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THREATS OF ANTIBIOTIC RESISTANCE

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Global consumption of antibiotics has increased nearly 40% in the last decade. The incredible rapid resistance of antibiotic resistance which is taking place worldwide is not only a serious threat to the practice of modern medicine, but equally important, a threat to global public health. This urgent issue is so alarming that it caught the attention of G-20 Summit in both China (2016) and Germany (2017), let alone the U.N. Assembly in 2016 had called for a special meeting of "superbugs" which focused on the escalating drug resistance with respect to the sexually transmitted disease gonorrhea and carbapenem resistant *Enterobacteriaceae*. While the causes of antibiotic resistance are complex, certainly human behavior play a significant role in the spread of antibiotic resistant genes. In addition to the human behavior, the drivers of resistance include agriculture sector, animal husbandry, household and industry – these factors contribute significantly to the spread of the resistant genes within the ecosystem. Such resistant mechanisms are continuously emerging globally, which threatens our ability to treat common infections, resulting in increased death, disability and costs. Since the development and clinical use of penicillins, nearly 1000 resistant-related beta-lactamases that inactivate various types of antibiotics have been identified. The emergence of resistance to last-resort treatments known as extended-spectrum cephalosporins (ESCs) is now eminent. The five riskiest superbugs are recognized as (1) the original one: *Staphylococcus Aureus* (MRSA), (2) the hospital lurkers: *Clostridium Difficile* and *Acinetobacter*, (3) the food borne pathogens: *Escherichia Coli* and *Salmonella*, (4) The sexually-transmitted infections: Gonorrhea and Chlamydia, and (5) TB. India is a typical example of encountering the deadly bacterial resistance. The high prevalence of the *mrc-1* gene in *E. Coli* samples both in animals and raw meat, with the number of positive-testing samples are increasing each year in China. On average, more than 20 percent of bacteria in the animal samples and 15 percent of the raw meat samples carried the *mrc-1* gene. Numerous European countries have reported the existence of *mrc-1* gene in the isolates from human, isolates from animals used for food, isolates from food, and isolated from the environment. In conclusion, pathogens rapidly develop mutations that render current treatments ineffective – resistance to carbapenems, one of the 'last lines' of antibiotics, is widespread and has been observed in numerous countries. Therefore, there is an urgent need between research universities and industry aimed at developing novel antimicrobial agents to save the practice of modern medicine.

BIOGRAPHY

Reza Nassiri is a former Associate Dean of Global Health at the Michigan State University (MSU). He also served as MSU director of Institute of International Health. He is currently Professor of Pharmacology and Toxicology, Professor of Family and Community Medicine, and, lecturer in Global Health, Infectious Diseases and Tropical Medicine. He currently works on international public health issues relating to infectious diseases and has expertise in global health. He has made contributions in various fields of medical sciences including clinical investigation and health education. On the basis of his extensive experience and expertise in chronic infectious diseases including HIV/AIDS, TB, antimicrobial resistance and human gut microbiome, he has developed clinical research programs in Brazil, Haiti, Dominican Republic and Mexico. He had served as editorial board member for the journal of HIV and AIDS Review.

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