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ANTIMICROBIAL RESISTANCE (AMR) - A Global threat

Antimicrobial Resistance (AMR) is the ability of the bacteria, viruses, fungi and parasites to resist the effects of antimicrobial medicines that kill susceptible organisms or keep them from growing.

The resistance level is increasing 5-10% every year for broad spectrum antimicrobials which are highly misused.

Extensive use of antibiotics in COVID-19 pandemic push a quick spread of antibiotic resistant across healthcare facilities of different countries all over the world.¹

Antibiotic



Resistance

Silent, invisible
Pandemic of
21st century

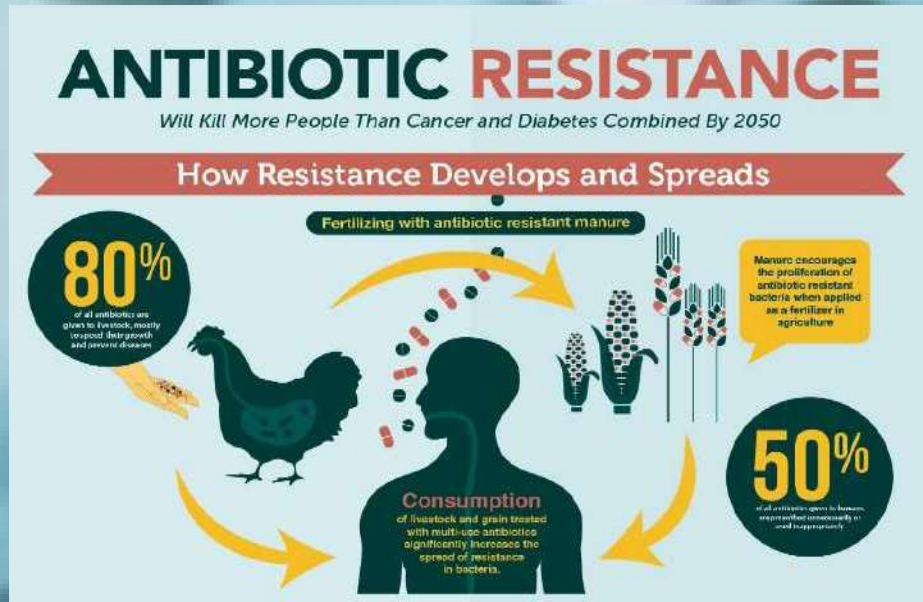
Superbug- Bad bugs

Superbugs are the strain of bacteria, virus, parasites and fungi that are resistant to the most of the antibiotics. They can cause severe bacterial infections that are extremely difficult to treat.²

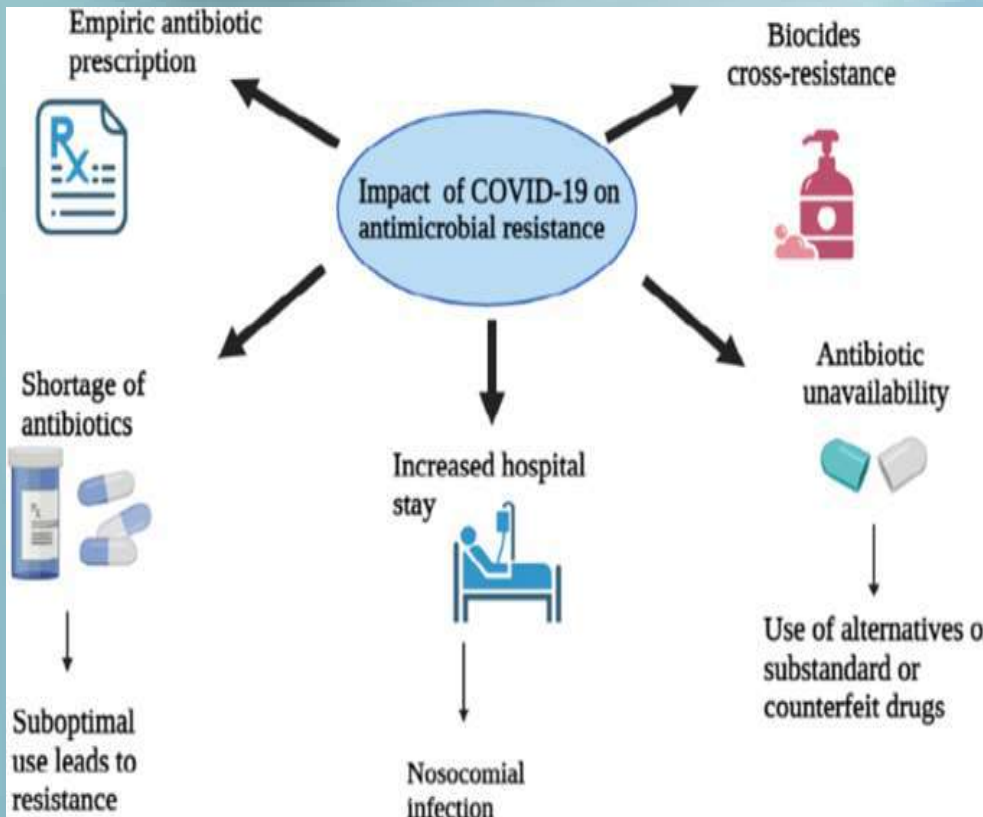
Most common superbugs:

