

## Typhoid: A preventable global health threat

Typhoid, a serious and sometimes fatal enteric fever spread through contaminated food and water, is a substantial public health issue that disproportionately impacts children and low-income populations in Asia and sub-Saharan Africa.

### SYMPTOMS

Typhoid causes fever, fatigue, headache, abdominal pain, and diarrhea or constipation. With symptoms common to many infections, typhoid may often be mistaken for other diseases such as malaria, pneumonia, dengue, or influenza. If left untreated, typhoid can cause a variety of short- and long-term complications.

### TRANSMISSION

Caused by a bacteria called *Salmonella enterica* serovar Typhi (*S. Typhi*), typhoid is spread by the fecal-oral route through contaminated food and water and poor sanitation. It can be transmitted in an epidemic (i.e., sudden outbreaks) or endemic (i.e., regularly found within a population) fashion.

### GLOBAL BURDEN

Although typhoid has been largely eliminated in industrialized countries, it continues to be a substantial public health problem in many low- and middle-income countries. The Global Burden of Disease (GBD) study estimates that in 2021, there were more than 7 million cases and more than 93,000 deaths due to typhoid worldwide. However, the burden is likely underestimated due to difficulties with surveillance and diagnostics.

Children and adolescents in Asia and sub-Saharan Africa are disproportionately impacted by typhoid, with those living in poor communities at greatest risk. GBD estimates that 75 percent of typhoid deaths occur in Asia, though recent data from sub-Saharan Africa suggest that the typhoid burden in the region is likely greater than previously known. Additionally, current



Children wait to receive TCV during the introduction campaign in Malawi. Photo: TyVAC/Madalitso Mvula.

trends of drug resistance, urbanization, and climate change may increase the risk for typhoid worldwide.

### TREATMENT

Appropriate antibiotics are the only effective way to treat typhoid. The traditional first-line antibiotics for treatment of typhoid are chloramphenicol, ampicillin, and cotrimoxazole. However, resistance has been seen with these antibiotics since the 1970s, and evidence shows that drug resistance is spreading. Extensively drug-resistant typhoid emerged in 2016 in Pakistan and is resistant to almost all available oral antibiotics against the disease.

Depending on severity of disease and presence of complications, additional treatment measures such as intravenous hydration, blood transfusions, or surgery may be required. The risk of complications underscores the importance of prompt treatment following diagnosis, as well as the need to prioritize prevention.

### PREVENTION

Improved water quality, sanitation, and hygiene are the major ways to break the typhoid transmission cycle in the long term. Until these investments can be

made in all countries, vaccination is an important and effective way to prevent typhoid now.

Three types of typhoid vaccines are globally available: typhoid conjugate vaccines (TCVs); an oral, live attenuated vaccine; and an injectable Vi capsular polysaccharide vaccine.

TCVs prequalified by the World Health Organization (WHO) are safe, provide strong and durable protection for at least 4 years after a single dose, and are suitable for children 6 months of age and older, allowing for delivery through routine childhood immunization programs. Results from Phase 3 studies of Typhar TCV®, one of the prequalified TCVs, in Bangladesh, Malawi, and Nepal found the vaccine to be safe and efficacious, preventing 79-85 percent of typhoid cases in vaccinated children. Additionally, TCVs can be safely given alongside other routine vaccines including measles-rubella, yellow fever, meningococcal A, polio, and human papillomavirus vaccines.

Expanded use of TCVs through routine immunization has the potential to reduce the need for antibiotics, slow further emergence of drug-resistant typhoid strains, and save lives. Modeling analyses project that TCV introduction can drastically reduce the number of drug-resistant typhoid cases and deaths. TCVs are projected to be one of the most impactful vaccines for preventing drug resistance-associated deaths in children younger than 15 years old.<sup>1, 2</sup>

## WHO RECOMMENDATION

In March 2018, WHO recommended TCV as the preferred typhoid vaccine because of its improved performance and suitability for younger children. WHO recommends the introduction of TCV to be prioritized in countries with the highest burden of typhoid disease or a high burden of antimicrobial-resistant *S. Typhi*. The WHO guidance encourages routine administration to be accompanied by catch-up vaccination campaigns for



Siblings after receiving TCV during Nepal's introduction campaign. Photo: TyVAC/Rocky Prajapati.

children up to 15 years of age, where feasible and supported by data.

## GAVI SUPPORT FOR TCVs

Gavi supports the introduction of TCVs into routine immunization programs of eligible countries and is accepting applications for financial support. Five Gavi-eligible countries—Pakistan, Liberia, Zimbabwe, Nepal, and Malawi—have introduced TCV into their routine immunization programs since 2019, with more than 64 million children vaccinated in campaigns. Samoa and Tuvalu, which are non-Gavi-eligible, have also introduced TCV into their routine immunization programs. Additional countries are in various stages of decision-making.

## REFERENCES

1. Lenward JA, Charani E, Gleason A, et al. Burden of bacterial antimicrobial resistance in low-income and middle-income countries avertible by existing interventions: An evidence review and modelling analysis. *The Lancet*. 2024;403(10442): P2439-2454.
2. Birger R, Antillon M, Bilcke J, et al. Estimating the effect of vaccination on antimicrobial-resistant typhoid fever in 73 countries supported by Gavi: A mathematical modelling study. *The Lancet Infectious Diseases*. 22(5):P679-691.

Learn more and join the effort at [www.takeontyphoid.org](http://www.takeontyphoid.org).

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