

CORRESPONDENCE



Single-Dose Cholera Vaccine in Response to an Outbreak in Zambia

TO THE EDITOR: Killed oral cholera vaccines (OCVs) are part of the standard response package to a cholera outbreak, although the two-dose regimen of vaccines that has been prequalified by the World Health Organization (WHO) poses challenges to timely and efficient reactive vaccination campaigns.¹ Recent data suggest that the first dose alone provides short-term protection, similar to that of two doses, which may largely dictate the effect of OCVs during epidemics.²⁻⁴

A cholera outbreak was detected in Lusaka, Zambia, in February 2016, after a period of 4 years without a reported case of cholera. An emergency reactive vaccination campaign was implemented in April 2016, targeting more than 500,000 persons who were at high risk for cholera in Lusaka (population, >2 million persons). The Ministry of Health, with support from Médecins sans Frontières and the WHO, decided to implement a single-dose campaign to quell the epidemic rapidly, in view of the insufficient number of vaccine doses that were available in the global stockpile to complete a two-dose campaign. In December 2016, when more doses became available, a second round of vaccination was organized and the second vaccine dose was offered to persons at risk.

We conducted a matched case-control study to quantify the short-term effectiveness of a single-dose OCV regimen (Shanchol) between April 25, 2016, and June 15, 2016. The study was approved by two institutional review boards, and written informed consent was obtained from all the participants (see the Supplementary Appendix, available with the full text of this letter at NEJM.org). Cases of cholera were confirmed by means of culture, polymerase-chain-reaction as-

say, or both. Age- and sex-matched controls were selected from among the neighbors of case patients with cholera.⁵ We ascertained vaccination status by means of structured interviews using photographs of OCVs, and verified the information with the use of vaccination cards, when available. We calculated the vaccine effectiveness as $(1 - \text{odds ratio}) \times 100$, using conditional logistic regression. We also conducted a bias-indicator study involving persons with noncholera diarrhea and matched controls.

We enrolled 66 persons with confirmed cholera and 330 matched controls. Vaccination with a single dose was associated with significant protection in both the crude and adjusted analyses (effectiveness in the adjusted analysis, 88.9%; 95% confidence interval, 42.7 to 97.8; $P=0.009$) (Table 1). The bias-indicator analysis included 145 persons with noncholera diarrhea and 725 matched controls. In that analysis, we found that

THIS WEEK'S LETTERS

- 577 **Single-Dose Cholera Vaccine in Response to an Outbreak in Zambia**
- 579 **ACE Inhibitors and Statins in Adolescents with Type 1 Diabetes**
- 581 **Effects of Spaceflight on Astronaut Brain Structure**
- 583 **Nutritional Management of Chronic Kidney Disease**
- 585 **Acute Graft-versus-Host Disease**
- 587 **Maternal Health in the United States**