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## Letters

# Future of research into rotavirus vaccine

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## Cost effectiveness of vaccine is being assessed

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EDITOR—Weijer states that the benefits of rotavirus vaccine may outweigh risks for children in developing countries.<sup>1</sup> The issue of cost effectiveness is therefore central to the choice of whether developing countries should adopt a rotavirus vaccine. We are involved in a project funded by the United Kingdom's Department for International Development that will model the impact and incremental cost effectiveness of introducing a rotavirus vaccine into routine infant immunisation programmes in Bangladesh and Peru.

Frequently, poor families in developing countries must sell assets at a loss, or take out loans at high interest rates, to pay for care.<sup>2</sup> Hence optimising the use of vaccines will increase the potential for economic development of the poorest groups by reducing their out of pocket costs of obtaining treatment, especially for more severe disease. Governments also stand to benefit through reducing the burden on frequently overstretched health systems. In addition, gains will occur at the societal level, as care givers will require less time off work to provide and seek care. Yet the introduction of new or underused vaccines in developing countries has been hindered by the paucity of data related to the economic and epidemiological burden of diseases that can be prevented by vaccination.

Recently Miller and McCann conducted a cost effectiveness analysis to estimate the impact of vaccination against rotavirus in national immunisation schedules.<sup>3</sup> They estimated the cost per life year saved to be \$16 to \$31 in a low income setting, assuming a cost per dose of \$1 and vaccine efficacy of 60%; their results are encouraging. They did not include potential savings from the reduction in costs of admission to hospital, but a study from Argentina has illustrated the substantial burden placed on some health systems by rotavirus: in 1991 rotavirus infection led to roughly 84 500 outpatient visits and 21 000 admissions, each averaging four days, with associated direct medical costs of \$27.7m.<sup>4</sup>

It is important to identify, measure, and value the associated costs of providing the vaccine, including

the cost of treating adverse events.<sup>5</sup> Further modelling and economic analyses will enable an empirical measurement of the vaccine's costs and benefits; its utility for low income settings should not be dismissed prematurely. We hope that our research will help shed light on the appropriateness of the vaccine in developing countries once it becomes available.

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# Developing countries must apply mathematics to take their own decisions

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EDITOR—As Weijer pointed out in his editorial, some people assume that inaction is a morally neutral state.<sup>1</sup> This is dramatically true for the developing world, such as Latin American countries, because our politicians and public health authorities are still not aware that both action and inaction have consequences, with costs that have to be established. Nobody wishes to be responsible for the cost of the decisions taken, but it is necessary to know the risks and benefits before taking a decision such as the one to withhold the tetravalent rhesus rotavirus vaccine.

There are few aspects in favour of initiating a randomised controlled trial with this vaccine. Firstly, it is necessary to know the vaccine's efficacy and effectiveness in a country with high mortality. Secondly, information about the epidemiology of intussusception in developing countries is scarce. Rates of intussusception are probably lower than in developed countries, and therefore the risk of intussusception associated with this vaccine is not necessarily that observed in the United States. Thirdly, large studies of effectiveness will give additional information about the potential risk of intussusception with use of rotavirus vaccine. Finally, assuming the worst scenario of a 25% fatality rate from intussusception, 2000–3000 of the deaths caused by rotavirus vaccine will also occur without the vaccine.

In Venezuela, a country with low mortality from rotavirus diarrhoea (1 in 6000 infants aged <1 year die