



THE SILENT PANDEMIC: ANTIMICROBIAL RESISTANCE (AMR)



What is AMR?

Antimicrobial resistance (AMR) is the ability of microorganisms (bacteria, fungi, viruses and parasites) to persist or grow or cause infections in the presence of drugs manufactured to stop their growth or kill them. It is a current global pandemic and a threat to global public health and development. In 2019, AMR directly led to about 1.27 million human deaths and contributed to 4.95 million deaths globally.

How does AMR come about?

Antimicrobial Resistance (AMR) occurs when bacteria, viruses, fungi and parasites no longer respond to antimicrobial medicines.

It is a natural process that happens over time through genetic changes in pathogens, but is accelerated by human activity. The misuse and overuse of antimicrobials in humans, animals and plants are the main drivers in the development of drug-resistant pathogens. As a result of drug resistance, antibiotics and other medicines become ineffective and infections become difficult or impossible to treat, leading to risk of disease spread, severe illness, disability and death.



Source: <https://jpabs.org/misc/food-poisoning-treatment-antibiotic.html>

What causes antimicrobial resistance?

- Overuse and misuse of drugs
- Poor sanitation and hygiene

- Failure to use drugs as recommended
- Poor disease control and prevention
- Use of counterfeit drugs
- Lack of and/or poor enforcement of drug laws and regulations
- Presence of drug residues in food of animal origin
- Under dosage of antimicrobials.



How does AMR spread?

The group of pathogens most affected by AMR is Bacteria.

Resistant bacteria can spread in several ways. They can spread between people, through contaminated surfaces and food, and from animals.

Between people - Bacteria can spread between people through:

- Direct contact (touching)
- Coughing and sneezing
- Exposure to bodily fluids (such as close personal contact).

Contaminated surfaces - Bacteria can live on surfaces for long periods of time. You can pick up bacteria when you touch everyday objects.

Contaminated food - One can be exposed to bacteria when you handle, prepare or eat food that is contaminated with harmful bacteria.

Animals - Bacteria can pass between animals and humans through direct contact, animal products or through wastes from animals.



Source: <https://jpabs.org/misc/food-poisoning-treatment-antibiotic.html>



Strategies to prevent antimicrobial resistance.

- Proper use of antimicrobials in animals and humans
- Treatment of sick animals should only be done by qualified veterinary personnel.
- Only treat sick animals and when justified.
- Antibiotics meant for humans should not be given to livestock.
- Embracing proper animal husbandry through proper feeding, hygiene, vaccination and use of probiotics and prebiotics
- Antibiotics should be prescribed before purchase avoiding over the counter drug purchase
- Use of antimicrobials by health professionals
- Avoid eating produce from recently treated plants and animals
- Avoid using manure contaminated with AMR bacteria or drug residues in farms.
- Proper wastewater management from farms, slaughter houses among other facilities

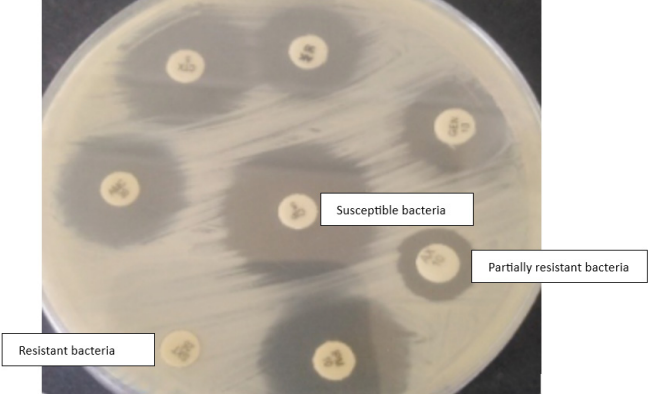
Antibiotic classes that have been affected by AMR

Bacteria have developed resistance to many antibiotic classes including:

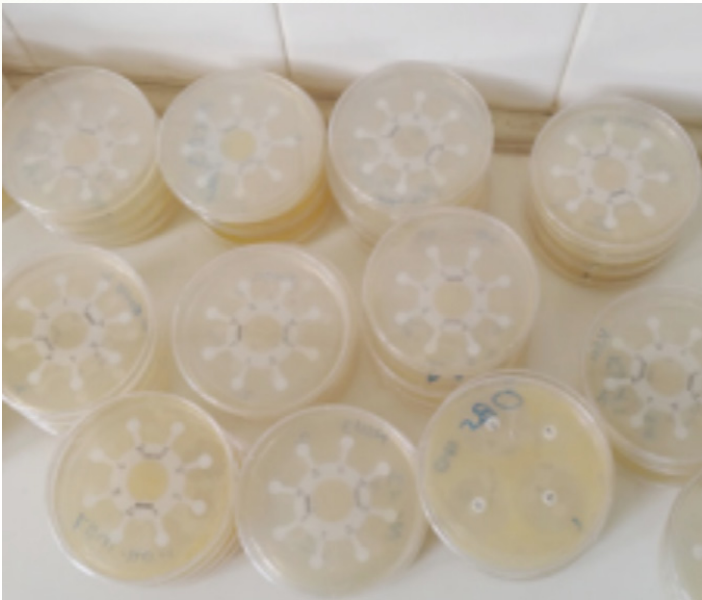
- Beta lactams such as Penicillin and Methicillin
- Tetracycline
- Aminoglycosides such as Gentamycin and Amikacin
- Macrolides such as Erythromycin,
- Fluoroquinolones such as Ciprofloxacin
- Sulfonamides such as Cotrimoxazole
- Chloramphenicol among others

Detection/Diagnosis of AMR

- 1. Culture of the micro-organisms in the laboratory and testing them against a range of antibiotics to determine the best antimicrobial to treat an infection.



Source: KALRO VSRI



Conducting antimicrobial susceptibility testing (Source: KALRO VSRI)

2. Molecular techniques are then used to detect the presence and type of genes responsible for the resistance such as PCR or whole genome sequencing.

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