Emerging Problems in Infectious Diseases

Antimicrobial resistance: a critical public health challenge in Albania

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Abstract

Antimicrobial resistance (AMR): AMR represents a critical challenge for healthcare systems globally and in Albania. The increasing ability of microorganisms to withstand standard therapies complicates infection management, elevates morbidity and mortality, and drives up healthcare costs. Overprescribing and incomplete antibiotic courses are principal contributors, underscoring the necessity for robust stewardship and ongoing education. Continued research and the development of novel antimicrobials are essential.

Growing concern: AMR is exacerbated by inappropriate antimicrobial use, suboptimal infection control, and global mobility. Both human and veterinary medicine are affected, with resistance spreading via direct contact and the food chain. The "One Health" approach-integrating human, animal, and environmental health-is essential for effective AMR management; and without intervention, AMR could result in millions of deaths annually. The major drivers of AMR include (i) unnecessary prescriptions and incomplete treatment courses; (ii) poor hygiene and infection control in clinical settings; (iii) international movement of people and goods; and (iv) limited development of new antimicrobial agents. Albania is experiencing rising rates of antibiotic resistance, particularly in urinary tract infections (UTIs) and community-acquired pathogens. Excessive antibiotic prescribing among certain healthcare professionals highlights the need for improved stewardship and adherence to clinical guidelines. The National Action Plan on AMR exists, but its implementation requires further evaluation.

Conclusions: Albania has established a functioning AMR surveillance system and continues to implement awareness campaigns. Ongoing research and targeted interventions are needed to address resistance trends. Strengthening stewardship and surveillance is critical to mitigating the impact of AMR on patient outcomes and public health.

Antimicrobial resistance

Antimicrobial resistance (AMR) extends beyond bacteria, affecting viruses, fungi, and parasites, and results in reduced efficacy of medications previously used to treat infections. This increases the difficulty of managing infections, heightens the risk of disease transmission, and can lead to severe health complications.

Antibiotics, first mass-produced in the 1940s, revolutionized infection management and dramatically reduced mortality from common injuries and procedures. However, the misuse and overuse of antibiotics—such as unnecessary prescriptions or incomplete treatment courses—are major contributors to the development of resistance. These practices enable resistant bacteria to proliferate, resulting in more severe illnesses, prolonged hospitalizations, and increased healthcare costs [1]. Addressing this challenge requires ongoing research and the development of new antibiotics, as well as public education to promote responsible antibiotic use [2].

Antimicrobial resistance (AMR) is a naturally occurring phenomenon, but its progression is accelerated by the overuse and misuse of antimicrobial agents, inadequate infection control, and increased global travel and trade.

AMR affects both humans and animals, with resistance spreading through direct contact and the food chain. This leads to infections that are more difficult and costly to treat, higher mortality rates, and an increased risk of disease outbreaks. Methicillin-resistant *Staphylococcus aureus* (MRSA) exemplifies bacteria that are resistant to multiple antibiotics.

Addressing AMR requires a "One Health" approach, which recognizes the interconnectedness of human, animal, and environmental health, and necessitates cross-sector collaboration. Without effective intervention, AMR poses a significant global public health threat, with the potential to cause millions of deaths annually [3].

The key drivers of AMR include: overuse and misuse of antimicrobials, including unnecessary prescriptions and incomplete treatment courses [4]; inadequate hygiene, sanitation, and infection control in healthcare settings; global movement of people and goods facilitating the spread of resistant organisms [5];

and slow development of new antimicrobial agents.

AMR - a growing concern and a public health challenge in Albania

Recent data demonstrate a marked increase in antibiotic resistance among bacterial strains in Albania, particularly those implicated in urinary tract infections (UTIs) [6]. Community-acquired UTI pathogens exhibit high resistance rates to tetracycline, piperacillin, minocycline, and trimethoprim. Enterobacterales, notably *Escherichia coli*, frequently produce extended-spectrum beta-lactamases (ESBLs) [7]. Multidrug resistance is also prevalent in strains such as *Pseudomonas aeruginosa*. Studies conducted on poultry farms have identified elevated resistance levels in *E. coli* and *Salmonella* isolates [8].

Furthermore, a recent survey of Albanian dentists revealed antibiotic prescription rates that often exceed established guidelines, highlighting deficiencies in antimicrobial stewardship [9]. These findings underscore the urgent need for enhanced awareness of antimicrobial resistance (AMR) and stricter adherence to prescribing protocols, especially within dental practice.

Although a National Action Plan on AMR has been developed, its implementation and effectiveness warrant further evaluation, and research on resistance patterns—particularly for UTIs—remains limited [10].

Addressing AMR issue in Albania: the surveillance system

The Institute of Public Health (IPH), Albania's leading technical authority in public health, operates under the Ministry of Health. Its responsibilities include monitoring risk factors, infectious disease surveillance, laboratory reference, and vaccination program management. The National Action Plan on AMR provides a strategic framework for addressing antimicrobial resistance, though its effectiveness requires ongoing evaluation.

During 2023–2024, the IPH has focused on several key initiatives, including: implementing a laboratory surveillance system in line with national guidelines and standard operating procedures, operating an epidemiological surveillance system to collect and analyze antimicrobial resistance data, monitoring hospital-acquired infections related to AMR to support infection control in healthcare settings, and developing health promotion materials to raise public awareness.

A 2023 study assessed the prevalence of healthcare-associated infections and antimicrobial use in selected hospitals, revealing that the proportion of surgical patients receiving a single antibiotic remained consistent between 2014 and 2021 (87.7% and 88.1%, respectively) [11]. Recent data indicate that first-generation cephalosporins are the most used antibiotics (35.99%), followed by third-generation cephalosporins (21.94%), a notable increase from 2014.

Microbiology laboratories play a central role in AMR surveillance, with the most frequently reported resistant strains being *Escherichia coli* (38%), *Staphylococcus aureus* (29%), *Klebsiella pneumonia* (13%), and *Pseudomonas aeruginosa* (11%).

Recommendations for clinical management of AMR include: strengthening antimicrobial stewardship programs across all healthcare settings; enhancing adherence to prescribing guidelines, particularly among dental and outpatient providers; supporting ongoing surveillance and research to monitor resistance trends and inform interventions; promoting awareness campaigns based on the World Health Organization (WHO) guidelines and the "One Health" approach.

Conclusions

Following a comprehensive preparatory phase-including the development of SOPs and guidelines-the National AMR Surveillance System, led by the Institute of Public Health (IPH), is now operational and has begun collecting relevant data.

This implementation has enabled a rapid assessment of the current AMR landscape and highlighted areas for improvement. Targeted educational materials have been distributed to raise public awareness about responsible antibiotic and antimicrobial use, in alignment with WHO guidelines and the "One Health" approach, as part of the AMR Action Plan 2022–2025 and the World AMR Awareness Week.

Looking ahead, further research is essential to better understand the prevalence and evolving patterns of AMR across different settings and pathogens in Albania, and to benchmark these trends against global developments. Continued support for the AMR Action Plan (2022–2025) is necessary to strengthen surveillance systems, monitor resistance trends, and implement timely interventions as needed.

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Conflict of interest
No conflict of interest is declared.

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