



ANTIMICROBIAL RESISTANCE

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ANTIMICROBIAL

**AN AGENT THAT KILLS MICROORGANISM
OR INHIBITS THEIR GROWTH.**

**MAIN CLASSES OF ANTIMICROBIAL
AGENTS ARE:**

**DISINFECTANTS- MICROBES ON NON-LIVING
SURFACES TO PREVENT THE SPREAD OF
DISEASES**

ANTIMICROBIAL

**ANTISEPTICS-APPLIED TO LIVING TISSUE AND
HELP REDUCE INFECTION DURING SURGERY**

**ANTIBIOTICS – DESTROY MICROORGANISMS
WITHIN THE BODY.**

- TREAT BACTERIAL INFECTIONS.

**'PROLONGED USE, CAN DECREASE THE
NUMBER OF GUT FLORA.**

WHAT IS ANTIMICROBIAL RESISTANCE

- **HAPPENS WHEN MICROORGANISMS (BACTERIA, FUNGI, VIRUSES AND PARASITES) CHANGE WHEN THEY ARE EXPOSED TO ANTIMICROBIAL DRUGS LIKE ANTIBIOTICS, ANTIFUNGALS, ANTIVIRALS, ANTIMALARIALS AND ANTHELMINTICS.**



**MICROORGANISMS THAT DEVELOP
ANTIMICROBIAL RESISTANCE ARE
SOMETIMES REFERRED TO AS “SUPERBUGS”**

**AS A RESULT, MEDICINES BECOME
INEFFECTIVE AND INFECTIONS PERSIST IN
THE BODY, INCREASING THE RISK OF
SPREAD TO OTHERS.**

What is Antimicrobial Resistance (AMR)?

- **Resistance of a microorganism to an antimicrobial medicine to which it was previously sensitive;**



- AMR is a consequence of the **misuse and overuse** of antimicrobial medicines in man and animals.
- It develops when a microorganism mutates or acquires a resistant gene.

FACTORS THAT ACCELERATE THE EMERGENCE AND SPREAD OF AMR

- NO AMR SURVEILLANCE AND MONITORING SYSTEMS**

INAPPROPRIATE MISUSE OF ANTIMICROBIAL MEDICINES.

INSUFFICIENT PREVENTION, DIAGNOSTIC AND THERAPEUTIC TOOLS.

LACK OF A COMPREHENSIVE AND COORDINATED RESPONSE.

- **GIVEN AS GROWTH PROMOTERS IN ANIMALS AND FISH.**
- **ANTIMICROBIAL RESISTANT MICROBES ARE FOUND IN MAN, ANIMALS, FOOD AND ENVIRONMENT (WATER, SOIL AND AIR)**
- **POOR INFECTION CONTROL, INADEQUATE SANITARY CONDITIONS, AND FOOD HANDLING.**

Understanding Antimicrobial Resistance

- **Requires a good understanding of the bacterial world**

- **Bacteria are EVERYWHERE!!!**
- **Bacteria can survive and develop in extreme conditions.**
- **They can adapt and resist to low or high temperatures, to acidic conditions, to high pressure, to radiations.**

- **Bacteria can exchange genetic material.**
- **They can multiply very quickly**
 - **When appropriate conditions are met, bacteria can divide every 20 minutes.**
 - **It will only take 10 hrs for one bacterium to multiply to over one billion bacteria.**



Why is antimicrobial resistance a global concern?

Antimicrobial agents are essential to ensure human health, animal health and welfare, and food security.

Why is antimicrobial resistance (AMR) a global concern?

1. **AMR kills** – Infections caused by resistant microorganisms often fail to respond to the standard treatment, resulting in prolonged illness and greater risk of death.

Why is antimicrobial resistance (AMR) a global concern?

2. **AMR challenges control of infectious diseases –**

AMR reduces the effectiveness of treatment because patients remain infectious for longer, thus, potentially spreading resistant microorganisms to others

Why is antimicrobial resistance (AMR) a global concern?

3. **AMR increases the cost of health care** – when infections become resistant to first-line medicines, more expensive therapies must be used. The longer duration of illness and treatment, often in hospitals, increases health care costs and the financial burden to families and societies.