- MRSA
- Clostridium difficile
- Carbapenem-Resistant Enterobacteriaceae (CRE)
- Multidrug-Resistant Acinetobacter
- E.coli H30 Rx
- Neisseria gonorrhoeae
- Vancomycin resistant Enterococcus

SPREAD OF ANTIMICROBIAL RESISTANT



Impact of COVID 19 pandemic in spread of antimicrobial resistant ³



In 2020: The outbreaks of antimicrobial resistant **Acinobacter** and **Candida** including *C. Auris* occurs in Covid units. ³

ANTIMICROBIAL STEWARDSHIP PROGRAMME

“Antimicrobial Stewardship” (AMS): A tool applied in the health-care setting for **“The careful and responsible management of antimicrobial use”**.

- **Coordinated intervention** designed to improve and measure the appropriate use of antibiotics by
 - Promoting selection of optimum antibiotics, correct dose, duration and route of administration
 - Leading to improved patient outcomes and decreases adverse events - **AMR**
- AMS principles also emphasis on the responsible and prudent use of antimicrobial agent not only in humans but also in the animal and agriculture sectors ⁴.



Principles of antimicrobial stewardship

Step 1: Make a diagnosis using multiple data points through confirmatory tests

Step 2: Limit the empirical antibiotic therapy to life threatening situations only

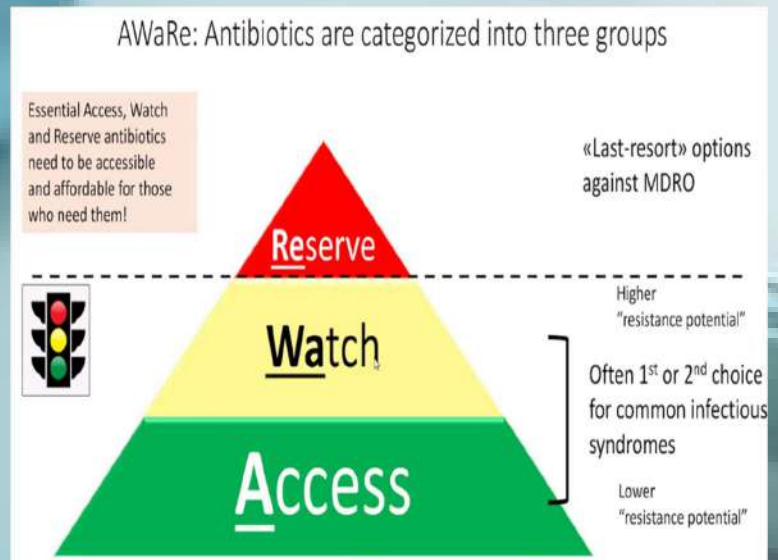
Step 3: Know the local antibiotic resistance patterns and prescribe accordingly

Step 4: Use the correct choice, dose, route, frequency of administration and duration of antibiotic treatment (based on PK/PD parameters)

Step 5: De-escalate once diagnosis and antibiotic susceptibility is known

ACCESS WATCH RESERVE (AWaRe) CLASSIFICATION BY WHO (2021) ⁵

- The WHO Expert Committee has declared “The AWaRe Classification” 2017 (Updated in 2021) to emphasize the importance of appropriate use of antibiotics.
- Antibiotics are classified into three groups: **Access**, **Watch** and **Reserve**.
- It is a useful tool for:
 - Monitoring antibiotic consumption
 - Defining targets and monitoring the effects of stewardship policies that aim to optimize antibiotic use and curb antimicrobial resistance.
 - Support antibiotic stewardship efforts at local, national and global levels.



