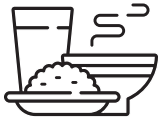


Typhoid Fever (or Enteric Fever)



A **food & water borne disease** mostly transmitted through **contaminated food or water**¹



Caused by highly virulent and invasive **enteric bacterium *Salmonella Typhi*** (S. Typhi)²



An estimated **9 million infections** and **110 000 deaths** occurred in 2019 worldwide³

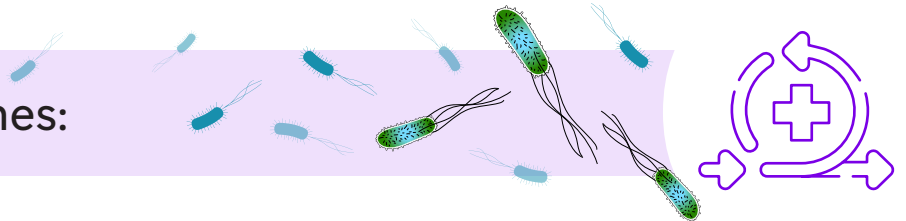


Transmission risk increased when **lacking access to safe water, adequate sanitation or poor hygiene among food handlers**²



Incubation period from 7 to 14 days²

From exposure to outcomes:



10-15% of hospitalized patients **develop complications**²



Complications include intestinal haemorrhage, intestinal perforation and encephalopathy²



Fatality rates range from:

- **1-4 %** if **adequate therapy** is undertaken²
- **10-20%** if **untreated or treated with inappropriate antibiotics**²



2-5% of cases develop into **chronic carriers**²



Typhoid fever treatment



The treatment of typhoid fever consists of antibiotics^{2,4}

Only 1-4% of suspected typhoid cases are culture-confirmed⁴

Antibiotics administered before diagnosis confirmation
=> **emergence of drug-resistant *S. Typhi* strains**⁵

