

# Vaccines are the key



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Vaccines do not just prevent disease, they are a long-term investment in the development of a society and in the health of its children. The prevention of childhood disease is not simply a matter of preventing tragic death. Repeated bouts of illness (combined with factors like chronic malnutrition) have a range of subtle negative effects on educational attainment, physical development and cognitive ability that can affect people late into adult life.

Healthy children are key to a prosperous society, yet children in Bangladesh and other developing countries continue to face an unacceptably high burden of preventable and treatable infectious disease. In

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advanced economies improvements in sanitation and healthcare have made childhood deaths from diarrhoeal disease a thing of the past. Yet across the world diarrhoeal disease continues to kill over 1,400 children every day, almost entirely in the poor countries of Asia, Africa and Latin America.

More must be done to address this shocking structural inequality in the world. Institutions like the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b) have played a central role in the fight against childhood diarrhoeal disease through the discovery, development and promotion of oral rehydration solution (ORS) and ongoing public health efforts to improve sanitation, treatment and diagnosis throughout the country. These innovations have prevented millions of deaths across the world. Yet the persistence of childhood diarrhoeal disease shows that this is not enough. A vaccine that could prevent diarrhoeal disease would be extremely useful in the current context of Bangladesh.

Diarrhoeal disease can be caused by a number of different germs - the most famous of these is probably the marine bacterium *Vibrio cholerae*, native to our region and the causative agent of cholera. Although completely eliminated from advanced economies through improvements in sanitation, cholera continues to claim lives across the Global South. Oral cholera vaccines have recently been developed and have been used to control cholera outbreaks by global public health organisations in countries like Sudan, Mozambique and Indonesia. The icddr,b has recently partnered with the International Vaccine Institute

(IVI) and a local pharmaceuticals company to conduct a clinical study for CholVax, an oral cholera vaccine, in Bangladesh. These oral cholera vaccines have the potential to prevent cholera outbreaks among the most vulnerable populations in our country.

Rotavirus - a virus that causes diarrhoea - is much less well-known than cholera but far more ubiquitous. Rotavirus is the leading cause of severe childhood diarrhoea across the world, accounting for 45 percent of all cases in both developed and developing countries. It is estimated that virtually all children in the world are infected with rotavirus by the time they are 3-5 years old, regardless of economic background.

Surveillance work and research by icddr,b have provided accurate estimates of rotavirus incidence and burden in our country. In Bangladesh, an estimated 2.4 million cases of rotavirus diarrhoea occur in children younger than 5 years annually, resulting in about 3,000 deaths a year. A single episode of rotavirus can cost USD 84 to treat, which is 85 percent of the average Bangladeshi family's income. The total cost of rotavirus hospitalisation in Bangladesh is estimated to be USD 66.8 million per year. Clearly, preventing rotavirus diarrhoea would provide a lot of benefit to the poor people in this country.

Three vaccines have been developed to prevent rotavirus - RotaShield, Rotarix and Rotateq. The icddr,b is one of the only institutions in the entire world to have conducted vaccine studies for all three vaccines in all phases of testing. These vaccine studies play a key role in facilitating

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vaccine licensing and guiding public health policy. RotaShield is no longer recommended for use due to concerns about safety, but Rotarix and Rotateq have been available in private clinics in Bangladesh. However, at about USD 17 a dose they are too expensive to be widely used by the general public through the private sector.

Efficacy studies conducted by icddr,b have shown that rotavirus vaccines are about 45 percent effective in the context of Bangladesh. It is

estimated that routine rotavirus immunisation would prevent about 135,000 hospitalisations due to severe rotavirus diarrhoea in a year in Bangladesh. Furthermore, cost-effectiveness studies conducted in many countries have shown rotavirus immunisation to be highly cost-effective in high-burden countries like Bangladesh. These results make a strong case for the introduction of routine rotavirus vaccination into Bangladesh's Expanded Programme on Immunisation (EPI).

In September 2016, Bangladesh applied to GAVI, the Vaccine Alliance, to seek support to include rotavirus immunisation as part of our EPI. In November 2016 the application was approved. Currently, the biggest limitation to widespread rotavirus immunisation is the lack of a cold chain - as these vaccines use a live virus, they are not stable at room temperature. The government of Bangladesh is expanding cold chain capacity and plans to fully introduce routine rotavirus immunisation by 2018.

Eighty countries have now introduced rotavirus vaccines into their EPI, and more than 130 countries have licensed the vaccine. Rotavirus immunisation represents nothing less than a new global paradigm for public health. Disease surveillance and vaccine study work at icddr,b has played a central role in making this new paradigm a reality. Ultimately, these vaccines will improve the lives of the poorest children in Bangladesh. They are an investment in a bright and prosperous future for our beautiful country.

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