

Burden of Typhoid in Ghana

Ghana is a typhoid-endemic country. The Global Burden of Disease study estimated that, in 2023, there were at least:

20,596 typhoid cases (62 cases per 100,000)

332 typhoid deaths

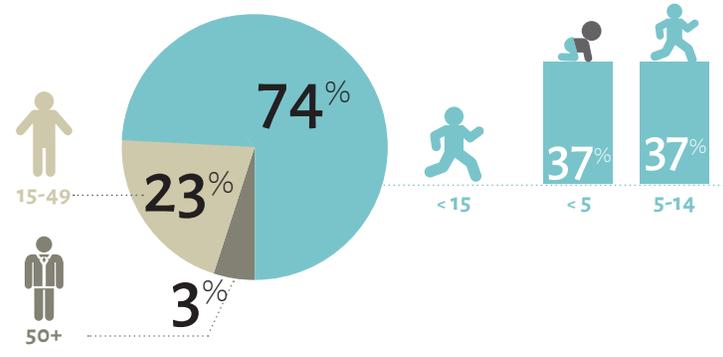
26,191 disability-adjusted **life-years lost** to typhoid¹



Most typhoid cases in Ghana occur in children **younger than 15 years old.**

Photo: PATH, Evelyn Hookstein

TYPHOID CASES IN GHANA BY AGE (2023)

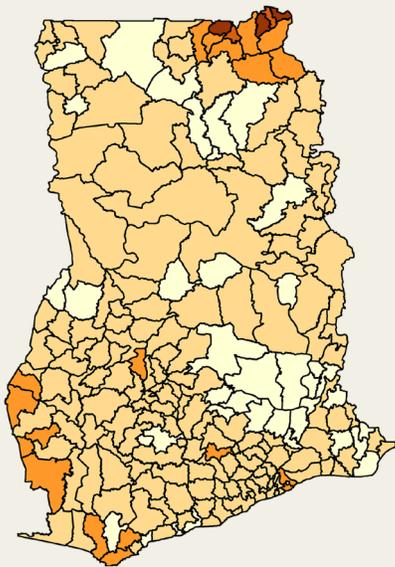


Blood culture-confirmed surveillance conducted by the Typhoid Fever Surveillance in Africa Program (TSAP) found typhoid incidence rates among children under 15 in Asante Akim North, Ghana, were **two times higher for rural children than for urban children** (636 versus 297 cases per 100,000, respectively).²

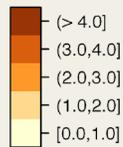


Clinical rates vary by district in Ghana

Reported clinical rates for typhoid differ by district, with a large burden concentrated in northeast and southwest Ghana.³



Average typhoid rates per 100 people from 2011-2015



Significant WASH barriers in Ghana exacerbate the risk of fecally transmitted diseases such as typhoid.

- » A SaniPath analysis found that, for children under 5 years of age in Accra, food—a frequent vehicle for typhoid outbreaks—is the most common and influential pathway for childhood fecal contamination.⁴
- » Another analysis in Accra found that fecal contamination and exposure is widespread across public and private domains, exacerbated by open defecation, poor sanitation services, environmental conditions, and employment activities.⁵ The pervasiveness of the contamination creates persistent, repeated risk of exposure for Accra residents, regardless of individual latrine use and hygiene practices, suggesting the need for multi-sectoral approaches.



Photo: PATH/Duone Porter

While typhoid is rarely fatal, the recovery is long and difficult.

The disease takes time, money, and productivity from those infected and their families and is associated with numerous long-term complications.

Drug-resistant typhoid strains are a growing problem in Ghana, regionally, and across the globe.



A study in 2001-2002 found 89% of typhoid isolates were resistant to chloramphenicol, the first-line treatment for typhoid at the time, with high resistance to second-line drugs co-trimoxazole and ampicillin as well. This finding spurred national guidelines to replace chloramphenicol with ciprofloxacin in 2004.⁶



Additionally, an analysis of typhoid isolates collected by TSAP from children under 15 in Asanta Akim North, Ghana, from 2010-2014 found 80% resistance to co-trimoxazole, 77% resistance to chloramphenicol, 67% resistance to ampicillin, with 63% resistant to all three of these drugs (multidrug-resistant typhoid).⁷



Another analysis using TSAP typhoid isolates found that young children aged 2-4 years had the highest incidence of multidrug-resistant typhoid in Ghana.⁸



Drug-resistant typhoid is more difficult to treat and forces the use of more expensive and less readily-available treatment options.

