Comprehensive estimates of cost-effectiveness support rotavirus vaccine introduction & expansion

Cost-effectiveness of rotavirus vaccination in children under five years of age in 195 countries: A meta-regression analysis

Introduction

Cost-effectiveness analyses (CEA) can support decisions to introduce or expand rotavirus vaccination in routine immunization schedules. CEA are not available in 53 countries. Only one CEA exists for 49 countries. For countries with more than one CEA, results can vary greatly.

We used advances in meta-regression methods and estimates of vaccine efficacy by location to estimate incremental cost-effectiveness ratios (ICERs) for rotavirus vaccination in 195 countries.

Methods

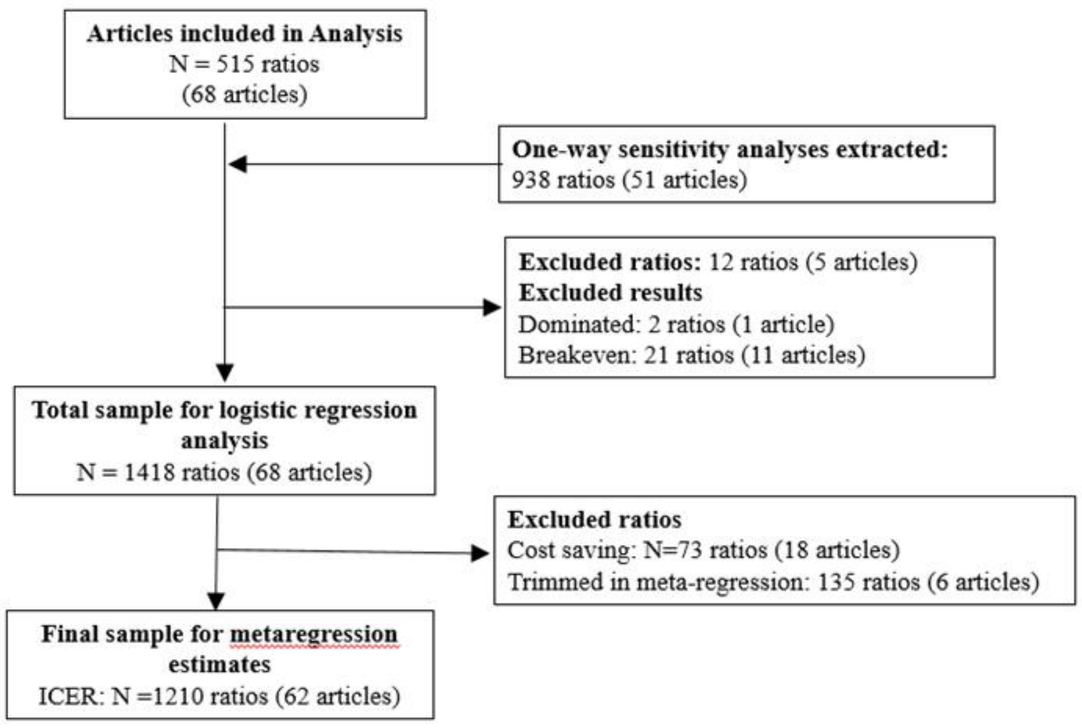
Data are from Tufts University CEA and Global Health CEA registries of published estimates.

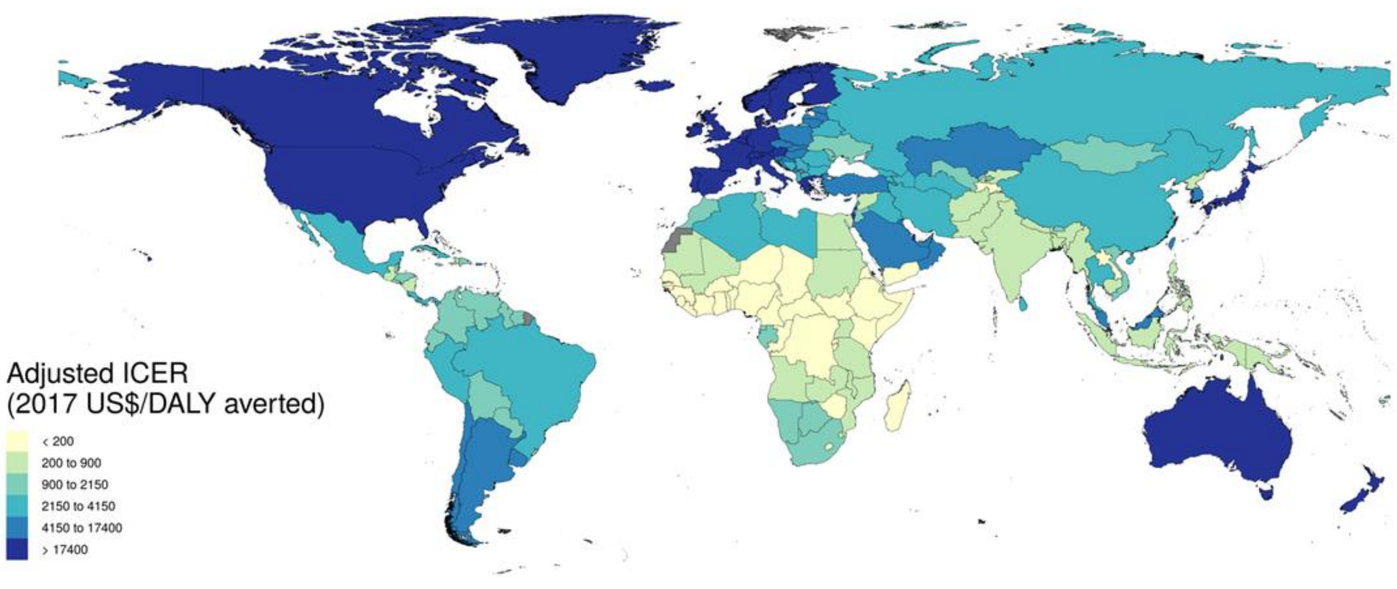
We used a five-stage, mixed-effects, Bayesian metaregression framework to predict ICERs, and logistic regression model to predict the probability that the vaccine was cost-saving.

