Are rotavirus vaccines a good investment for middle-income countries?

Middle-income countries not eligible for support from Gavi, the Vaccine Alliance, have been slow to introduce rotavirus vaccines, largely due to cost concerns. In most cases, rotavirus vaccination is likely to be highly cost-effective and beneficial for these countries.[1]

Rotavirus infections caused approximately 151,000 deaths in children younger than five years of age in 2019.[2] The World Health Organization (WHO) recommends routine rotavirus vaccination in all countries, especially in those with a high burden of rotavirus diarrhea.[3] In most of the 110+ countries that have introduced rotavirus vaccines into routine immunization, the vaccines have been highly impactful and cost-effective, with benefits vastly outweighing risks.[4] Of these countries, approximately half have been lower-income countries that have introduced with support from Gavi. Most of the other countries that have introduced are higher-income countries.

The biggest group of countries that have yet to introduce rotavirus vaccines are middle-income countries (MICs) not eligible for Gavi support. Of the 63 non-Gavi MICs, only 30 have introduced rotavirus vaccines. Because these countries often have constrained budgets but do not benefit from international aid, cost may be a major hurdle to introduction.[5]

With the availability of lower-cost rotavirus vaccines, as well as enhanced data on introduction costs and disease burden from other countries, PATH conducted a modeling study to predict the 2020-2029 impact, cost-effectiveness,* and benefit-risk ratio of the currently available rotavirus vaccines for 63 MICs ineligible for Gavi support.[1]

What benefit could rotavirus vaccines have in MICs?

Between 2020 and 2029, routine rotavirus vaccination in all MICs not eligible for Gavi support could avert:

- 77 million rotavirus cases
- 21 million clinic visits
- 3 million hospitalizations
- 37,900 deaths
- US$826 million in government spending
- US$1.2 billion in societal spending

Where would rotavirus vaccines have the greatest impact?

Among MICs that have not yet introduced routine rotavirus vaccination, rotavirus vaccines could have a substantial health benefit in:

CHINA	EGYPT	THE PHILIPPINES	IRAN
3,647 lives saved from 2020-2029	**6,509** lives saved from 2020-2029	**4,539** lives saved from 2020-2029	**1,035** lives saved from 2020-2029

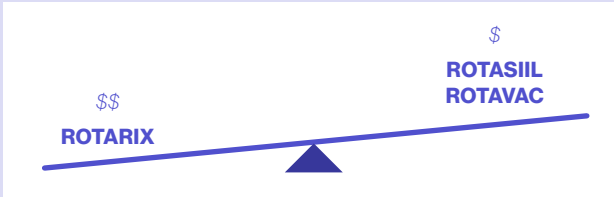
Are rotavirus vaccines cost-effective in MICs?

Considering costs from the government perspective, rotavirus vaccination is highly cost-effective in 77% of MICs analyzed. This includes 21 of the 33 MICs not yet using rotavirus vaccines.

Considering costs from the societal perspective, the percentage of countries for which rotavirus vaccination is highly cost-effective rises to 87% of countries analyzed.

Which rotavirus vaccine product is most cost-effective for MICs?

In all 63 MICs, vaccination costs were estimated to be systematically lower with ROTAVAC® and ROTASIIL® than with ROTARIX®, with a slight cost advantage to ROTASIIL.



Should MICs introduce rotavirus vaccines?

Based on the availability of low-cost rotavirus vaccine products and the potential benefits of rotavirus vaccination that vastly outweigh risks, rotavirus vaccines are likely to provide strong public health benefits and value for money in most MICs ineligible for Gavi support.

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2. Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. *The Lancet*. 2020;396(10258):1204-1222.
3. World Health Organization. Rotavirus vaccines: WHO position paper—July 2021. *Weekly Epidemiological Record*. 2021; 96: 301-320.
4. Haider S, Chaikledkaew U, Thavorncharoensap M, et al. Systematic review and meta-analysis of cost-effectiveness of rotavirus vaccine in low-income and lower-middle-income countries. *Open Forum Infectious Diseases*. 2019; 6ofz117.
5. Aliabadi N, Tate JE, Parashar UD. Potential safety issues and other factors that may affect the introduction and uptake of rotavirus vaccines. *Clinical Microbiology and Infections*. 2016; 22: S128-S135.

* Cost-effectiveness is defined as having an incremental cost-effectiveness ratio (cost per disability-adjusted life-year [DALY] averted by rotavirus vaccination) lower than 0.5 times their GDP per capita with at least one of the rotavirus products under consideration. This value is considered cost-effective in most contexts, but each country may have its own threshold and unique considerations.