Category	Count	Description	Examples
Access	48	First-line antibiotics Low resistance potential e.g. Amoxicillin, Nitrofurantoin etc.	<ul style="list-style-type: none"> • Amikacin • Amoxicillin • Ampicillin • Amoxicillin-clavulanic acid • Benzathine benzylpenicillin • Benzylpenicillin • Cefazolin • Chloramphenicol • Clindamycin • Cloxacillin • Doxycycline • Gentamicin • Metronidazole • Nitrofurantoin • Phenoxymethyl penicillin • Procaine penicillin • Spectinomycin • Sulfamethoxazole-trimethoprim
Watch	110	Critically important antibiotics High resistance potential e.g. Quinolones, Macrolides etc.	<ul style="list-style-type: none"> • Azithromycin • Cefixime • Ceftriaxone • Cefotaxime • Ceftazidime* • Cefuroxime • Vancomycin (intravenous* and oral) • Ciprofloxacin • Clarithromycin • Meropenem* • Piperacillin-tazobactam
Reserve	22	Antibiotics for MDR organisms 'Last-resort antibiotics' e.g. Polymyxin, Tigecycline etc.	<ul style="list-style-type: none"> • Fosfomycin (intravenous) • Linezolid • Colistin • Polymyxin B • Ceftazidime-avibactam • Meropenem-vaborbactam • Plazomicin

Global Antimicrobial Resistance and Use Surveillance System (GLASS)

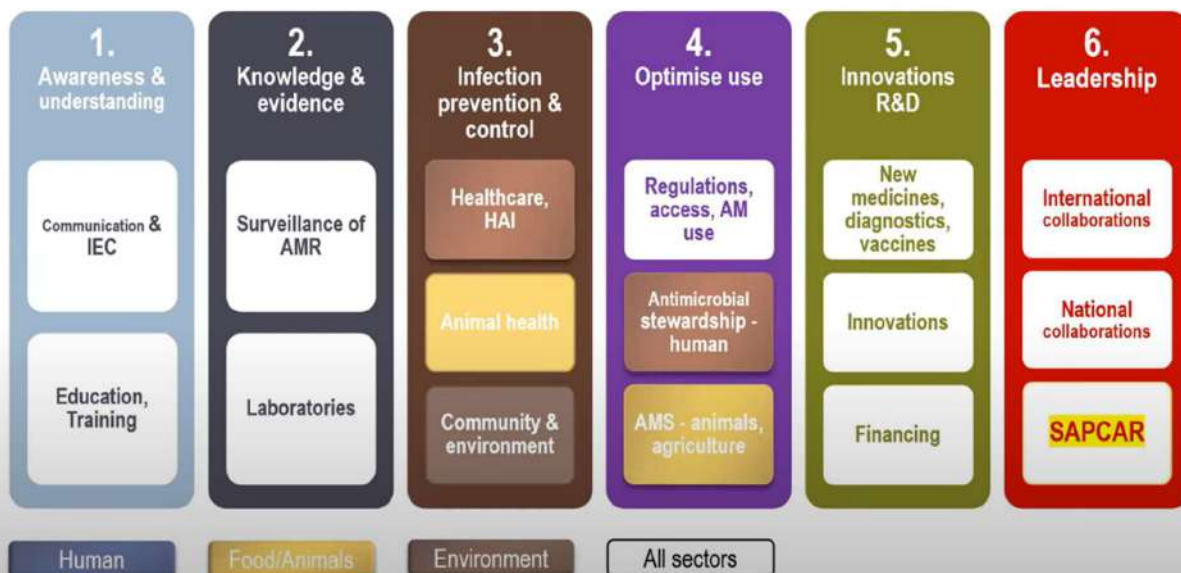


On 22 October 2015, The World Health Organization (WHO) launched the Global Antimicrobial Resistance and Use Surveillance System (GLASS) - The first global system to incorporate official national data form surveillance of AMR in human, in the food chain and the environment.

