Typhoid Fever among Children, Ghana

To the Editor: Typhoid fever (TF) remains a problem of concern in many low-income countries. *Salmonella enterica* serovar Typhi causes ≈22,000,000 symptomatic infections and 220,000 fatalities worldwide annually (1). However, the effect and incidence of TF in many parts of sub-Saharan Africa are largely unknown because diagnostic laboratories are lacking and fatal TF is frequently attributed to malaria (2,3). In Ghana, TF ranks among the leading 20 causes of outpatient illness, accounting for 0.92% of hospital admissions (4).

We conducted our study at the rural Agogo Presbyterian Hospital in the Ashanti Region of Ghana. The percentage of residents of 99 villages and household clusters of buildings (population size 18–13,559 persons, median 277 persons) with access to the study hospital was assessed in a healthcare utilization survey. A proportional-to-size number of children were randomly selected in each village, and a standardized interview was conducted. TF incidences were calculated for September 2007–November 2008 (Table). A bacteriology laboratory with BACTEC 9050 automated blood culture system (Becton Dickinson), and may re...
were 33% and 46%, respectively, before 2002 and 73% and 79% in 2003–2004 (7) and thus similar to those in our study.

In addition, resistances to ciprofloxacin and ceftriaxone were <10%. Multidrug resistance (resistance to ampicillin, trimethoprim/sulfamethoxazole, and chloramphenicol) was observed in 63% of children in our study, compared with 7% in India, 22% in Vietnam, and 65% in Pakistan (8–10).

More effort is needed in Africa to enable reliable and standardized laboratory diagnoses of *Salmonella* infections and to sustain TF surveillance and drug sensitivity surveys. Moreover, introduction of a vaccination program should be discussed after more data are obtained from other areas in Ghana and West Africa. Such data currently are collected in an extensive standardized surveillance program across the continent performed by our group and others. In parallel, trials should be conducted to assess the effectiveness and cost-effectiveness of currently available and newly developed TF vaccines.

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To the Editor: Approximately half the *Shigella* spp. infections in developing countries are caused by endemic shigelaeae (1), which in these countries are responsible for ≈10% of all episodes of diarrhea among children <5 years of age and up to 75% of deaths from diarrhea (2). Deaths from epidemic *Shigella* spp. in the community are estimated to outnumber deaths within the healthcare setting. In Papua New Guinea, diarrhea is a major cause of hospital admission and death (3); *Shigella* spp. are among the most common causes of enteric bacterial infection (4,5), and *S. flexneri* is the most common serotype (3,6). Outbreaks of bloody diarrhea are frequently reported; however, diagnosis in remote settings is challenging, partly because the storage requirements for the organism are difficult to meet.

Multidrug resistance of shigelaeae is not new (1); many countries have