To the Editor—Mermin et al. described a massive outbreak of multidrug-resistant typhoid fever involving 10,000 clinical cases and 100 deaths that occurred in the central Asian republic of Tajikistan in 1997 [1]. The team from the Centers for Disease Control and Prevention (CDC), Atlanta, investigated the outbreak in the capital city of Dushanbe, where they determined that contaminated municipal water was the most important of perhaps multiple sources. The control programs that were recommended to local governmental and international agencies included water chlorination, water pipe repair, education programs, epidemiologic surveillance, and distribution of ciprofloxacin to local hospitals for treatment. Typhoid vaccination was entirely missing from the wide-ranging list of interventions. The authors acknowledged that safe and effective vaccines were available. Indeed, it would be very surprising if members of the CDC investigative team were not vaccinated before traveling to Tajikistan, as are millions of other travelers going to typhoid-endemic regions [2]. So why was a measure so commonly recommended and so effective for travelers not recommended for typhoid control for local inhabitants?

Rather than invoking costs or lack of sufficient governmental infrastructure in this war-torn region as prohibitive factors, the authors stated that improvements in water treatment (and other measures to improve sanitation) were more likely to provide long-term benefits because they would affect other waterborne pathogens as well as typhoid. The implication was that providing vaccine somehow interfered with education and sanitation efforts. This would occur only if vaccination created a false sense of protection—causing individuals to forsake sanitary precautions or governments to abandon improvements in water treatment or sanitation. A related possibility was that the cost of the vaccination program might compete for scarce funding resources. These considerations were important, but it did not appear that a cost analysis of intervention strategies was performed for the Tajikistan outbreak. The presence of international agencies and the provision of large quantities of ciprofloxacin indicated that funds were available, but there was no indication that vaccine manufacturers were contacted to determine the cost and availability of the vaccine. If this outbreak were caused by polio, another waterborne pathogen, the threshold for vaccine use would have been much lower, and most probably use of vaccine would have been mandated by both national and international agencies as an appropriate measure. Multidrug-resistant typhoid, with a 1% mortality rate and attendant high morbidity, is a disease of major health and economic concern.

The reluctance to use typhoid vaccines in the face of epidemic or endemic disease is not new. In the 1970s, Thailand was faced with a similar problem. Typhoid rates were high, yet the World Health Organization (WHO) did not recommend vaccination as part of the solution. Nevertheless, Thailand initiated a nationwide vaccination program in school-age children with an injectable vaccine made locally from inactivated whole cells. This campaign was highly effective in reducing the incidence of typhoid fever in Thailand and did not compromise the general plan to improve sanitation [3]. The Thai typhoid vaccination program had a nationwide impact on typhoid rates. The CDC recommendations, which did not include vaccination, might have been effective for Dushanbe but would be unlikely to affect the rest of the country, where high rates of typhoid were also reported.

In contrast to Thailand in the 1980s, Tajikistan was experiencing political instability and civil unrest during the epidemic, which may have limited the vaccination option. In contrast, mass typhoid vaccination campaigns can be quite practical if they are targeted at school-age children and if the logistics of immunization are school based. In most large typhoid outbreaks in developing countries, as well as in most endemic situations, approximately two-thirds of reported cases occur in school-age children, 5-19 years of age [4]. A large school-based intervention with live oral typhoid vaccine Ty21a in Santiago, Chile, in the early 1980s involving ~200,000 children showed that this was practical even though multiple doses were administered [5]. Moreover, there was evidence that large-scale use of Ty21a in 4 field trials in Santiago resulted in a herd immunity effect that interfered with transmission and lowered the incidence in segments of the populations that did not receive vaccine [6]. Typhoid immunization has been effectively introduced among school-age children living in high-risk areas of neighboring Uzbekistan. The current opinion of the WHO Scientific Advisory Group of Experts is that immunization of school-age children should be undertaken in geographical areas where typhoid fever is a recognized public health problem and antibiotic-resistant Salmonella typhi strains are particularly prevalent. Immunization can be complementary to sanitation in reducing typhoid rates [7].

Two available typhoid vaccines, oral Ty21a and parenteral purified Vi polysaccharide, are well tolerated, moderately protective, and practical to use [4]. Moreover, in recent years, their cost has markedly diminished. An economic analysis of the use of typhoid vaccines in endemic situations revealed that 2 parameters in particular—the incidence of the disease and the duration of protection—had a favorable impact on the cost effectiveness of vaccination [8]. Whether the vaccine is 70% or 90% effective does not appreciably alter the equation. From this perspective, it was notable that in 2 separate field trials in Chile, Ty21a conferred impressively long-term protection. In the Area Occidente trial, 3 doses of enteric-coated capsules conferred 62% protection for 7 years, and in a separate study in Areas Sur Oriente and Norte, 3 doses of the liquid formulation conferred 78% protection over 5 years of follow-up [9].
Vi vaccine also provided good protection when administered in countries with a high incidence of typhoid fever [10]. In a field trial in South Africa, a single dose of Vi polysaccharide had a vaccine efficacy of 55% for at least 3 years [11]. The typhoid vaccines currently available should be considered for a larger role in public health control programs [12].

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