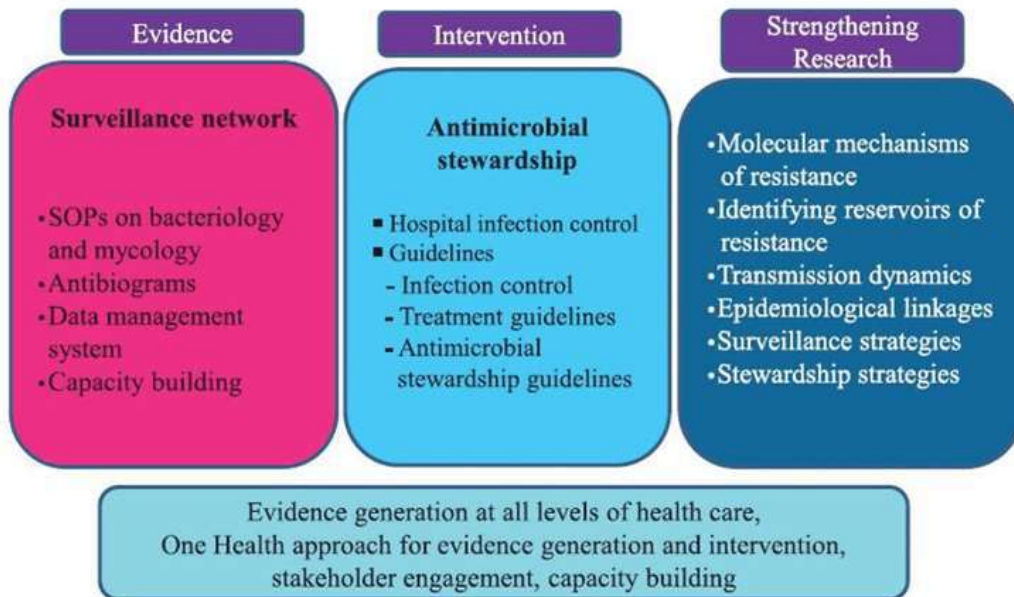
Global action plan (GAP) mandates Member States to produce national strategic plans for AMR through surveillance and reporting, antibiotic stewardship and preventing infection.⁶

National Action Plan (NAP) - Antimicrobial Resistant (AMR) plan of India⁷

NAP-AMR strategic priorities - India



ICMR-AMRSN



. The activities of Indian Council of Medical Research Antimicrobial Resistance Surveillance & Research Network.

QUIZE corner!!!!



A new schedule aimed at monitoring and regulating the sale of antibiotics in the country is _____

- a. Schedule Y b. Schedule H c. Schedule H1 d. Schedule X

Which of the following antimicrobials are enlisted as "Reserve" antimicrobials (as per WHO AWaRE classification) in current "Essential Medicine List"?

- a. Amikacin b. Amoxicillin c. Cefixime d. Linezolid

Pre XDR Tuberculosis is resistant to _____ antitubercular drugs

- a. INH / R + Ciprofloxacin c. INH/ R + Levofloxacin
b. INH + R + Levofloxacin d. R + Levofloxacin + Amikacin



World Antimicrobial Awareness Week (WAAW)⁸



World Antimicrobial Awareness Week (WAAW) is a global campaign started in 2015 and is celebrated annually from 18-24 November every year.

The 2021 theme was **Spread Awareness, Stop Resistance**. It generated concept of “**One Health**” - including all stakeholders, policymakers, health care providers, and the general public to involve in Antimicrobial Resistance (AMR) Awareness programs and activities.⁸

STRATEGY TO CONTROL ANTIMICROBIAL USE

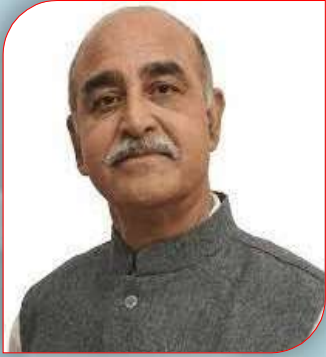
- **Antimicrobial cycling** - Scheduled rotation of antimicrobials used in hospital or unit (e.g., OPD, ICU) to reduce resistance by changing selection pressure
- **Computer assistance**- patient-specific recommendations at every point of care (order entry).
- **Antibiotic “Time outs”**- reassessment of continuing need & choice of antibiotics after 48 hours of initiation of empirical antibiotics use to answer this key question and decide duration of treatment.⁷



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Answers to QUIZ: 1) C, 2) D, 3) B



Message from Executive Director.....

"I heartily congratulate the department of pharmacology for bringing this informative newsletter on clinical pharmacology and therapeutics focusing on antimicrobial resistance. My best wishes to the entire team.

Dr. (Col) CDS Katoch, Executive Director, AIIMS, Rajkot.

Team Pharmacology



This issue highlights the key points for awareness of antimicrobial resistance and measures to prevent it. This initiative will definitely be useful for medical practitioners and all readers for effective, safe and rational use of antimicrobials. We hope you enjoy reading this e-bulletin!

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