Antibiotic resistance analysis (RS TV)

GS-PAPER-3 Health (PT-MAINS)

Antibiotics are life saving medicines. But these very same medicines can threaten our lives, if used indiscriminately. Already, seven lakh people around the world die due to drug-resistant diseases each year. And if no radical changes are made, these drug-resistant diseases could kill 10 million people a year by 2050.

Antibiotics

- An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infections.
- Antibiotic medications are widely used in the treatment and prevention of such infections.
- They may either kill or inhibit the growth of bacteria.
- A limited number of antibiotics also possess antiprotozoal activity.
- Antibiotics are not effective against viruses such as the common cold or influenza; drugs which inhibit viruses are termed antiviral drugs or antivirals rather than antibiotics.

WHO: AWaRe.

It is an online tool aimed at guiding policy-makers and health workers to use antibiotics safely and more effectively.

The tool, known as ‘AWaRe’, classifies antibiotics into three groups:

1. **Access** — antibiotics used to treat the most common and serious infections.
2. **Watch** — antibiotics available at all times in the healthcare system.
3. **Reserve** — antibiotics to be used sparingly or preserved and used only as a last resort.

Concerns

- Antibiotic resistance is already one of the biggest health risks and is estimated to kill 50 million by 2050 worldwide.
- The threat continues to escalate globally because more than 50 per cent of antibiotics in many countries are used inappropriately such as for treatment of viruses when they only treat bacterial infections or use of the wrong (broad spectrum) antibiotic.
- Besides, reduced access to effective and appropriate antibiotics in many low-
and middle-income countries contributes to childhood deaths and lack of funding and implementation of national plans to tackle antimicrobial resistance.

Superbug

- A superbug is usually defined as a microorganism that’s resistant to commonly used antibiotics – but not all superbugs are created equal.
- The number of different antibiotics to which it can be resistant determines the degree of the superbug. Some are resistant to one or two, but others can be resistant to multiple drugs.
- So, if a bug is resistant to every available antibiotic, it would be the superbug of all superbugs.
- Cases where people die from antibiotic-resistant infections are still comparatively rare, particularly in places like Australia, which doesn’t allow antibiotics to be sold without a doctor’s prescription.
- But around the world, the number of people dying because their infection can’t be treated by any available antibiotic is increasing.
- Currently, antibiotic-resistant bacteria cause 700,000 deaths worldwide each year, and a UK government review on antimicrobial resistance predicted this number could increase to 10 million by 2050.
- If superbugs are allowed to spread, we may reach a point where it is too dangerous to conduct surgeries such as c-sections and transplants because of the risk of superbug infection, which would have huge implications for the health of people around the world.

What is antibiotic resistance?

Antibiotics are medicine used to treat infections caused by bacteria. **Antibiotic Resistance refers to resistance developed by bacteria against antibiotics or the ability of bacteria to mutate or change so as to resist the effects of antibiotics.** The more we use them, and the more we abuse them, the less effective they become.

Antibiotics are unquestionably useful against bacterial infections. However, indiscriminate use has resulted in development of resistance in patients with bacterial infections thereby leading to long lasting illnesses.

**Thanks to that annoying thing called evolution, bacteria are constantly adapting to counter-attack antibiotics.** Antibiotic resistance is one of the most significant threats to patients’ safety. It is driven by overusing antibiotics and prescribing them inappropriately.
Negative effect:

- Antibiotic resistance causes people to be sick for longer and increases the risk of death.
- Resistance also increases the cost of health care with lengthier stays in hospital and more intensive care required.
- Antibiotic-resistant bacteria increase the chance and severity of illness and ultimately death.
- Few new antibiotics are being developed, which is exacerbating the situation as more antibiotic resistant bacteria adapts and arises.

Therefore, rational use of antibiotics is essential in order to minimize antibiotic resistance.

Antimicrobial Resistance in India

AMR is of particular concern in developing nations, including India, where the burden of infectious disease is high and healthcare spending is low. **The country has among the highest bacterial disease burden in the world.** Antibiotics, therefore, have a critical role in limiting morbidity and mortality in the country. The 2015 WHO multi-country survey revealed widespread public misunderstanding about antibiotic usage and resistance.

