The key issue is therefore to define the problem and its magnitude, in order to plan effective management.

The Government of India is taking concerted measures to combat major communicable and noncommunicable diseases. In this regard it has implemented national programmes to reduce morbidity and mortality from these causes, to improve the quality of life of those affected, and to reinforce the delivery of primary, secondary and tertiary health care. In view of the large numbers of cases of trauma today, and that it affects mainly young people and those in the productive age group — with consequent economic implications — there is an urgent need to develop similar programmes in trauma care.

A "minimum trauma care system" should clearly spell out the facilities available, in terms of human resources and equipment, to ensure a minimum level of preparedness for an emergency response. It is important to strengthen national preparedness capabilities through capacity building at the national level and by ensuring maximum congruence between emergency relief, rehabilitation, and long-term development efforts. Irrespective of the cause of trauma and the nature of the injuries sustained, the mainstay of immediate treatment is basic life support and resuscitation. The lack of specialized equipment and operators continues to be a major weakness in the existing trauma care system, yet the need to ensure survival before other interventions cannot be overemphasized. ■

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Effectiveness of mass vaccination with WC/rBS cholera vaccine during an epidemic in Adjumani district, Uganda

Sir – Further to the mass cholera vaccination campaign in refugee camps in Adjumani district, Northern Region, Uganda, reported in the last issue of the *Bulletin* (*1*), we describe below the situation when a cholera outbreak occurred in the district one year after the campaign.

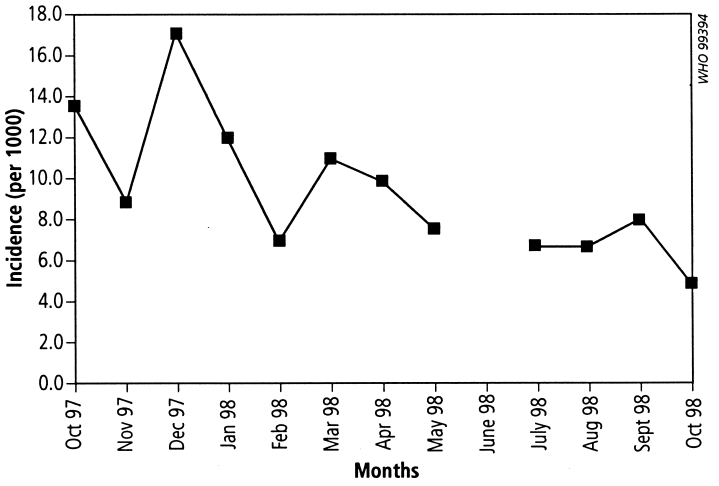
Adjumani district has offered asylum to Sudanese refugees since 1989. The refugee population, which represents about 55% of the total district population (125 000 people), is spread over 35 different settlement camps. At the request of WHO, a pilot vaccination campaign with the WC/rBS oral cholera vaccine was conducted in October 1997 in six of these camps. The objective was to assess the feasibility and acceptability of mass vaccination in a large refugee setting (*2*). Vaccine coverage was 87.0%, a total of 27 607 persons being fully vaccinated.

A cholera epidemic caused by *Vibrio cholerae* El Tor serotype Ogawa reached the north of Uganda in April 1998. In Adjumani district the first cases of cholera were reported in August, and the epidemic peaked in October 1998. Between 17 August and 8 November, 358 cases of cholera were reported from 60 different locations covering the entire district. The overall attack rate was 0.3% and the case-fatality ratio was 4.2% (15 deaths). The epidemic affected the entire district, and all the refugees, including those living in the vaccinated camps, were exposed to the risk of cholera. A total of 28 cases out of 358 (7.8%) occurred among refugees, but none of them came from a settlement that participated in the vaccination campaign in 1997. Attack rates were higher in the Ugandan population than in the refugee population (0.59% v 0.04%, relative risk: 14.4 (95% confidence interval, 9.8–21.2)). Water supplies and sanitation facilities were similar in the vaccinated and non-vaccinated settlements, but were better in the settlements than in the Ugandan villages. This fact might partly explain the lower attack rate observed in the refugee population.

Since no case of cholera was reported from the vaccinated population, it was not possible to measure vaccine effectiveness using classic epidemiological studies (*3*). Therefore, in order to assess whether the cholera vaccination had had a protective effect, we compared the global incidences of common (non-bloody) diarrhoea between vaccinated and non-vaccinated refugee settlements for the month of October 1998. We also compiled the evolution of common diarrhoea incidences in four vaccinated settlements over the period October 1997 (vaccination) to October 1998 (outbreak).

The median incidences of common diarrhoea in October 1998 were lower in the vaccinated settlements (2.8/1000) compared with non-vaccinated settlements (10.0/1000) and the Ugandan population (4.3/1000) attending the same health units, but the differences were not statistically significant. The trends in the common diarrhoea incidences since October 1997 in four vaccinated camps did not show any marked increase during the cholera epidemic period (Fig. 1).

Fig. 1. **Incidence of common diarrhoea in four vaccinated settlements, October 1997–October 1998, Adjumani district, Uganda** (Note: Data were missing for three settlements for June 1998)



Although it was not possible to measure the field effectiveness of the WC/rBS cholera vaccine during this epidemic, the evidence presented below points to its protective effect.

- Vaccinated settlements did not report any cholera cases, despite their proximity to non-vaccinated and affected settlements.
- The median incidence of common diarrhoea was lower in vaccinated settlements than in non-vaccinated settlements and among the Ugandan population attending the same health units during the epidemic period.
- The common diarrhoea incidence in the vaccinated settlements remained stable during the epidemic period.

This evidence suggests that WC/rBS vaccine can help in preventing diarrhoea in a refugee community exposed to the risk of cholera. These data, together with others, were reviewed by a group of experts convened by WHO in May 1999. The participants recognized that the oral WC/rBS vaccine was a potentially useful public health tool for some specific, carefully evaluated emergency situations and that cholera vaccine should be considered for preemptive use in high risk populations (*4*). Pilot mass vaccinations, which should now be encouraged in appropriate situations, would offer opportunities for further evaluating the feasibility and impact of cholera control strategies. However, factors that still prevent the public health use of this vaccine, such as insufficient supplies or uncertainties of price, should now be resolved. ■

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