

Emerging antibiotic resistance in Africa, threat to healthcare delivery

Summary

Antimicrobial resistance is threatening the health and wealth of the world, and the race to combat it is on. Although the battle is a global one, Africa is currently at a disadvantage in the fight. Weak healthcare systems and other factors are hindering the continents' efforts in this regard. There is an urgent need for African countries to do more to rise to this challenge.

Keywords: antimicrobial resistance, Africa, infections, monitoring and surveillance

Volume I Issue 4 - 2017

 Akinde OS,¹ Taiwo MO²
¹Department of Medical Microbiology and Parasitology, University of Obafemi Awolowo, Nigeria

²Department of Microbiology, Federal University of Agriculture, Nigeria

Correspondence: Taiwo MO, Department of Microbiology, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria, Tel 0806 0012 150, Email taiwomikeo@gmail.com

Received: July 23, 2017 | **Published:** August 01, 2017

Abbreviations: AMR, antimicrobial resistance; WHO, world health organization; MRSA, methicillin-resistant *staphylococcus aureus*

Introduction

The imminent end of the antimicrobial era is a major challenge in medicine. As more otherwise "normal" micro-organisms become implicated in different infections and established pathogens show new and/or extended resistance to otherwise effective antibiotics, many therapeutic options are being challenged. This has made the World Health Organization (WHO) predict that a return to the pre-antibiotic age is upon us.¹ This problem is a global one, affecting every region of the world. It is particularly more serious in the sub-Saharan Africa. It has been estimated that about 4,150,000 deaths will be attributed to Antimicrobial Resistance (AMR) in Africa by 2050, second only to that of Asia. This will have unthinkable consequences on human, social and economic factors in the region.² Africa as a continent is belied with various challenges; armed conflicts, widespread corruption, serious poverty, and very weak institutions. These have made the continent poorly equipped and positioned to fight effectively the real public health threat of AMR. Although AMR is a challenge across different types of microorganisms, bacterial and viral pathogens are of greater interest. This is because they account for a lion share of clinical infections observed. The proclivity of microorganisms to acquire and disseminate resistance genes among themselves via horizontal gene transfer makes resistance patterns to become widely distributed. Bacterial pathogens exhibit an array of resistance phenotypes, the most important of which is the production of resistance enzymes. These include extended spectrum beta-lactamases, carbapenemases and AmpC. These enzymes confer resistance to different classes of antibiotics. The problem is further compounded by the fact that very few new antibiotics have been developed within the last thirty years. We effectively do not have any new weapon in the fight against AMR. It is disheartening that only a very few countries in sub-Saharan Africa have systems that monitor antibacterial resistance in key pathogens, therefore the severity of the problem is not fully known. Although the WHO regional office in the region is spear-heading the establishment of a type of laboratory-based surveillance and monitoring system, its adoption and implementation across the continent is still poor.³

AMR infections are seen in both clinical settings and the community. Hospital acquired infections completely typifies the issue of antibiotic resistance. Higher morbidity and mortality levels, with increased length of hospital stay and healthcare costs are seen in these infections. Direct transmission (hospital acquired infections) and indirect ones (escape of pathogens to the environment via poorly treated sewage, etc.) occur through healthcare settings.⁴ *Escherichia coli*, implicated in urinary tract infections, bacteremia and foodborne infections, is increasingly being resistant to third-generation cephalosporins and fluoroquinolones. *Staphylococcus aureus*, a common part of the skin flora, is one of the most important pathogens in humans. It is a causative agent of bacteremia, tissue infections due to trauma, skin infections. The issue of resistance is not limited to hospital settings, as community incidences are on the increase also. The emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin resistant *S. aureus* has greatly limited therapeutic options for infections caused by this pathogen. *Klebsiella pneumoniae*, an important bloodstream infection pathogen, is very serious in hospitalized individuals. It is also an important nosocomial pathogen. Other important bacterial AMR infections are *Pseudomonas aeruginosa*, *Streptococcus pneumoniae*, non-typhoidal *Salmonella*, and *Neisseria gonorrhoeae*.³ It is worthy of note that bacterial diarrhoea, malaria, tuberculosis and HIV infections, responsible for high mortality rates in sub-Saharan Africa, are also showing increased resistance to hitherto effective antimicrobials. Thus, healthcare institutions, while trying to do so much with so little, are faced with this new threat. They could barely cope. As the global community deploys all available weapons and approaches in combating this real threat to humanity using cutting edge technologies and innovations, African nations and governments cannot be let out. The following are areas that the region's governments and healthcare professionals can help mitigate this threat;

- i. Strengthening local healthcare institutions and structures so as to better manage the inevitable challenges of increased incidences of AMR infections. Improved government funding for the health sector will go a long way. Also, routine susceptibility testing will provide much needed data on the rates and patterns of AMR in the region.⁵

- ii. Instituting a robust monitoring and surveillance system for key indicator organisms responsible for AMR. This is the cornerstone to any serious effort in the war against AMR. Countries should work with each other and their local health institutions in achieving this.⁵
- iii. Enforcing the prohibition of over- the-counter sale of antibiotics. This can significantly slow the emergence of certain resistance traits, especially in the community. Good infection control practices have been known to greatly decrease incidences of nosocomial infections. Also, the promotion of good antimicrobial stewardship will also help.⁶

Conclusion

Africa can be better prepared in the fight against AMR, only if she is ready to do the needful. It is time for health researchers, agencies/ organizations and the government of African countries to start acting decisively to combat this threat to human wellbeing.

Acknowledgements

None.

Conflict of interest

The author declares no conflicts of interest.

References

1. Liu YY, Wang Y, Walsh TR, et al. Emergence of plasmid-mediated colistin resistance mechanism MCR-1 in animals and human beings in China: a microbiological and molecular biological study. *Lancet Infect Dis.* 2015;16(2):161–168.
2. Jim O'Neill. Review on antimicrobial resistance antimicrobial resistance: tackling a crisis for the health and wealth of Nations, London: 2014.
3. World health organization. *Antimicrobial resistance: global report on surveillance.* Geneva: WHO; 2014.
4. Vincenti S, Quaranta G, De Meo C, et al. Non-fermentative gram-negative bacteria in hospital tap water and water used for haemodialysis and bronchoscope flushing: Prevalence and distribution of antibiotic resistant strains. *Sci Total Environ.* 2014;499:47–54.
5. Hara GL, Gould I, Endimiani A, et al. Detection, treatment, and prevention of carbapenemase-producing Enterobacteriaceae: Recommendations from and International working group. A review paper. *J Chemother.* 2013;25(3):129–140.
6. Ntirenganya C, Manzi O, Muvunyi CM, et al. High prevalence of antimicrobial resistance among common bacterial isolates in a tertiary healthcare facility in Rwanda. *Am J Trop Med Hyg.* 2015;92(4):865–870.