- AMR has huge implications for India. There is a need to have in place a good comprehensive AMR National Action Plan in line with the Global AMR action plan.
- For resistance, this means cutting the misuse of antibiotics in humans and farm animals, fighting environmental pollution, improving infection control in hospitals, and boosting surveillance.
- While most of these goals need government intervention, individuals have a critical part to play too.
- This is especially true for India, which faces a unique predicament when it comes to restricting the sale of antibiotics — some Indians use too few antibiotics, while others use too many.
- Many of the 410,000 Indian children who die of pneumonia each year do not get the antibiotics they need, while others misuse drugs, buying them without prescription and taking them for viral illnesses like influenza.
- Sometimes this irrational use is driven by quacks. But just as often, qualified doctors add to the problem by yielding to pressure from patients or drug-makers.

This tussle — between increasing antibiotic use among those who really need...
them, and decreasing misuse among the irresponsible — has kept India from imposing blanket bans on the non-prescription sale of these drugs.

When policymakers did propose such a ban in 2011, it was met with strong opposition. Instead, India turned to fine-edged tools such as the Schedule H1, a list of 24 critical antibiotics such as cephalosporins and carbapenems, whose sale is tightly controlled.

How can we prevent antibiotic resistant infections?

It is important to understand that, although they are very useful drugs, antibiotics designed for bacterial infections are not useful for viral infections such as a cold, cough, or the flu.

- Before taking any antibiotic ask the physician if it is required and beneficial.
- Always take antibiotics as prescribed by the physician.
- Take antibiotics to treat only bacterial infections.
- Do not take antibiotics in viral infections such as cold, cough, or flu
- Do not repeat the same antibiotic for the next time you get sick.
- Do not stop antibiotic before complete prescribed course of treatment.
- Do not skip doses.
- Do not copy the antibiotic with the same diseases which is prescribed for someone else.

Why is antibiotic resistance one of the biggest health challenges:

- Antimicrobial resistance will result in difficulty in controlling the diseases in the community and ineffective delivery of the health care services.
- Neonates and the elderly both are more prone to infections and are vulnerable.
- A very significant part of out-of-pocket expenditure on health care is on medicines. The ineffective drugs and/or second line expensive antibiotics is pushing the treatment costs higher.
- WHO has published its first ever list of antibiotic-resistant ‘priority pathogens’ a catalogue of 12 families of bacteria that pose the greatest threat to human health and most of these 12 superbugs have presence in India.
- Antibiotic resistance is emerging as a threat to the successful treatment of infectious diseases, organ transplantation, cancer chemotherapy and major surgeries.
- Even when the process happens naturally, it is accelerated by the wrong use of antibiotics in humans and animals, and the effectiveness of these in the treatment of diseases such as pneumonia, tuberculosis and gonorrhea has diminished.
- Treating fatal diseases like sepsis, pneumonia and tuberculosis (TB) are becoming tough because microbes that cause these diseases
are increasingly becoming resistant to fluoroquinolones.

Excessive use of medicines in poultry:-

Unregulated sale of the drugs for human or animal use accessed without prescription or diagnosis has led to unchecked consumption and misuse. Of tested birds destined for meat consumption, 87% had the super germs based on a study published in the journal Environmental Health Perspectives.

The mutated robust microbe strain can invade the body and cause diseases that are difficult to treat. Even mild infections require stronger dosage. Annual healthcare cost due to antibiotic resistance is estimated to be as high as $20 billion, with an additional productivity loss of up to $35 billion in the US.

Way forward

Poultry: Ban the use of antibiotics for growth promotion and mass disease prevention. It should only be used to cure the sick animals based on prescription of veterinarians. There is a need to introduce a labelling system wherein poultry raised without use of antibiotics should be labelled through reliable certified schemes to facilitate consumer choice.

Rationalizing antibiotic use to limit antibiotic resistance in India. Improving regulation of drug production and sale. Encouraging behavior change among doctors and patients are of immediate priority.

Regulation of the medical sector, particularly in the prescription of medicines. Improved management of the health care delivery systems, both public and private, will minimize conditions favourable for the development of drug resistance.

Improved awareness of antimicrobial resistance through effective communication. WHO’s World Antibiotic Awareness Week is one such event. Reducing the incidence of infection through effective infection prevention and control. As stated by WHO, making infection prevention and hand hygiene a national policy priority.

Discourage non-therapeutic use of antimicrobial agents in veterinary, agriculture and fishery practices as growth-promoting agents. Promoting investments for antimicrobial resistance activities, research and innovations Strengthening India’s commitment and collaborations on antimicrobial resistance at international, national and sub-national levels. Regulate the release of antibiotic waste from pharmaceutical production facilities and monitoring antibiotic residues in wastewater.