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Antimicrobial Resistance in Community-Acquired Infections: Trends and Strategies

Anslie Daena*

Department of Molecular Medicine, Sapienza University of Rome, Viale Regina Elena 324, 00161 Rome, Italy

Introduction

Antimicrobial Resistance (AMR) represents one of the greatest threats to public health in the 21st century. Initially a concern primarily in hospital settings, AMR has now become increasingly prevalent in Community-Acquired Infections (CAIs), undermining the effectiveness of once-reliable treatments. Community-acquired infections those contracted outside healthcare facilities include respiratory tract infections, urinary tract infections, skin and soft tissue infections and gastrointestinal diseases. These infections, commonly treated with empirical antibiotics, are becoming more difficult to manage due to the rising incidence of resistant pathogens circulating in the general population. The misuse and overuse of antibiotics in human medicine, agriculture and animal husbandry, as well as insufficient surveillance and inadequate stewardship, are driving this alarming trend. This article explores the evolving patterns of antimicrobial resistance in community settings, highlights key resistant organisms of concern and outlines strategic interventions necessary to combat this growing public health challenge [1].

Description

Over the past two decades, AMR has been increasingly documented in community-acquired pathogens once considered reliably susceptible to standard antibiotics. Among the most notable resistant organisms are Extended-Spectrum Beta-Lactamase (ESBL)-producing Escherichia coli, Methicillin-Resistant Staphylococcus Aureus (MRSA), multidrug-resistant Streptococcus pneumoniae and drug-resistant Neisseria gonorrhoeae. These pathogens have adapted to resist multiple classes of antibiotics, rendering common therapies ineffective and forcing clinicians to use broader-spectrum or more toxic drugs. For example, Urinary Tract Infections (UTIs), one of the most frequent community-acquired conditions, are increasingly caused by ESBL-producing E. coli, which are resistant to penicillins, cephalosporins and often fluoroquinolones. These strains now circulate in the community, not just in hospitals, making empirical treatment more challenging and increasing the risk of treatment failure [2]. Respiratory tract infections caused by Streptococcus pneumoniae and Haemophilus influenzae have also shown increasing resistance to macrolides, beta-lactams and tetracyclines, complicating the management of pneumonia, otitis media and sinusitis. Community-associated MRSA (CA-MRSA), once confined to healthcare environments, has spread into schools, sports teams, military barracks and prisons, causing skin and soft tissue infections and sometimes invasive diseases. Additionally, gonorrhea, a common sexually transmitted infection, has developed resistance to nearly every antibiotic used for treatment, with ceftriaxone remaining the only widely effective option. These trends indicate that antimicrobial resistance is no longer confined to hospitalized patients and high-risk groups but is now a widespread problem affecting healthy individuals in community settings.

Several factors contribute to the acceleration of AMR in the community. Overprescription and self-medication with antibiotics, often without proper clinical indication, are significant drivers. In many countries, antibiotics can be purchased over the counter without a prescription, leading to rampant misuse. Patients frequently demand antibiotics for viral infections such as the common cold or flu, for which antibiotics are ineffective. Additionally, incomplete treatment courses and the use of leftover medications contribute to subtherapeutic exposure, promoting the survival of resistant strains. The use of antibiotics in livestock for growth promotion and disease prevention further amplifies resistance by selecting for resistant bacteria that can transfer to humans through the food chain, water and environmental contamination. Another compounding factor is the lack of robust surveillance systems for tracking AMR in the community. Many low- and middle-income countries (LMICs) lack national surveillance programs or infrastructure to monitor resistance trends. Without data on local resistance patterns, clinicians often resort to empirical antibiotic use, increasing the risk of inappropriate therapy and selection pressure. Diagnostic limitations in primary care settings also contribute, as many infections are treated empirically without microbiological confirmation. This leads to the unnecessary use of broad-spectrum antibiotics when narrower options might suffice. Furthermore, the COVID-19 pandemic has exacerbated antibiotic misuse globally, as antibiotics were frequently prescribed for viral infections due to diagnostic uncertainty and concern over secondary bacterial infections.

Conclusion

Antimicrobial resistance in community-acquired infections is an escalating public health crisis that threatens the foundation of modern medicine. Once-confined resistant pathogens are now widespread in the general population, making common infections harder to treat and increasing the risk of complications, hospitalizations and mortality. The drivers of AMR in the community are multifactorial, including inappropriate prescribing, inadequate regulation, insufficient diagnostics and poor surveillance. Tackling this challenge requires a coordinated and comprehensive strategy that combines education, stewardship, diagnostics, surveillance and policy reform. Only through sustained global and local efforts can we preserve the effectiveness of existing antibiotics and ensure the safe and effective treatment of infections for generations to come.

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Conflict of Interest

None.

***Address for Correspondence:** Anslie Daena,Department of Molecular Medicine, Sapienza University of Rome, Viale Regina Elena 324, 00161 Rome, Italy, E-mail: daena.anslie@uniroma1.it*

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