Typhoid conjugate vaccines (TCVs) in Ghana

The World Health Organization (WHO) recommends the introduction of prequalified TCVs be prioritized in countries with a high burden of typhoid disease or a high burden of drug-resistant typhoid. Gavi, the Vaccine Alliance support for introduction is **available now**. TCVs:



Are highly effective and safe for children as young as **6 months** of age;



Require a **single dose** to prevent 79-85% of typhoid cases in children;



Offer strong protection for **at least 4 years**; and



Can be **co-administered with measles-rubella, yellow fever, and meningococcal A vaccines**.^{10,11}

A recent modeling analysis shows that in Ghana, a catch-up campaign up to 15 years of age followed by routine immunization is the preferred strategy and likely cost-effective with support from Gavi.^{*12}

* At a willingness to pay threshold of US\$100 or more to avert one disability-adjusted life-year.

Let's Take on Typhoid in Ghana

- ✓ Typhoid is endemic in Ghana, with more than **20,000** cases per year.
- ✓ More than half of Ghana's typhoid burden is borne by children **younger than 15** years of age.
- ✓ Data show an increase in **drug-resistant typhoid** in Ghana, regionally, and globally.
- ✓ **TCVs** are safe, effective, and WHO-recommended for routine immunization as part of a cost-effective, integrated approach to typhoid prevention and control alongside safe water, sanitation, and hygiene interventions.
- ✓ **Gavi support** for TCV introduction is available **now**.





Photo: PPA/TU | Duane Porter

1. Institute for Health Metrics and Evaluation. Global Burden of Disease. 2023. Accessed via: ghdx.healthdata.org/gbd-results-tool.
2. Cruz Espinoza LM, Nichols C, Adu-Sarkodie Y, et al. Variations of invasive *Salmonella* infections by population size in Asante Akim North Municipality, Ghana. *Clinical Infectious Diseases*. 2016;62(Suppl 1): S17-22.
3. Badu Osei F, Stein A, Dodzi Nyadanu S. Spatial and temporal heterogeneities of district-level typhoid morbidities in Ghana: A requisite insight for informed public health response. *PLoS ONE*. 2018;13(11):e0208006.
4. Wang Y, Moe CL, Null C. Multipathway quantitative assessment of exposure to fecal contamination for young children in low-income urban environments in Accra, Ghana: The SaniPath Analytical Approach. *The American Journal of Tropical Medicine and Hygiene*. 2017;97(4):1009-1019.
5. Hurd J, Hennink M, Robb K, et al. Behavioral influences on risk of exposure to fecal contamination in low-resource neighborhoods in Accra, Ghana. *Journal of Water, Sanitation & Hygiene for Development*. 2017;7(2):300-311.
6. Grob U, Zmuzu SK, de Ciman R, et al. Bacteremia and antimicrobial drug resistance over time, Ghana. *Emerging Infectious Diseases*. 2011;17(10):1879-1882.
7. Marks F, von Kalckreuth V, Aaby P, et al. Incidence of invasive *Salmonella* disease in sub-Saharan Africa: A multicenter population-based surveillance study. *The Lancet Global Health*. 2017;5(3):e310-e323.
8. Park SE, Pham DT, Boinett C, et al. The phylogeography and incidence of multi-drug resistant typhoid fever in sub-Saharan Africa. *Nature Communications*. 2018;9(1):5094.
9. Patel PD, Patel P, Liang Y, et al. Safety and efficacy of a typhoid conjugate vaccine in Malawian children. *New England Journal of Medicine*. 2021;385(12):1104-1115.
10. Sirima SB, Ouedraogo A, Barry N, et al. Safety and immunogenicity of co-administration of meningococcal type A and measles-rubella vaccines with typhoid conjugate vaccine in children aged 15-23 months in Burkina Faso. *International Journal of Infectious Diseases*. 2021;102:517-526.
11. Sirima SB, Ouedraogo A, Barry N, et al. Safety and immunogenicity of Vi-typhoid conjugate vaccine co-administration with routine 9-month vaccination in Burkina Faso: A randomized controlled phase 2 trial. *International Journal of Infectious Diseases*. 2021;108:465-472.
12. Blicke J, Antillon M, Pieters Z, et al. Cost-effectiveness of routine and campaign use of typhoid Vi-conjugate vaccine in Gavi-eligible countries: A modelling study. *The Lancet Infectious Diseases*. 2019;19(7):728-739.