Why is antimicrobial resistance (AMR) a global concern?

4. AMR jeopardizes health-care gains to society

The achievements of modern medicine are put at risk by AMR. Without effective antimicrobials for care and prevention of infections, the success of treatments such as organ transplantation, cancer chemotherapy and major surgery would be compromised.



Why is antimicrobial resistance (AMR) a global concern?

5. **AMR compromises health security and damages trade and economies – the growth of global trade and travel allows resistant microorganisms to be spread rapidly to distant countries and continents.**

What Drives AMR



- Inappropriate and irrational use of medicines provides favourable conditions for resistant microorganism to emerge and spread.
- Ex. When patients do not take the full course of a prescribed antimicrobial
- When poor quality antimicrobials are used resistant microorganism can emerge and spread.

What drives AMR?

- Underlying factors:

1. Inadequate national commitment to a comprehensive and coordinated response, ill-defined accountability and insufficient engagement of communities.
2. Weak or absent surveillance and monitoring systems.

What drives AMR?

3. Inappropriate and irrational use of medicines, including animal husbandry
4. Poor infection prevention and control.

COMBAT DRUG RESISTANCE

**No action today,
no cure
tomorrow**

-WHO

The Problem

- Inappropriate use of antimicrobial agents in human and veterinary medicine has led to AMR, resulting in prolonged illness and increased costs.

The Solution

- **A holistic and coordinated management across the animal, food and human sectors in different ecosystems and geographic locations**
- **Improved inter-sectoral collaboration where regulations of medicines are managed by different entities**

Needs

- **Good governance of all sectors related to authorization and use of antimicrobials (lab expertise, international standards and legislation development and implementation, surveillance and monitoring)**

Steps for action at country level

- Formal **mechanisms of collaboration** between departments/authorities involved (health, agriculture, livestock, food, environment)
- **Concordance** between veterinary and human medicines regulation, approval, prescription control and monitoring of use

Steps for action at country level

- Adoption and implementation of **international standards and protocols** to facilitate information sharing and harmonization in surveillance of AMR and antimicrobial use in humans and animals
- **Surveillance programs** to monitor current and emerging AMR patterns involving animal and human health sectors

World Organization for Animal Health (OIE)



Protection of Animal Health and Food Safety

- Developed standards and recommendations for controlling AMR**
- Responsible and prudent use of Antimicrobial Agents in Veterinary Medicine (Terrestrial Animal Health Code)**

Key Guidelines in the responsible and prudent use of antimicrobials :

- 3. Adherence to the label instructions (no underdosing or prolongation of dosing interval and observance of withdrawal period)**

Responsible and prudent use

Responsibilities of the Competent Authorities

- Ensuring regulation of production, import and distribution
- Granting marketing authorization (criteria for safety, quality, efficacy, etc)

Responsible and prudent use

Responsibilities of the Competent Authorities

- Combat manufacture, advertisement, trade distribution and use of unlicensed/ counterfeit products.
- Quality control of products

Responsible and prudent use

Responsibilities of the Competent Authorities

- Control over prescription, supply, administration
- Ensure that the environmental impact of antimicrobial use is restricted to a minimum

Responsible and prudent use

Responsibilities of Distributors, Wholesalers and Retailers

- For antimicrobial agents only by prescription and delivery from a veterinarian
- Detailed records

Responsible and prudent use

Responsibilities of Veterinarians

- Promotion of good farming practices to minimize the need of antimicrobial agents
- Prescription and delivery only to animals under their care; when necessary; precise indications (including withdrawal period)

Responsible and prudent use

Responsibilities of Veterinarians

- Appropriate choice (target pathogens) of antimicrobial agents for efficacy of treatment
- Detailed records

Responsible and prudent use

Responsibilities of food animal producers

- Implement health & welfare programs with involvement of a vet
- Use of antimicrobial agents only by prescription and delivery by a well qualified vet
- Comply with withdrawal periods

