ANTIMICROBIAL RESISTANCE : SCIENCE & TECHNOLOGY

NEWS : *What is anti-microbial resistance (AMR) and why is it a grave threat?*

WHAT'S IN THE NEWS ?

Antimicrobial resistance, which is caused when microbes evolve into drug-resistant 'superbugs' in response to the misuse or overuse of antibiotics, is a growing problem in India. Who is responsible; what can be done?

Antimicrobial Resistance (AMR) Overview:

Antimicrobial Resistance (AMR) occurs when microorganisms (bacteria, viruses, fungi, and parasites) evolve to resist the effects of antimicrobial drugs like antibiotics. This resistance leads to the emergence of "superbugs," which are resistant to multiple antibiotics, making infections difficult or impossible to treat. AMR is a global health threat as it can render common medical procedures unsafe, increases the cost and duration of healthcare, and leads to higher mortality rates.

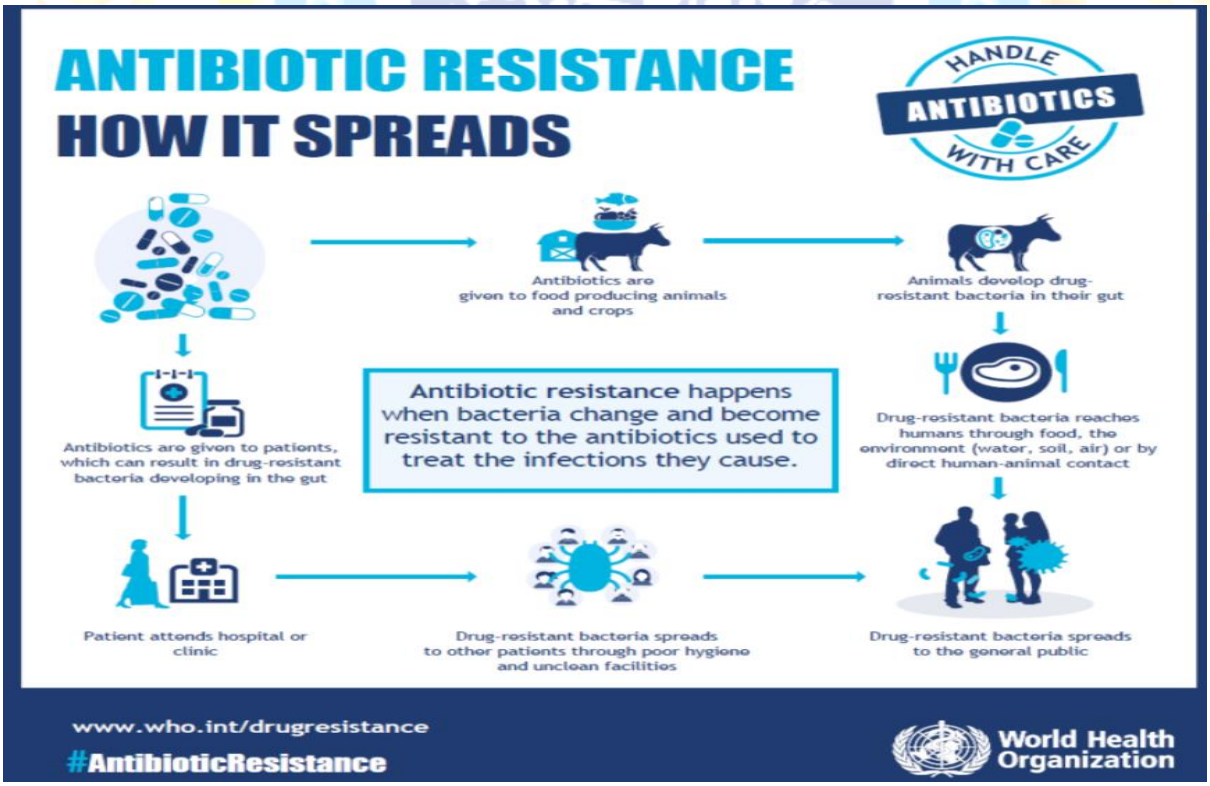
Why AMR is a Concern:

1. **Superbugs**: Resistant pathogens make infections harder to treat, leading to prolonged illnesses, disability, and death.
2. **Healthcare Impact**: AMR increases the duration of hospital stays, requires more expensive treatments, and causes complications that could have been avoided.
3. **Global Health Crisis**: AMR undermines the effectiveness of antibiotics, which are crucial for surgeries, cancer treatment, and infectious diseases, posing a threat to global health security.

