

INFECTION

Rotavirus vaccination shows beneficial effects in Mexican and African children

Rotavirus gastroenteritis is a major health problem worldwide and is the single most important cause of childhood diarrhea and diarrhea-related death.

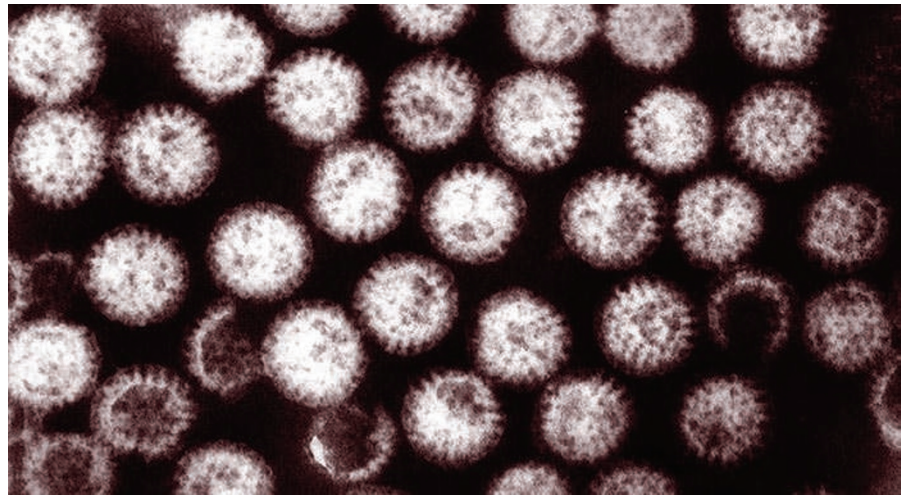
Two new studies published in the *New England Journal of Medicine* report that rotavirus vaccination can reduce the incidence of severe rotavirus gastroenteritis and diarrhea-related mortality in African and Mexican children, respectively.

These two studies are important because more than 90% of childhood deaths related to rotavirus occur in developing countries. Rotavirus vaccination is, therefore, an important opportunity to improve child health and survival in these countries.

The African, multicenter, randomized, placebo-controlled trial evaluated the efficacy of a live, oral rotavirus vaccine for the prevention of severe rotavirus gastroenteritis in 3,166 South African infants and 1,773 Malawian infants. “Live, oral vaccines work less well in developing countries and it is important to establish their efficacy before a vaccination program of this type is implemented,” says Nigel Cunliffe from the University of Liverpool, UK, who was one of the investigators on the African study.

Healthy infants were randomly allocated to receive either two doses of vaccine plus one dose of placebo, three doses of vaccine or three doses of placebo at 6 weeks, 10 weeks and 14 weeks of age. Infants were followed up for the first year of life during which all episodes of gastroenteritis caused by the wild-type rotavirus were recorded and graded according to severity.

Of the total study population, 1.9% of vaccinated infants versus 4.9% of infants who received placebo experienced an episode of severe rotavirus gastroenteritis (vaccine efficacy 61.2%). The efficacy of the vaccine against all-cause severe gastroenteritis was 30.2%. In Malawi, vaccine efficacy was lower than in South Africa (49.4% versus 79.6%), but a greater



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number of episodes of severe rotavirus gastroenteritis were prevented (6.7 versus 4.2 cases prevented per 100 infants vaccinated per year).

Cunliffe explains that their results are important because “this is the first time the efficacy of rotavirus vaccination to reduce severe rotavirus gastroenteritis and all-cause gastroenteritis has been demonstrated in an African setting. Malawi is an impoverished country with a high burden of diarrheal disease and a wide diversity of rotavirus strains are known to circulate in the country, including a high proportion of globally uncommon rotavirus serotypes. This population, therefore, provides a stiff test for either of the two currently licensed vaccines”.

Mexico introduced a national rotavirus vaccination program in 2006; however, the impact of this rotavirus vaccine on the incidence of diarrhea-related death was not determined before the program was implemented. Richardson and colleagues, therefore, assessed the effect of rotavirus vaccination on diarrhea-related death in children under 5 years of age during two consecutive rotavirus seasons. The authors compared data on diarrhea-related mortality before and after the rotavirus vaccine was introduced. Diarrhea-related mortality was 29% lower for children aged

12–23 months after vaccination than before vaccination. The annual median number of deaths relating to diarrhea fell significantly for children (18.1 deaths reduced to 11.8 deaths per 100,000 children) and infants (61.5 deaths reduced to 36.0 deaths per 100,000 infants).

The authors say that their “findings indicate an encouraging reduction in diarrhea-related mortality” and that “besides direct benefits to vaccinated infants, it is possible that vaccination of a proportion of the population could reduce overall transmission of rotavirus in the community”.

“These studies emphasize the tremendous benefit that rotavirus vaccines could have in reducing diarrhea-related morbidity and mortality among children in developing countries. Research should be pursued to investigate how we can make current rotavirus vaccines work better in the world’s poorest countries where rotavirus vaccines are most badly needed,” says Cunliffe.

Rachel Jones

Original articles Madhi, S. *et al.* Effect of human rotavirus vaccine on severe diarrhea in African infants. *N. Engl. J. Med.* 362, 289–298 (2010) | Richardson, V. *et al.* Effect of rotavirus vaccination on death from childhood diarrhea in Mexico. *N. Engl. J. Med.* 362, 299–302 (2010)