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## Economic evaluation tailored to promote vaccine uptake: how third world consumers can respond

'It is up to vaccine manufacturers to lower prices and comply with the affordability criteria in developing countries.'

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*'Suppose it were ascertained that every child in the world could be rendered absolutely immune from all disease during its entire life by taking half an ounce of radium to every pint of its milk. The world would be none the healthier, because not even a Crown Prince – no, not even the son of a Chicago Meat King – could afford the treatment. Yet it is doubtful whether doctors would refrain from prescribing it on that ground. The recklessness with which they now recommend wintering in Egypt or at Davos to people who cannot afford to go to Cornwall, and the orders given for champagne jelly and old port in households where such luxuries must obviously be acquired at the cost of stinting necessities, often make one wonder whether it is possible for a man to go through a medical training and retain a spark of common sense'* George Bernard Shaw [1].

This issue of *Expert Review of Pharmacoeconomics and Outcomes Research* carries an article on the economic evaluations of rotavirus vaccines [2]. Common sense suggests that if a vaccine is safe and efficacious and it has been shown to be cost-beneficial (saves lives and money), it should be included in the program for universal immunization. The authors of the rotavirus review note that this does not happen routinely – that experience of introducing hepatitis B and *Haemophilus influenzae* type b (Hib) vaccines in developing countries (countries that have the largest markets) has not been encouraging [2]. The twin

issues of biased cost-effectiveness evaluations and the question of affordability are discussed in this annotation.

Rotavirus vaccine was withdrawn in 1999 due to unacceptable side effects – one intussusception in 5000 vaccine recipients [3]. Given this background, reintroducing rotavirus vaccine in resource-poor countries will be particularly difficult. Economic evaluation must include the potential costs of side effects in order to be comprehensive. However, the reviewers point out that none of the papers that they studied computed the cost of vaccine side effects [2]. As the data are not available, it is impossible to draw conclusions about cost-benefits of the vaccine.

Cost-benefit equations can be biased in other ways. Underplaying the costs and enlarging the perspective in which the benefits are evaluated can justify any vaccine, no matter how expensive. Economic evaluations performed on chickenpox and hepatitis B vaccines illustrate various aspects of this problem. The recent call for the retraction of an economic evaluation that exaggerated the number of deaths from hepatitis B in India from 5000 to 250,000 per year demonstrates how data can be manipulated [4]. A national vaccination program would have been difficult to justify preventing only 5000 deaths and, therefore, the mortality was inflated to 250,000. The authors could not provide the model used to project the figure of 250,000 deaths [5].

Chickenpox is a relatively mild disease in childhood. When chickenpox vaccine was first introduced in the USA, the cost of the vaccination was calculated at US\$98 million. The cost of chickenpox disease, if no vaccine was used, is US\$90 million. The vaccine was not cost-effective. The perspective was therefore enlarged to show the vaccine as cost-effective. For example, the loss in wages of a parent staying at home with the child with chickenpox were accounted for [6]. Loss in wages was estimated at US\$390 million, allowing for justification for a considerable hike in the price of chickenpox vaccine [6].

The saga of Hib research in India demonstrates how international research funding is used to promote the interest of vaccine manufacturers – to demonstrate a need that does not in fact exist. The incidence of Hib disease in Asia is very low – six in 100,000 compared with 109 in 100,000 in the Western Pacific [7]. The thrust of Hib research was to convince health planners that Hib was a major problem that had gone unrecognized due to poor microbiologic facilities and the technical inability to culture the organism. An Invasive Bacterial Infections Surveillance Group study performed over 4 years, in six large referral hospitals in India, employed sophisticated culture techniques to isolate the organism. These studies revealed a remarkably low incidence of Hib disease [8,9]. Not convinced, the World Health Organization undertook a large population-based study. This reported the incidence of Hib disease at nine per 100,000 [10]. It merely confirmed the low incidence of Hib being similar to 1998 figures of Levine and coworkers [7]. The World Health

Organization study was completed in 2002 and the findings were presented at a conference, however, the results have yet to be published. Research designed to promote the interest of vaccine manufacturers, and its selective publication, make health planners look at health economic evaluations with skepticism.

Even if a vaccine is cost-effective, the question of affordability still exists. The reviewers of the rotavirus evaluation point out that many countries cannot afford more than US\$8 per child for vaccination [2]. One method to judge if an intervention is affordable is to look at costs against the gross national product of the country. It can be assumed that interventions that cost more than the percapita-gross national product of the country, per quality-adjusted life year saved, are not affordable [11]. It is up to vaccine manufacturers to lower prices and comply with the affordability criteria in developing countries.

Public funding for vaccine research has all but dried up. In a market economy, it is open to vaccine manufacturers to produce biased cost-effectiveness evaluations and even determine what vaccines are produced to boost dividends for shareholders. Yet, in the market economy, it is for the consumer (healthcare provider) to decide whether the vaccine will be employed for the benefit of the target population. Decreased demand will drive prices down. National health planners, and those advising vaccination need to play their part as consumer advocates. Unbiased critical reviews of economic analyses, as performed by the authors of the review of rotavirus can help [2].

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