Causes of AMR:

1. **Misuse of Antibiotics**:
   - In many countries, including India, antibiotics are commonly used without prescriptions, often for viral infections (like colds and flu) where antibiotics are ineffective.
   - Self-medication and over-the-counter access to antibiotics fuel the spread of resistance.
2. **Doctor Practices**:
   - Physicians may prescribe broad-spectrum antibiotics, which target multiple bacteria, instead of narrow-spectrum antibiotics that target specific pathogens.
   - Often, antibiotics are prescribed based on symptoms rather than diagnostic tests, leading to unnecessary or inappropriate use.
3. **Pharmaceutical Pollution**:
   - Pharmaceutical manufacturing processes can release antibiotics into the environment through wastewater, creating reservoirs of resistant bacteria.

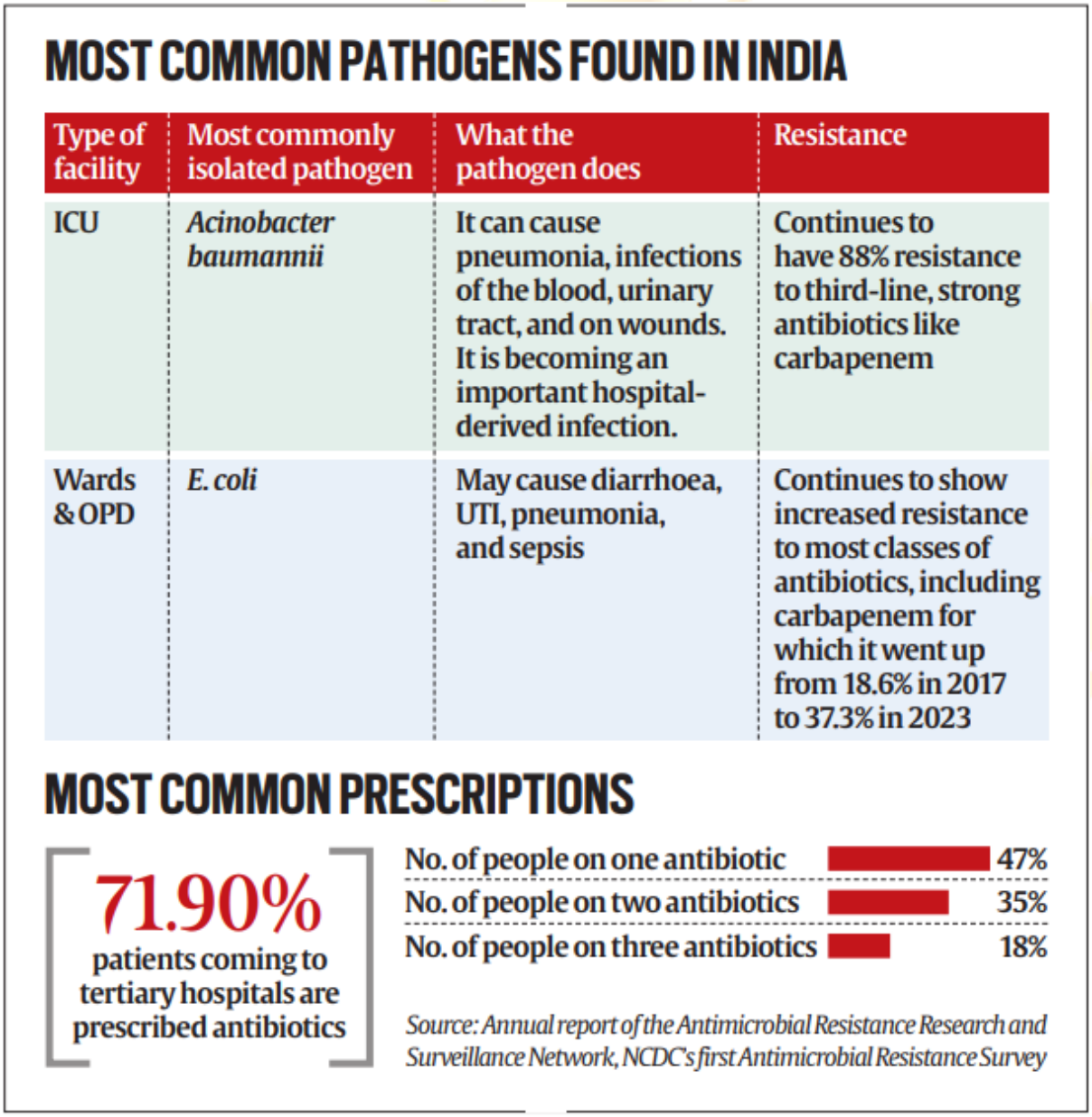
- The **World Health Organization (WHO)** has issued guidelines to reduce waste and improve pollution control in antibiotic production to curb this source of resistance.