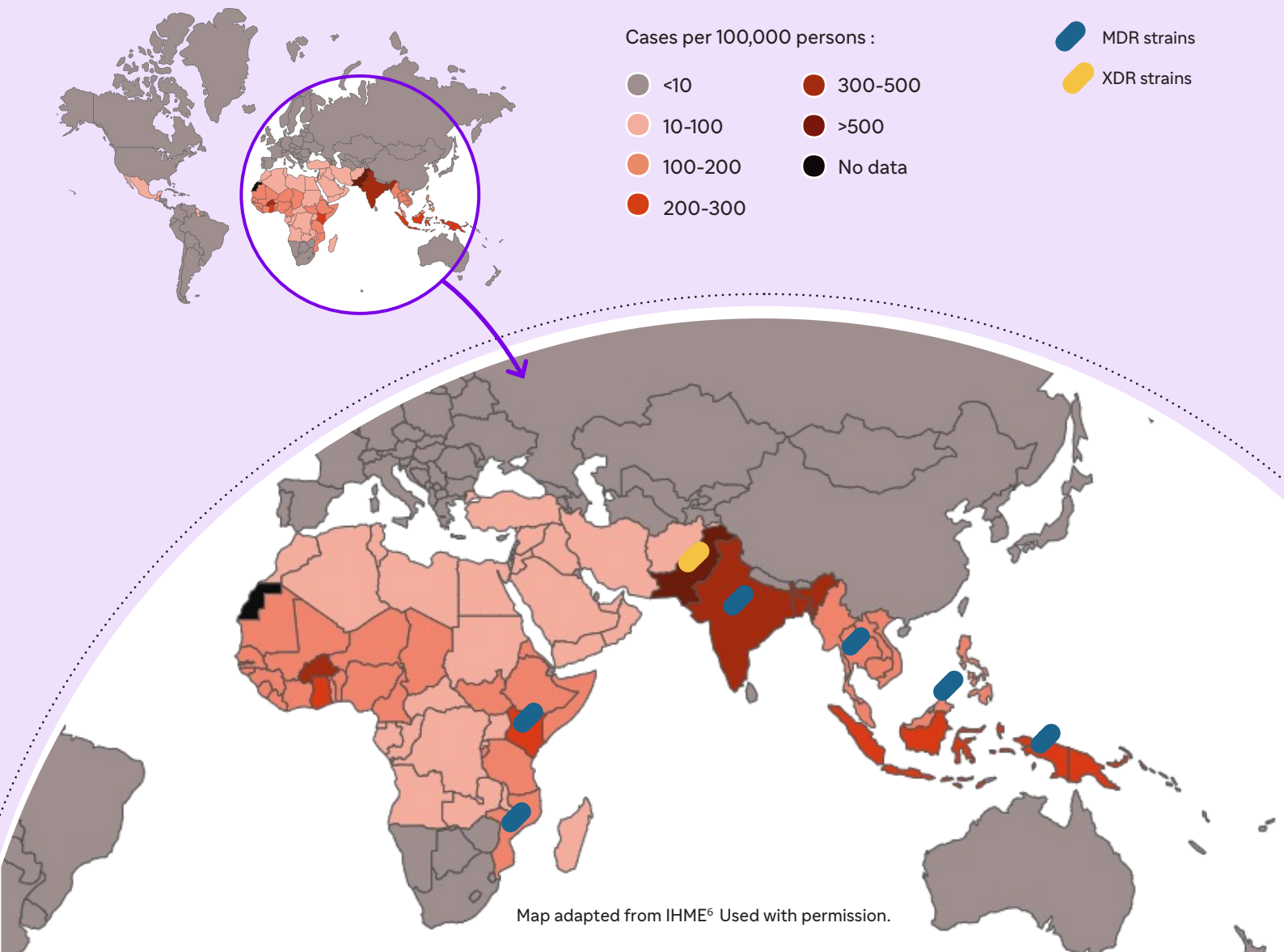


In recent decades, resistant *S. Typhi* strains have emerged:

- **MDR***, resistant to **first-line antibiotics** and spread into South Asia and Africa⁴
- **XDR****, MDR + resistance to **fluoroquinolones + ceftriaxone**, have emerged to Pakistan⁴

* MDR: multi-drug resistant; ** XDR: extensively-drug resistant

Typhoid Fever incidence and drug-resistant strains (2019)^{4, 6-7}



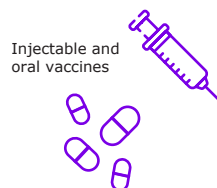
Risk of Typhoid Fever associated with travel



- 70- 85% of reported cases in Europe and North America are travel-related^{1,8}
- Travel-risk of being infected (per month of stay):
 - 30 cases /100 000 travelers to South Asia⁹
 - 1-5 cases /100 000 travelers to Africa or Latin America⁹
- Travelers visiting friends and relatives in their country of origin are more at risk¹⁰



Hygienic measures, safe eating and drinking habits remain essential when traveling to areas where the risk of typhoid fever is high¹¹



Due to increased drug-resistance, *typhoid fever vaccination* should be considered as preventive measure in addition to behavioral precautions^{4,10}

References

1. Muresu N, et al. Travel-Related Typhoid Fever: Narrative Review of the Scientific Literature. Int. J. Env. Res. & Pub. Health, 2020. 17 (615): 1-12. 2. World Health Organization. Typhoid vaccines: WHO position paper – March 2018. 13(93):153–72. 3. Institute for Health Metrics and Evaluation. Typhoid fever-level 4 cause. Seattle, WA: Institute for Health Metrics and Evaluation, Global Burden of Disease Collaborative Network; 2020. https://www.healthdata.org/results/gbd_summaries/2019/typhoid-fever-level-4-cause. Accessed April 2023. 4. Masuet-Aumatell C, et al. Typhoid fever infection – Antibiotic resistance and vaccination strategies: A narrative review. Trav Med and Infect Dis 2021. 40: 101946. 5. Andrews JR, et al. Typhoid conjugate vaccines: a new tool in the fight against antimicrobial resistance. Lancet Infect Dis 2019. 19(1):e26–e30. 6. Institute for Health Metrics and Evaluation – IHME- at the University of Washington, accessed on: 3/2/2023. Used with permission. 7. Kim CL, et al. The Burden of Typhoid Fever in Sub-Saharan Africa: A Perspective. Res Rep Trop Med., 2022. 13 1–9. 8. US Centers for Disease Control and Prevention. National Typhoid and Paratyphoid Fever Surveillance Annual Summary, Feb 2023 at: <https://www.cdc.gov/typhoid-fever/reports/annual-summary-2017.html>. Accessed April 2023. 9. Steffen R, et al. Travel vaccines—priorities determined by incidence and impact. J Travel Med, 2023. <https://doi.org/10.1093/jtm/taad085>. 10. US Centers for Disease Control and Prevention. Typhoid Fever Sept 2020. Available at: <https://wwwnc.cdc.gov/travel/diseases/typhoid>. Accessed April 2023. 11. US Centers for Disease Control and Prevention. Prevention Tips for Travelers. May 2020. Available at: <https://www.cdc.gov/typhoid-fever/prevention.html>. Accessed April 2023.