**Title:**Cost of implementation of malaria vaccination programmes in five sub-Saharan African countries (Burkina Faso, Kenya, Ghana, Mozambique and Tanzania)

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## OBJECTIVES

This study aimed to estimate, the resources needed and associated costs to introduce the RTS,S/AS01 malaria vaccine candidate in the expanded program on immunization (EPI) in five selected sub-Sahara African countries (Burkina Faso, Ghana, Kenya, Mozambique and Tanzania).

## METHODS

Semi-structured interviews were conducted from February to December 2015 among 57 EPI focal persons at different health system levels: central, intermediate (region/district) and local (health facility). The study included areas with different malaria endemicity from both rural and urban environments. Analysis of the information collected and additional published information (eg unit costs), provided estimates for the marginal costs (expressed in 2014 US$), i.e. the costs incurred for the expansion of existing resources. Average, minimum and maximum costs were estimated to reflect the total cost per fully immunized child, differentiating fixed (independent from the number of doses) from variable costs. Another distinction was made between economic and financial costs, the latter implying investment by the national health system.

## RESULTS

At a vaccine price of US$5 per dose (base case scenario), the economic costs per fully immunized child (4 doses all administered at the health facility) ranged from an average of US$25.42 (minimum:US$23.10-maximum:US$30.21) in Burkina Faso to US$36.79 (minimum:US$33.23-maximum:US$38.34) in Kenya. At a vaccine price of US$2 per dose, average costs were respectively US$12.00 (minimum:US$10.80-maximum:US$15.10) and US$23.27 (minimum:US$20.68-maximum:US$23.77) for these two countries,. At a vaccine price of US$10/dose, Kenya had the highest average costs (US$59.32 [minimum:US$54.14-maximum:US$62.61]).

When the fourth dose is administered in an outreach setting rather than at the health facility, and at a price of US$5 per dose, average costs increased by US$1 maximum.

In the base case scenario, the main costs components were vaccine purchase cost and wastage (75%). The average variable costs were similar across explored countries, and ranged from US$23.12 (minimum:US$20.86-maximum:US$27.85) for Burkina Faso to US$24.27 (minimum:US$21.01-maximum:US$29.53) for Ghana. Variability across countries was explained by the fixed-costs component rather than the variable costs. Most costs were financial.

## CONCLUSIONS

These estimates are overall similar to previous estimates based on secondary data. In the current context of several vaccines being introduced in the EPI, economies of scales are expected however in a context of additional stress on the health systems. These considerations should be taken into account for the potential introduction of the RTS,S/AS01 malaria vaccine candidate as well as of any other vaccines.

## DISCLOSURES

The authors certify that the work described in this abstract has never been accepted at a prior meeting. GlaxoSmithKline Biologicals S.A. (Rixensart, Belgium) funded this study (GSK study identifier: HO-14-14725) and all costs related to the development of the related publications. Editorial support was provided by Fabien Debailleul and Carole Desiron (Business & Decision Life Sciences on behalf of GSK Vaccines).

## CONFLICTS OF INTEREST

S. Alonso, V.O. Were, S. Kariuki, M. Mrisho, G. Bonsu, B. Fakih and F. Yaya Bocoum have nothing to disclose. J. Nonvignon received personal fees from the GSK group of companies for this study. E. Sicuri received personal fees from the GSK group of companies for this study. C. Sauboin is an employee of the GSK group of companies and hold restricted shares in this company. O. Leeuwenkamp reports consulting fees paid to his institution by the GSK group of companies until May 2015. His wife is employed by the GSK group of companies and holds restricted shares in this company.