Key Resistant Pathogens in India:

The **Indian Council of Medical Research (ICMR)** has identified several critical pathogens that are increasingly resistant to even last-resort antibiotics:

- **Escherichia coli (E. coli)**: Causes infections in the urinary tract and bloodstream.
- **Klebsiella pneumoniae**: A major cause of hospital-acquired infections, including pneumonia and septicemia.
- **Acinetobacter baumannii**: Highly resistant bacteria, especially prevalent in intensive care units (ICUs), causing infections in critically ill patients.



MOST COMMON PATHOGENS FOUND IN INDIA

Type of facility	Most commonly isolated pathogen	What the pathogen does	Resistance
ICU	*Acinobacter baumannii*	It can cause pneumonia, infections of the blood, urinary tract, and on wounds. It is becoming an important hospital-derived infection.	Continues to have 88% resistance to third-line, strong antibiotics like carbapenem
Wards & OPD	*E. coli*	May cause diarrhoea, UTI, pneumonia, and sepsis	Continues to show increased resistance to most classes of antibiotics, including carbapenem for which it went up from 18.6% in 2017 to 37.3% in 2023

MOST COMMON PRESCRIPTIONS

71.90% patients coming to tertiary hospitals are prescribed antibiotics

Source: Annual report of the Antimicrobial Resistance Research and Surveillance Network, NCDC's first Antimicrobial Resistance Survey

Strategies to Combat AMR:

1. **Prevention**:
   - Improving hygiene, sanitation, and access to clean water can reduce the spread of infections and the need for antibiotics.
   - Vaccination programs reduce the incidence of infections and lower the demand for antibiotics.
2. **Education**:
   - Training healthcare providers to prescribe antibiotics judiciously and only when necessary.
   - Encouraging diagnostic testing to ensure that antibiotics are only used for bacterial infections.
3. **Regulation**:
   - Enforcing stricter regulations on antibiotic production to prevent environmental contamination and limit the overuse of antibiotics in agriculture and healthcare.

Measures Taken to Address AMR:

National Initiatives in India:

1. **National Programme on AMR Containment (2012)**:
   - Established the **AMR Surveillance Network**, which strengthened laboratories in state medical colleges to monitor drug resistance patterns.
2. **National Action Plan on AMR (2017)**:
   - Adopts a **One Health** approach, recognizing that AMR affects humans, animals, and the environment.
   - Involves multiple government sectors, including health, agriculture, and the environment, in the fight against AMR.
3. **AMR Surveillance and Research Network (AMRSN, 2013)**:
   - Aims to generate data on drug-resistant infections and track trends across the country.
4. **International Collaboration**:
   - The **ICMR** has collaborated with the **Research Council of Norway** and **Germany's Federal Ministry of Education and Research** to advance research on new drugs and treatments for AMR.
5. **Antibiotic Stewardship Program**:
   - Launched by ICMR as a pilot program to regulate the use of antibiotics in hospitals, focusing on intensive care units (ICUs) where resistance is particularly problematic.
6. **Ban on Fixed Dose Combinations (FDCs)**:
   - The **Drug Controller General of India (DCGI)** has banned 40 FDCs (combinations of two or more drugs in a single dosage) that were found inappropriate and contributing to resistance.

Global Initiatives:

1. **World Antimicrobial Awareness Week (WAAW)**:

- A global campaign initiated by WHO in 2015 to raise awareness about AMR and encourage best practices among the public, healthcare workers, and policymakers.

2. **Global Antimicrobial Resistance and Use Surveillance System (GLASS, 2015)**:
   - WHO established GLASS to collect and share data on AMR from human, animal, and environmental sources to inform policies and interventions.
3. **Global Point Prevalence Survey (PPS) Methodology**:
   - WHO introduced this survey method to gather real-time data on how antibiotics are prescribed and used in hospitals. This allows for better tracking of prescribing patterns and can lead to more effective interventions over time.

Conclusion:

AMR is a multi-sectoral challenge that requires global and national cooperation across healthcare, environment, and agricultural sectors. In India, the efforts to combat AMR are significant but need to be sustained and expanded through education, regulation, and better healthcare practices. Globally, the fight against AMR will depend on continued collaboration, innovation in new drugs, and greater awareness among the public and policymakers.

Source : https://indianexpress.com/article/explained/explained-health/the-grave-threat-from-amr-9561108/