention measures

- Use of antibiotics in hospitals as antiseptic agents should be further regulated.
- Pharmacies should develop a proactive role in collecting and disposing of unused antibiotics from patients.
- Research in vaccines should be encouraged and supported, as this preventive measure has an important impact on reducing the spread of infections.
- Vaccination campaigns should be fully supported as long as they provide a satisfactory benefit-cost ratio. Evidence-based data supports that vaccination prevents the use of antibiotics⁵.

As stated above, continuous and extensive surveillance measures (as the ones taken by the European Antimicrobial Resistance Network - EARS-Net) can identify further steps to be taken in tackling AMR.

4.3. Students Involvement

4.3.1 EMSA

The European Medical Students' Association member associations represent the medical students in the following countries: Albania, Austria, Belgium, Bulgaria, Croatia, Georgia, Germany, Greece, Hungary, Italy, Kosovo, Latvia, Lithuania, Macedonia, Malta, Poland, Portugal, Romania, Russia, Serbia, Slovenia, The Netherlands, Turkey, Ukraine, and United Kingdom.



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EMSA aims to:

- Form a network between European medical students to facilitate European integration and develop a sense of European identity;
- Represent and voice the opinions of the medical students of Europe;
- Act as a forum for all medical students in Europe to discuss topics related to the fields of medical education, medical ethics, and medical research;
- Promote the highest standards in European medical education and ensure the quality of healthcare in Europe;
- Promote training, activities and projects related to health in Europe to the benefit of medical students and society;
- Facilitate intercultural understanding by organizing social and cultural events;
- Cooperate with other student organizations and organizations representing the medical profession.

4.3.2 EPSA

The European Pharmaceutical Students' Association (EPSA) is a student association representing 160,000 pharmacy students around Europe from 35 countries. EPSA is actively engaged on both student and professional levels, bringing pharmacy, knowledge and students together and encouraging personal development of its members. EPSA facilitates discussion between member associations, by being a platform for sharing knowledge and best practices. EPSA also acts as the voice of pharmacy students in Europe and advocates their interests. By organizing events on a European level, EPSA ensures knowledge transfer as well as social and cultural exchange.

EPSA aims to:

- Coordinate public health campaigns angled on AMR.
- Provide lectures / workshops during events regarding recent developments on pharmacy field.
- Advocate for a better adapted training in the faculty premises.
- Advocate for soft skills development during the university years to ensure a high standard of counselling for patients.
- Consult with relevant stakeholders in following the development of AMR.

The threat that AMR is posing becomes more and more concerning and it is of great importance to strengthen the current measures taken. It is urgent to develop new methods of prevention that engage more with the patients and are based on interprofessional collaboration. The antibiotic resistance seems to be inevitable, but there are certain measures that can be taken in order to fight against this tendency, hopefully preventing or delaying this process.

4.3.3 EDSA

The European Dental Students' Association (EDSA) is a non-profit, non-political organisation representing dental students across Europe. EDSA now represents over 65,000 students, in more than 184 dental schools. As an organisation we have a core interest in public health, social and domestic affairs. Through the release of our advocacy, we aim to highlight notable topics of concern within the dental and medical fields. Our main goals are to give students a voice in the national and



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international forum, to create a globally connected student community and to develop and promote international contacts. We strive to keep dental students aware of the key issues within the global health sector.

EDSA aims to:

- Raise awareness on AMR by:
 - Organizing workgroups and lectures during EDSA meetings.
 - Providing materials about AMR to national dental students associations.
 - Communicating through EDSA official publications and social networks about the issues faced with AMR.
- Ensure that the advocacy follows the evolution of antibiotic development.
- Promote the training of responsible and evidence-based rules of antibiotic prescription in European dental schools.
- Collaborate with official institutions and inform our members about recent developments in the field of AMR.

5. References

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