

## What is Antimicrobial Resistance (AMR) and how does it develop?

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The use of antibiotics for the treatment of bacterial infections has long played a vital role in promoting and securing human and animal health. However, over time with the indiscriminate use of antibiotics, some bacterial agents are able to change genetically and as such, antimicrobial agents that were previously effective may no longer work to reduce the numbers of these pathogenic bacteria. This phenomenon is called antimicrobial resistance (AMR).



Antibiotics are given to both humans and animals for therapeutic use. All have bacteria in their digestive tract (intestines) which may contain a low number of resistant organisms. Antibiotics will kill the disease-causing bacteria as well as eliminate good bacteria which promote health. This result in a favourable environment for the proliferation and multiplication of resistant bacteria and so antibiotic resistance (drug-resistant bacteria) arise.

The problem with this is, the resistant bacteria will transfer its resistant genes to their offspring and/or share the resistance gene with other types of bacteria. In some instances, a single bacteria gene can be to resistant to many antibiotics. With this new-found capability, the dissemination of resistant bacteria becomes widespread, with cross-contamination among human, animals and the environment.

This cycle is perpetuated when animal meat and by-products contain the resistant bacteria that can be passed on to humans if the meat is not properly prepared (cooked at ideal temperature) or if proper sanitation procedures are not observed by the food handler. The excrement from these animals can also contain the

resistant bacteria which are spread when it is utilized as fertilizer. Vegetables can become contaminated along with the environment (water and soil).

The process is also true for humans infected with resistant bacteria, where individuals presenting resistant organisms will infect susceptible persons. This phenomenon is mostly characterized by hospital infections; primarily wounds that take a long time to heal (i.e. MRSA). Furthermore, these bacteria also find their way to our wastewater treatment system and are also disseminated in the soil and water.

The environment, primarily the soil presents are great diversity of bacteria. As mentioned before, bacteria are able to exchange their genetic material (resistance gene) amongst themselves and by virtue of this; the soil presents the greatest source and diversity of resistant bacteria. But what does this mean? This signifies that both humans and animals will be perpetually exposed to resistant organisms in the environment and as a consequence both species will be subjected at some point or the other to contamination of the same.

It is therefore important that the impetus to engage in preventive actions against resistance be of great importance. These actions can include: taking medication as prescribed, prudent use and prescribing as required, reducing infections and its spread and developing new drugs.

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