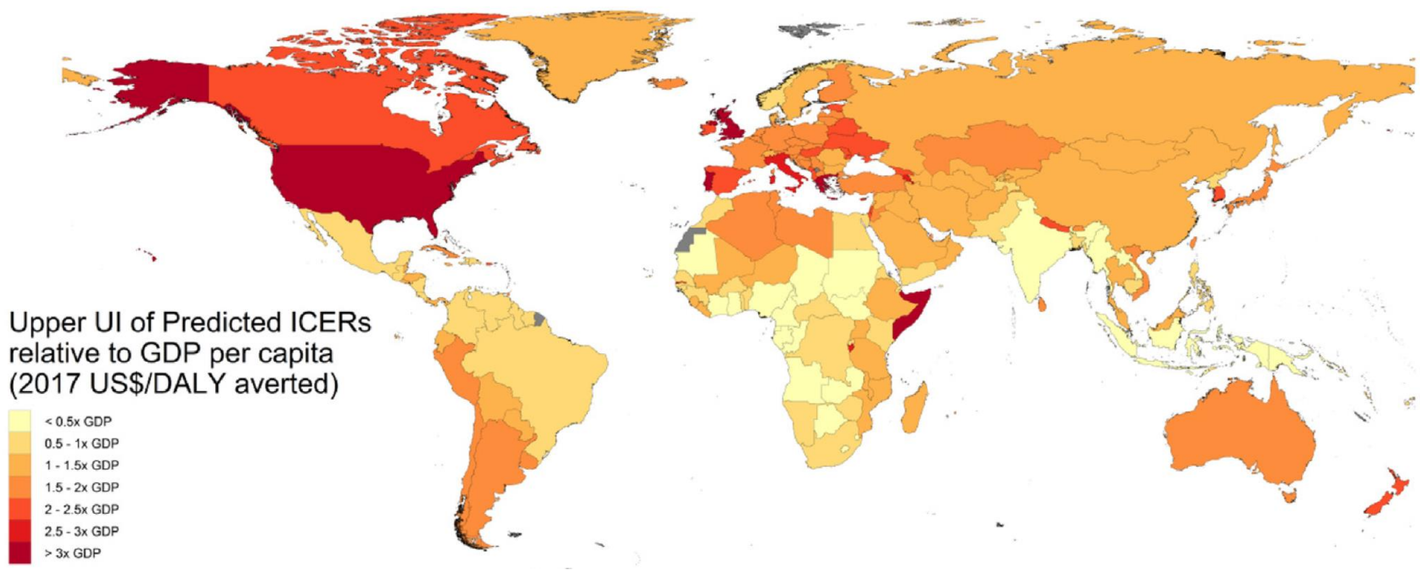
In the first stage, we estimated prior distributions for seven preselected covariates in which one-way sensitivity analyses were reported. The aim was to reduce omitted variable bias and identify prior distributions for variables that were highly correlated, such as log-vaccine cost and log-GDP per capita.

For both models, covariates were vaccine characteristics including efficacy, study methods, and country specific rotavirus disability-adjusted life-years (DALYs) and gross domestic product (GDP) per capita.

All results are reported in 2017 United States dollars.







Results

Among countries eligible for support from Gavi, The Vaccine Alliance, the mean ICER was $255 per DALY averted (95% Uncertainty Interval (UI): $39 - $918).

Among countries eligible for the PAHO revolving fund, the mean ICER was $2,464 per DALY averted (95% UI: $382 -$3,118).

Considering these results in the context of each country's economy and taking uncertainty into account, the upper UI of the adjusted ICERs with was less than 0.5 times GDP per capita in 21 countries and between 0.5 and 1.0 times GDP per capita in 43 countries.

It exceeded 3 times GDP per capita in the US, UK, Portugal, Greece, and Somalia.

Conclusion

Our results synthesize all available evidence, quantify uncertainty to facilitate decision-making, and incorporate recent evidence that vaccine efficacy differs across locations.

The estimates support expansion of rotavirus vaccination programs, particularly in countries eligible for support from Gavi, The Vaccine Alliance.

Marcia Weaver *mweaver@uw.edu*

Please see Janko, et al. Vaccine 2022

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