Drug resistance is a multifaceted, complex global issue that not only impacts health systems, it also affects agricultural, ecological, and economic sectors.

Antimicrobials are medications used to treat different types of infections caused by any type of microbe, from viruses to bacteria to fungi to parasites. Drug resistance—when the microbe is unaffected by the medication—undermines the treatment of many diseases. For typhoid, which is caused by a bacteria, there is growing resistance to many available antibiotics. Tackling drug-resistant typhoid will require effective prevention through vaccines and safe water and sanitation systems.

Dr. Robert Redfield, the US Center for Disease Control and Prevention administrator, said that “we are losing much of our ability to treat people who are sick, and I’m scared.”

Tackling drug-resistant typhoid will require effective infection prevention through vaccines and safe water and sanitation systems.
Antibiotics are medicines used to treat bacterial infections. Since their discovery and use, bacteria have naturally evolved and adapted, usually through genetic changes, in response to the constant use of these medicines. When that happens, the bacteria can protect itself from the antibiotic, rendering it ineffective in the treatment of disease and leading to drug resistance.

Drug resistance is occurring everywhere in the world, and the problem is increasing. A growing list of infections—such as pneumonia, tuberculosis, and typhoid—are becoming harder, and sometimes impossible, to treat as available antibiotics become less effective. Each year, at least 700,000 people die from drug-resistant infections, and that number is expected to rise to 10 million deaths per year by 2050 if nothing is done to reverse course. Without urgent, coordinated action, we are heading for a post-antibiotic era in which common infections will once again kill people.

Given the severity and potential consequences of inaction, the World Health Organization has developed the Global Action Plan on Antimicrobial Resistance to prioritize national-level action to improve awareness, strengthen surveillance and research, and provide a framework for action.
Appropriate antibiotics are the only effective way to treat typhoid.

Unfortunately, typhoid has evolved and developed to survive antibiotics. The original first-line antibiotics to treat typhoid were chloramphenicol, ampicillin, and cotrimoxazole; however, beginning in the 1970s, strains resistant to these three drugs—multidrug resistance (MDR)—appeared and since spread globally. MDR typhoid is prevalent in many parts of Asia and sub-Saharan Africa where typhoid has the largest burden.

The maps to the right demonstrate how MDR typhoid strains have spread across countries in multiple regions. The first shows the transfer of H58-type MDR typhoid, which is predominant in southeast Asia and in eastern and southern Africa. The second map shows the three MDR typhoid types prevalent in Africa—H58 is identified in eastern and southern Africa, while a different type is prevalent in Western Africa, highlighting the organic development of strains independent of each other.

In response, a new class of antibiotics, called fluoroquinolones, became the preferred treatment for MDR typhoid in the 1990s. As treatment with fluoroquinolones increased, however, typhoid again adapted, making these drugs less effective. Researchers are now observing typhoid strains that are classified as extensively drug-resistant (XDR), meaning they do not respond to five different classes of antibiotics used to treat typhoid, which leaves only one oral antibiotic left. In Pakistan, an ongoing outbreak of XDR typhoid has sickened more than 15,000 people since 2016. Researchers have also identified XDR strains in Bangladesh that are distinct from the Pakistan strain, which greatly enhances the potential for the rapid, global spread of XDR typhoid.

Drug resistance is a major threat to health across the globe, raising the urgency for prevention through proven interventions including vaccination and access to clean water, safe sanitation, and proper handwashing. Each prevented infection is a case that does not require antibiotic treatment. TCVs, which can be given to children as young as six months, can play a major role in both decreasing the burden of typhoid and reducing the spread of drug-resistant typhoid strains. By protecting those most vulnerable from getting sick, we not only keep children healthy so that they can grow and thrive, we also limit the opportunities for typhoid to spread and develop resistance to our remaining antibiotics, allowing treatment options to remain effective for those who do fall ill. TCVs are safe, effective, and available for countries to introduce into their routine childhood immunization schedules.

Call out typhoid specifically within country national action plans on drug resistance to ensure that it is recognized and included within country policy and plans. Further, health and finance ministries should work together to ensure that these action plans are properly funded.

In the short term, prioritize the introduction of TCV to prevent typhoid infections and slow the spread of drug-resistant typhoid strains, particularly in areas with high prevalence of drug-resistant typhoid. In addition, countries should invest in improvements to water and sanitation infrastructure to use all the prevention tools available to take on typhoid.

Improve access to intravenous antibiotic options to treat typhoid in low- and middle-income countries to ensure equitable treatment opportunities.

Additional Resources

- Take on Typhoid website
- World Health Organization antimicrobial resistance website

Typhoid +

Visit www.takeontyphoid.org for the complete series, which includes information about:

- Climate Change
- Drug Resistance
- Forced Migration
- Universal health coverage (UHC) and the Sustainable Development Goals (SDGs)
- Urbanization
- Water, Sanitation, and Hygiene

TyVAC Typhoid Vaccine Acceleration Consortium

Coalition Against Typhoid a program of the Sabin Vaccine Institute

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