Do studies underestimate the prevalence of typhoid?

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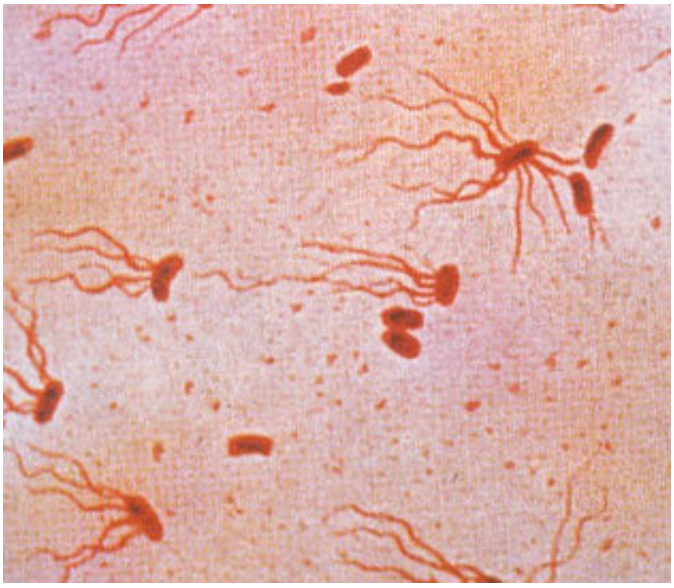

Salmonella typhi. Credit: Wikipedia

Blood culture surveillance programs are critical for estimating the prevalence of typhoid and paratyphoid fevers, but cases can be missed when patients don't seek medical care, or seek medical care and don't have a blood culture test. Researchers writing in *PLOS Neglected Tropical Diseases* have now calculated inflation factors that can be used to adjust these incidence rates to account for under-detection.

Typhoid and paratyphoid fever are infections caused by the bacteria *Salmonella enterica Typhi* and *S. Paratyphi*. In countries with a high

incidence rate of the diseases, vaccine programs are used to control typhoid fever. Surveillance programs to estimate these incidence rates, however, can miss cases, when patients don't receive blood cultures or in settings where patients self-treat with widely available antibiotics. Therefore, the true burden of disease is thought to be underestimated.

In the new work, Merryn Voysey of the University of Oxford, UK, and colleagues used data from an ongoing Typhoid Vaccine Acceleration Consortium (TyVAC) clinical trial of a typhoid vaccine in Nepal. Children aged 9 months through 16 years in the Lalitpur area of Kathmandu were eligible and local healthcare providers—including 18 community clinics and one tertiary care hospital—were instructed to collect blood samples to culture for patients who had a fever for at least two days or a current temperature of at least 38 degrees. There was also an active surveillance effort included in the trial.

During the first year of passive surveillance, data was collected on 2,393 fever presentations. Overall, 1615 (68%) of patients had blood cultures. Children were more likely to have blood taken for culture if they were older, had a longer fever, a higher temperature or clinicians suspected typhoid or a urinary tract infection. Models revealed that patients who had blood taken were 1.87 times more likely to be positive for Salmonella than those without blood cultures.

"Crude typhoid incidence estimates should be adjusted for both the proportion of cases that go undetected due to missing blood cultures as well as the lower likelihood of culture-positivity in the group with missing data," the researchers say.

More information: Voysey M, Pant D, Shakya M, Liu X, Colin-Jones R, et al. (2020) Under-detection of blood culture-positive enteric fever cases: The impact of missing data and methods for adjusting incidence estimates. *PLOS Neglected Tropical Diseases* 14(1): e0007805.

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