

Oral Delivery Technologies

Health need

Vaccines against some pathogens are more efficacious when delivered by the oral route, particularly if the route corresponds with the site of infection. By adopting a route for vaccine delivery that mimics the natural infection, the appropriate immune tissue is targeted, helping to better achieve a protective immune response.

Vaccines and medications that are suitable for oral routes of delivery include oral poliovirus vaccine, rotavirus vaccine, cholera vaccine, pediatric drugs, and some nutritional supplements. There are many devices that can deliver drugs and vaccines orally. However, some are not appropriate for developing countries, and others are only suitable under particular circumstances. For example, some vaccines have large dose sizes, which preclude the use of certain types of devices. These vaccines are also packaged in bulky containers that can easily overburden a packed cold chain. Even the most streamlined, user-friendly design will do little good if it proves too costly for immunization programs in low-resource settings.

Technology solution

A major benefit to oral delivery is ease of administration, particularly by health workers with minimal training. It also means one less injection for a baby and one less needle for disposal. Despite many options, finding the right technology for a particular situation can be a challenge. The device has to fit the drug's format and be inexpensive to manufacture and purchase. Ideally, it should also integrate seamlessly into the logistics system and be suitable for outreach to remote areas. Connecting device developers to vaccine manufacturers and enabling these partnerships through a long development process calls for more creative and synergistic approaches.

Current status and results

PATH specializes in exploring the landscape of available technologies, identifying and developing solutions, and helping countries articulate their needs so that manufacturers can offer products that best fit a program's unique situation. Our goal is to ensure that the presentation and packaging of vaccines and medications is appropriate, sustainable, and enables the best coverage and efficacy possible.

As part of this effort, PATH conducted an analysis and user assessment of oral delivery technologies for use with rotavirus vaccine. A variety of types of devices were evaluated, including liquid droppers and tubes, modified syringes, prefilled and user-filled devices, single- and multiuse devices, and separate as well as integrated reconstitution technologies. Moving forward, PATH will continue to assess the technical feasibility, cost, usability, and cold chain impact of oral delivery devices for rotavirus vaccine. The results will be shared with manufacturers developing new, low-cost rotavirus vaccines intended for use in low-resource countries.



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Oral delivery of polio vaccine in Bangladesh.

A major benefit to oral delivery is the ease of administration.

Availability

For more information regarding this project, contact Darin Zehrung at dzehrung@path.org.

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