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## The Challenge of Antimicrobial Resistance

### Why in news?

The Global Research on Antimicrobial Resistance (GRAM) report was published in the Lancet recently providing the most comprehensive estimate of the global impact of AMR.

### What is AMR?

- Antimicrobial resistance (AMR) is the ability of a microbe to resist the effects of medication previously used to treat them.
- Resistant microbes are more difficult to treat, requiring alternative medications or higher doses, both of which may be more expensive or more toxic.
- Microbes resistant to multiple antimicrobials are called **Multi Drug Resistant (MDR)** or sometimes **Superbugs**.

### What are the causes?

- **Usage**- There is an increasing use of antibiotics for human and veterinary purposes in the recent period.
- There is irrational consumption(over usage) of broad spectrum antibiotics.
- **Regulation**- India and China are the largest producers of antibiotics.
- In India, effluents generated from these industries are treated as per the pharmaceutical wastewater discharge guidelines as prescribed by the Central Pollution Control Board.
- But the current standards do not include antibiotic residues, and they are not monitored in the pharmaceutical industry effluents.
- The existing good manufacturing practices (GMP) under the WHO (2016) framework is restricted to drug safety alone and does not recognise the environmental risk with pharmaceuticals products.
- **Waste Discharge**- The uncontrolled discharge of untreated urban waste is another major source for AMR in many low and middle income countries.

### What did the GRAM report find?

- GRAM is led out of the University of Oxford Big Data Institute - IHME Strategic Partnership.
- As per the report, as many as 4.95 million deaths may be associated with bacterial AMR in 2019.
- Estimates show that AMR is a leading cause of death globally, higher than HIV/AIDS or malaria.
- The death rate was the highest in Western sub-Saharan Africa, at 27.3 deaths per 100,000 and

lowest in Australasia, at 6.5 deaths per 100,000.

- Lower respiratory-tract infections accounted for more than 1.5 million deaths associated with resistance in 2019.
- The six leading pathogens for deaths associated with resistance were
  1. *Escherichia coli*
  2. *Staphylococcus aureus*
  3. *Klebsiella pneumoniae*
  4. *Streptococcus pneumoniae*
  5. *Acinetobacter baumannii*
  6. *Pseudomonas aeruginosa*
- The pathogen-drug combination, **meticillin-resistant S aureus**, caused more than 1 lakh deaths attributable to AMR in 2019.

## What are the implications of this study?

- **Common infections-** Common infections are now killing thousands of people every year. This includes
  - lower respiratory tract infections
  - bloodstream infections
  - intra-abdominal infections
  - pneumonia
  - foodborne ailments
- **Effect on children-** In 2019, one in five global deaths attributable to AMR occurred in children under the age of five.
- **Effect on treatment-** AMR is threatening the ability of hospitals to keep patients safe from infections.
- It is undermining the ability of doctors to carry out essential medical practice safely, including surgery, childbirth and cancer treatment since infection is a risk following these procedures.
- **Effect on research-** Between 2000 and 2018, just 15 antibiotics were approved.
- Out of the seven deadliest drug-resistant bacteria, vaccines are only available for two (*Streptococcus pneumoniae* and *Mycobacterium tuberculosis*).
- Only these two have been a focus of major global health intervention programmes through pneumococcal vaccination and other programmes.

## What steps have been taken so far to address the issue of AMR?

- **Tackling the overuse of antibiotics by human beings-** India classified important antibiotics under **Schedule H1** of the **Drugs and Cosmetics Rules 1945**.
- The drugs specified under Schedule H and Schedule X are required to be sold by retail on the prescription of a Registered Medical Practitioner only.
- **Tackling the overuse in the veterinary sector-** India's 2017 National Action Plan on Antimicrobial Resistance did talk about restricting antibiotic use as growth promoters.
- In 2015, a **Global Action Plan on AMR** was developed by the WHO, the Food and Agricultural Organization and the World Organization for Animal Health.

## What is the way forward?

- Greater action is needed to monitor and control infections, globally, nationally and within individual hospitals.

- Access to vaccines, clean water and sanitation needs to be expanded.
- The use of antibiotics in food and animal production must be optimised.
- Minimising the use of antibiotics where they are not necessary and acting according to World Health Organisations recommendations is the need of the hour.
- There is a need for increased funding for developing new antimicrobials and targeting priority pathogens and ensuring that they are affordable to accessible to most of the world.

## Reference

1. <https://www.thehindu.com/sci-tech/health/explained-the-challenge-of-antimicrobial-resistance/article38297630.ece?homepage=true>



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