Vaccine development and developing countries

Participation of patients in medical research requires that a balance is struck—between anticipated benefits and potential harms of the new treatment being assessed, and with a view to the broader value of evidence accrued for guiding clinical practice and future research. Tensions can arise, however. Research in low-income settings has sometimes been perceived to be of greater potential benefit to those in high-income countries, where a drug may be marketed after licensing. In an extreme case, at the time of an outbreak of influenza A H5N1 virus in 2006–07, researchers in Indonesia were unable to share clinical samples with their counterparts in high-income countries, owing to a perceived lack of reciprocity for the benefits of research. This disappointing, and unusual, event underscores the need for a shared and participatory agenda in health research.

In today’s Lancet, Nita Bhandari and colleagues present an excellent example of successful clinical research in a developing country. They report a phase 3 clinical trial of Rotavac, an oral 116E strain rotavirus vaccine, in India. They document an efficacy of about 54% against severe rotavirus gastroenteritis in infants. Drawing on funding and technical support from Indian and international sources, development of this vaccine against an attenuated human–bovine reassortant virus has taken some 30 years to come to fruition.

Although oral rotavirus vaccines—the licensed Rotarix and RotaTeq—have been available for some years, Rotavac has the potential to be a powerful and affordable vaccination option. India has a larger burden of rotavirus deaths than any other country, with most rotavirus admissions occurring in the first year of life. Rotavac can therefore be expected to be of great benefit in reducing childhood mortality from diarrhoea, contingent on future licensing and introduction in India, and subject to ongoing monitoring of adverse events including intussusception. Availability of an additional rotavirus vaccine could also prove to be of benefit in other developing countries.

In an accompanying Viewpoint, Maharaj Bhan and coauthors describe the collaborative international process which led to the development of Rotavac. They discuss the economic landscape for vaccine development that has influenced the vaccine’s creation and will continue to affect its provision alongside competing vaccines. In a Comment in this issue, Brian Greenwood discusses the ethics of randomised vaccine trials. The setting in which a vaccine is to be used, for instance a low-income country, is expected to affect the protection achieved and necessitates rigorous evaluation. In what circumstances, however, is it appropriate for people in a trial’s control group to be denied a vaccine of expected health benefit in order to establish efficacy in those allocated by chance to an experimental group? Again the question of balance comes into play, which could involve provision of another licensed vaccine to people in the control group. Questions of this nature will continue to exercise researchers and policy makers, especially in resource-poor countries.

Vaccines cross borders readily given their relative ease of administration and durable effects. Not only have vaccines contributed to long-term health gains in high-income countries and the decisive eradication of smallpox, but vaccination campaigns in developing countries have played an important part in reducing neonatal mortality. Yet the ongoing setbacks in the global mission to control poliomyelitis, which have included violent targeted opposition to polio vaccination projects in Pakistan, emphasise the political dimension of health programmes and of vaccination in particular.

There is no shortage of disease targets in need of vaccines. Although development of vaccines against HIV continues to pose serious challenges for both basic and clinical researchers, vaccines against malaria and dengue (both infectious diseases that cause major burdens of morbidity and mortality concentrated in developing countries) are in advanced stages of clinical assessment. In the future, while development of new vaccines will remain costly in terms of time and research effort, the Rotavac story could prove inspiring for a world planning new health aspirations and challenges for the post-MDG era—a combination of research creativity and entrepreneurial ingenuity shaping future medical treatments brought about by and for the people of developing countries.

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