

Antimicrobial resistance: a risk factor for infectious diseases

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Antimicrobial resistance was the theme of World Health Day 2011 and the topic of discussion among scientific, academic, community, and government institutions, which analyzed its health impact and measures to contain it. The evidence and operational studies to foster more appropriate use of antimicrobial drugs, from effective prescribing to changing consumer behavior, are of particular interest. This special issue of the *Pan American Journal of Public Health*, therefore, is devoted to highlighting the progress and challenges in one of the areas of the greatest public health concern in the Region of the Americas.

Antimicrobials are the key component in the treatment of infectious diseases, which still are responsible for approximately 1 million deaths each year in the Americas. However, these are the only pharmaceuticals that, if used improperly, can lead to resistance. Without public attention and urgent action, antimicrobial resistance threatens to take the world back to the pre-antimicrobial era, when there was no effective treatment for pneumonia, meningitis, malaria, or tuberculosis.

The use of antimicrobials has produced great strides in public health in the Region, among them a decline in morbidity from tuberculosis, malaria, and congenital syphilis; a reduction in mortality from HIV/AIDS, and a reduction in infant and maternal mortality from infectious causes. All of this progress in public health is seriously threatened by the steady increase in the number of resistant microorganisms, whose infections increase mortality, treatment costs, the spread of disease, and its duration (1). The situation in the developing countries is particularly alarming, since respiratory and gastrointestinal infections continue to be major causes of mortality. However, multiresistant strains of the microorganisms responsible for AIDS, tuberculosis, gonorrhea, malaria, influenza, pneumonia, diarrhea, and other infections affect the population worldwide in both developed and developing countries.

On World Health Day 2011, the World Health Organization (WHO) launched a global campaign designed to safeguard these drugs for future generations. WHO called on governments, health professionals, industry, civil society, and patients to take urgent, coordinated action to stem the spread of resistance, limit its current impact, and preserve medical advances for future generations. To provide a framework for strategies and plans of action in this area, it launched a six-point policy (2):

- 1) Develop and implement comprehensive, financed national plans, with civil society responsibility and participation.
- 2) Strengthen surveillance and laboratory capacity.
- 3) Ensure uninterrupted access to essential medicines of assured quality.
- 4) Regulate and promote rational use of medicines, including those used in livestock production.
- 5) Enhance infection prevention and control.
- 6) Foster innovation and research and development for new diagnostic and treatment tools.

The Pan American Health Organization (PAHO), in turn, recognized in the mid 1990s that antimicrobial resistance posed a serious risk to public health in the Region; in response, it designed and implemented a program to strengthen laboratory capacity in the identification of bacteria and antimicrobial susceptibility testing. This program, which is ongoing, has two main objectives: to improve antimicrobial resistance surveillance and the countries' capacity to combat antimicrobial resistance in the Americas.

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As part of that effort, this special issue contains studies on new mechanisms of resistance, such as carbapenemases, which inactivate virtually all antibiotics that are effective against enterobacteria. Some of these carbapenemases have recently been described in the Region, among them the New Delhi metallo-enzyme (NDM) in Guatemala (3). This is one of the most complicated situations for controlling hospital infections, given the uncertainties in the provision of effective treatment against NDM-carrier bacteria. Methicillin-resistant *Staphylococcus aureus* (MRSA), first described in the early 1960s, has spread in hospital settings and today is a public health problem of the first order, especially in intensive care units. The appearance of community strains of MRSA in the 1990s, which differ from the hospital strain in their molecular and genetic make-up, epidemiological characteristics, clinical manifestations, and antibiotic resistance, is another serious problem, due to the dramatic clinical progression of mild skin lesions that can result in serious pulmonary conditions with high case-fatality rates.

We hope that this special issue will contribute to the advancement of science in the field of antimicrobial resistance. Research is indispensable from all angles—the hard sciences and pharmacological, clinical, operational, and economic studies—to develop an evidence base that supports effective interventions for the containment of antimicrobial resistance. Drug resistance is not a threat on the horizon; it is here today, and urgent responses must be found.

REFERENCES

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