What is the Value Proposition for a non-Replicating Rotavirus Vaccine?

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Background

Live oral rotavirus vaccines (LORV) represent important public health interventions despite efficacy values in several high rotavirus disease settings in the range of 40-60%. Marked waning of efficacy in the first 2 years of life has also been described. Parenteral, non-replicating rotavirus vaccine (NRRV) candidates in development might overcome these deficiencies. The relative public health and economic value of NRRVs remains to be systematically determined.

Methods

A multi-disciplinary team at PATH with partners is currently determining the value proposition for NRRVs in different settings. Assumptions regarding efficacy and delivery characteristics of both LORV and NRRVs were informed by a careful analysis of the rotavirus literature, and we took into account DTP-combination vaccines likely available in a few years. The main body of work includes feasibility and accessibility assessments based on interviews with global and national immunization program stakeholders. These, in turn, will feed into demand forecasts and health economic modelling. We also consulted the published literature to help focus our efforts given numerous potential use cases for an NRRV (primary infant series, booster NRRV immunization or a mixed scenario).

Results

In an initial analysis, we examined a published modelling study (Burnett Vaccine 2017) to determine, in a population of children well-immunized with LORV, the proportion of the remaining rotavirus-related mortality preventable with an NRRV booster at 12 months of age. With the most likely waning assumptions, a highly effective boost might prevent only 6% and 12% of the remaining rotavirus-related mortality in Africa and Southeast Asia, respectively. This may be optimistic as another study (Rogawski JID 2018) concluded that, in similar settings, the age-related increase in immunity in the unimmunized group due to natural infection could account for as much as 50% of the apparent waning. We also undertook economic modelling to assess the economic viability of a mixed schedule (use of both LORV and 2 doses of NRRV in infants).

Summary

Our efforts may be most productively spent assessing the value proposition for NRRV vaccination within a primary infant series. However, a mixed schedule may also be economically viable, appearing more impactful but less cost effective than a LORV alone.