Conclusion

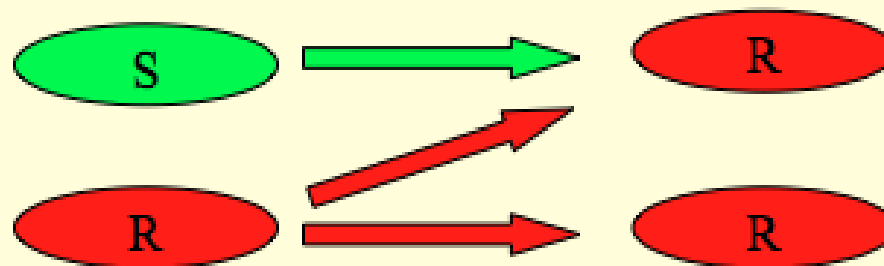
- **Antimicrobial Resistance is not a recent phenomenon, but it is crucial to take action now to keep antimicrobial agents effective and useful to combat disease.**

How do susceptible bacteria become resistant?

- Mutation



- Acquisition of resistance genes

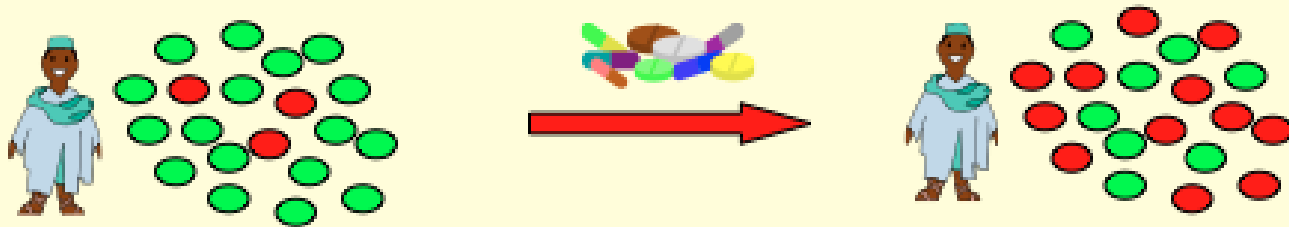


In most bacteria, these events are rare* – but critical!

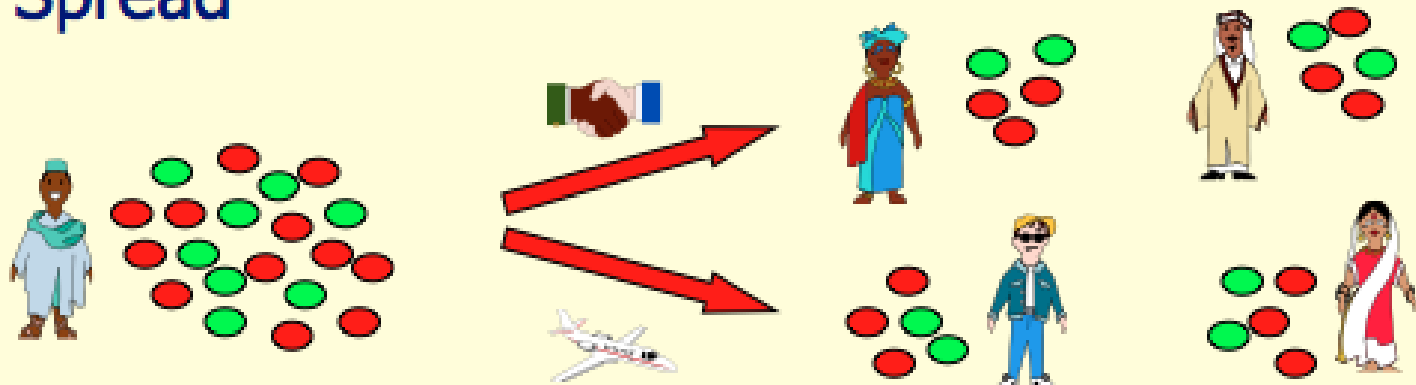
* But there are important exceptions – *M. tuberculosis*, *Pseudomonas*, *Enterobacter*

Why are resistant bacteria so common?

- Selection



- Spread





**THANK YOU
VERY MUCH**