

The grave threat from AMR

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?

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Ahead of the September 26 UN General Assembly High-Level Meeting on antimicrobial resistance, the World Health Organization last week published its first-ever guidance on antibiotic pollution from manufacturing.

“The emergence and spread of AMR (antimicrobial resistance) caused by antibiotic pollution could undermine the effectiveness of antibiotics globally, including the medicines produced at the manufacturing sites...,” the WHO said on September 3.

AMR — and consequently, the creation of “superbugs” — affects healthcare everywhere, but has especially poor outcomes in patients suffering from multiple diseases. A survey by the Indian Council of Medical Research (ICMR), the country’s apex body for the formulation, coordination and promotion of biomedical research, shows that AMR continues to rise across the country.

“...Common pathogens are becoming more and more resistant to antibiotics. This increase has been noted despite the fact that the number of samples and the centres at which we carry out surveillance has remained the same over the years,” Dr Kamini Walia, one of the authors of the recently released ICMR annual report on Antimicrobial Resistance Research and Surveillance Network (January-December 2023), said.

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Dr Walia described this situation as a “symptom”. “We have to make changes across the board to ensure the antibiotics that we have remain effective,” she said.

What is antimicrobial resistance (AMR) and why is it a cause for concern?

AMR is a condition in which a pathogen acquires the ability to survive and cause infection even in the presence of an antimicrobial drug. AMR is the result of evolution of microbes in a situation where there is a misuse or overuse of antibiotics.

Excessive use of antimicrobial drugs can lead to the creation of resistant or extremely resistant superbugs, which can circulate in hospitals, through drinking water, or sewers. Infections caused by these pathogens will not respond to commonly prescribed antibiotics.

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Growing antibiotic resistance would mean that simple infections would become difficult to treat — for example, doctors have reported patients requiring admission to hospital for the treatment of even urinary tract infections. Within hospitals, this is likely to lead to more complications and longer stays, making the treatment increasingly more expensive.

Why is AMR increasing?

INDIVIDUALS: Many Indians have a tendency to pop an antibiotic for a fever, without even checking if the fever is caused by a bacterium. An antibiotic is of no use for viral infections such as influenza, but consuming it can drive up resistance in the population.

Many find it difficult or expensive to go to a doctor for a simple sickness, and instead prefer to take a pill that perhaps their local chemist has recommended. Dr Walia said that it is not fair to ask people who are only trying to get better quickly, to not consume antibiotics.

“Instead, we have to prevent infections so that people do not feel the need to take antibiotics,” she said. “This can be achieved through improving hygiene and measures like frequently washing hands.

“It can also be achieved through vaccinations. For example, the pneumococcal vaccine or influenza vaccine for the elderly can reduce incidents of pneumonia,” she said. “However, not many people take this vaccine.” (The updated vaccine for the 2024-25 flu season is now available in hospitals.)

DOCTORS: Doctors must be educated to not use broad-spectrum antibiotics, Dr Walia said. These are antibiotics that work against a wide range of infections, but these are also the ones that are more likely to lead to resistance.

“Our report provides a list of antibiotics that should be used in the community for a particular infection and ones that should be reserved for patients admitted to hospitals,” she said.

A survey on prescribing trends for antibiotics released by the National Centre for Disease Control (NCDC) last year found that 71.9% of patients coming to hospitals were prescribed

antibiotics on average, with only a 10-percentage point difference in antibiotic use between intensive care units that have the sickest patients and the other wards.

Surprisingly, 55% of the antibiotics were prescribed not for the treatment of an infection, but to prevent one.

Overuse of antibiotics has rendered some of them useless or of limited use. Dr Walia cited the example of the common diarrhoea medicine Norfloxacin, which has become ineffective. Also, resistance to carbapenem, a class of strong, third-line antibiotics used to treat severe bacterial infections, is on the rise for the treatment of conditions such as typhoid, which is not required, she said.

DIAGNOSTICS: Another problem is empirical prescription of antibiotics, made by doctors based on what they think has likely caused the infection based on the symptoms. Instead, doctors should, wherever possible, insist on diagnostic tests that can help them prescribe specific antibiotics for the infection rather than broad-spectrum ones, Dr Walia said.

PHARMA COMPANIES: The WHO's guidelines on antibiotic pollution from manufacturing released last week provides guidance on wastewater and solid waste management for antibiotic manufacturing facilities. Despite the high levels of antibiotic pollution that have been widely documented, the issue is largely unregulated, the WHO said.

"Pharmaceutical waste from antibiotic manufacturing can facilitate the emergence of new drug-resistant bacteria, which can spread globally and threaten our health. Controlling pollution from antibiotic production contributes to keeping these life-saving medicines effective for everyone," Dr Yukiko Nakatani, WHO Assistant Director-General for AMR ad interim, said.

What are the most common resistant pathogens in India?

The three most common pathogens isolated in patient samples from tertiary care centres in the ICMR surveillance network are *E. coli*, which can cause gut infections; *Klebsiella pneumoniae*, which can cause pneumonia and urinary tract infections; and *Acinetobacter baumannii*, which is mainly associated with hospital acquired infections, the recent report said.

E. coli isolates demonstrated a decrease in susceptibility to most antibiotics, with susceptibility to carbapenem reducing from 81.4% in 2017 to 62.7% in 2023.

Klebsiella pneumoniae also showed reduced susceptibility, with the susceptibility to two different medicines from the carbapenem class reducing from 58.5% to 35.6% and 48% to 37.6% between 2017 and 2023.

n While no significant change was found in susceptibility for *Acinetobacter baumannii*, its resistance to carbapenems stood at 88% in 2023. Pathogens such as this are highly resistant to even strong antibiotics.

What are some of the most important things that need to be done?

Dr Walia suggested three measures that were likely to have the most impact on antibiotic resistance in the coming years.

PREVENTION of infections by putting in place hygienic practices, improving sanitation, and urging people to get vaccinated.

EDUCATION of doctors to ensure appropriate use of antibiotics, saving the stronger ones for hospital based patients, and getting the patients tested to see which infection they have.



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STUDIES to see the pathways of resistance from manufacturing facilities and bring in regulations wherever possible.