Malaria Vaccine Programme update

Dr. Stephen Sosler, Head, Vaccine Programmes
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Accelerating access: Gavi’s vaccine portfolio

- PNEUMO-COCAL MULTIVALENT MENINGITIS
- INACTIVATED POLIO
- ORAL CHOLERA
- HPV (CERVICAL CANCER)
- MEASLES-RUBELLA
- JAPANESE ENCEPHALITIS
- EBOLA
- TYPHOID
- MALARIA

**Year of first introduction/use of stockpile**

- **Gavi 1.0**
- **Gavi 2.0**
- **Gavi 3.0**
- **Gavi 4.0**
- **Gavi 5.0**

*Excluding COVID-19 vaccination*
Summary findings from the Malaria Vaccine Implementation Programme

RTS,S/AS01 implementation 2019 - 2023

- Over 2 million children reached through implementation in routine immunization programmes in Ghana, Kenya and Malawi since 2019
- Evaluation completed in 2023

<table>
<thead>
<tr>
<th>High impact results among children age-eligible for vaccination¹:</th>
</tr>
</thead>
<tbody>
<tr>
<td>13% reduction in all-cause mortality</td>
</tr>
<tr>
<td>22% reduction in hospitalized severe malaria</td>
</tr>
<tr>
<td>17% reduction in hospitalization with positive malaria test</td>
</tr>
</tbody>
</table>

Vaccine uptake is high, with no reduction in ITN use, uptake of other vaccines, or change in health-seeking behavior

Community demand and health worker acceptability is high

The vaccine continues to demonstrate a strong safety profile, after more than 6 million doses provided.

Vaccine delivery is equitable by gender and socioeconomic status; vaccine is reaching children who are not using other forms of malaria prevention (access to malaria prevention measure grows up to 94%).

¹ The reduction in mortality was achieved during a period of vaccine scale-up with coverage of the three primary doses of 63% - 75% and coverage of dose 4 of 33-54% (across countries at ~30 months since introduction). Impact is expected to increase further with increased vaccine coverage.
Two available vaccines

- **Product Choice:** There is no evidence that one vaccine performs better than the other. Country decisions on which vaccine to introduce should be made on programmatic characteristics, such as affordability and supply considerations to allow scale-up.

**RTS,S/AS01 Malaria Vaccine**
- WHO recommended: since October 2021
- WHO PQ: since July 2022

**R21 Malaria Vaccine**
- WHO recommended: since October 2023
- WHO PQ: since December 2023

WHO list of pre-qualified vaccines: [https://extranet.who.int/prequal/vaccines/prequalified-vaccines](https://extranet.who.int/prequal/vaccines/prequalified-vaccines)
WHO recommends the programmatic use of malaria vaccines for the prevention of *P. falciparum* malaria in children living in malaria endemic areas, prioritizing areas of moderate and high transmission

- The malaria vaccine should be provided in a schedule of 4 doses in children from around 5 months of age\(^1\) for the reduction of malaria disease and burden
- A 5th dose, given one year after dose 4, may be considered in areas where there is a significant malaria risk remaining in children a year after receiving dose 4
- Countries may consider providing the vaccine using an age-based, seasonal, or a hybrid of these approaches in areas with highly seasonal malaria or areas with perennial malaria transmission with seasonal peaks
- Countries should prioritize vaccination in areas of moderate and high transmission, but may also consider providing the vaccine in low transmission settings
- Vaccine introduction should be considered in the context of comprehensive national malaria control plans

\(^1\) Vaccination programmes may choose to give the first dose at a later or slightly earlier age based on operational consideration. Studies with RTS,S/AS01 indicated lower efficacy if first dose was given around 6 weeks of age. However, it seems unlikely that efficacy would be substantially reduced if some children received the first dose at 4 rather than 5 months, and providing vaccination at an age younger than 5 months may increase coverage or impact.

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This recommendation now includes two malaria vaccines:

- **RTS,S/AS01**
  - WHO prequalified in 2022
- **R21/Matrix-M**
  - Currently under WHO pre-qualification review
WHO recommendation: malaria vaccine dose schedule and delivery

• In areas of perennial malaria transmission, the malaria vaccine should be provided as a 3-dose primary series, starting from around 5 months of age, with a minimal interval of 4 weeks between doses.

• The fourth dose should be given to prolong protection. There can be flexibility to optimize delivery for dose 4:
  • Alignment with other second year of life vaccines
  • Administration prior to seasonal peaks to optimize efficacy
  • The optimal interval between dose-3 and 4 has not been established

• If malaria remains a significant public health problem in children a year after the fourth dose, then a fifth dose might be considered, depending on a local assessment of feasibility and cost-effectiveness.

This recommendation now includes two malaria vaccines:

• RTS,S/AS01
  WHO prequalified in 2022

• R21/Matrix-M
  Currently under WHO pre-qualification review
Highest impact achieved when malaria interventions strategically used together

Reduction in malaria burden when interventions are strategically used together

Insecticide Treated Net (ITN) efficacy: 

Seasonal Malaria Chemoprevention (SMC) efficacy:  https://journals.plos.org/plosmedicine/article/authors?id=10.1371/journal.pmed.1003727

RTS,S/AS01 efficacy of seasonal vaccination 63% efficacious over 3 years  
**Details on vaccine manufacturers and supply**

<table>
<thead>
<tr>
<th>RTS,S/AS01</th>
<th>R21/Matrix-M</th>
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</thead>
<tbody>
<tr>
<td><strong>Manufacturer</strong></td>
<td><strong>Manufacturer</strong></td>
</tr>
<tr>
<td>GlaxoSmithKline (GSK)</td>
<td>Serum Institute of India (SII)</td>
</tr>
</tbody>
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<thead>
<tr>
<th><strong>Procurement Framework</strong></th>
<th><strong>Market Pricing (2024)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract between UNICEF and GSK was established in March 2023</td>
<td>Contract between UNICEF and Serum Life Sciences (SLS), subsidiary of manufacturer SII, was finalized this week, it is conditional to R21/Matrix M achieving WHO PQ.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Market Pricing (2024)</strong></th>
<th><strong>Overall volumes available</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>~US$10.00 per dose (EUR 9.30)</td>
<td>Sufficient supply to meet realistic and planned demand</td>
</tr>
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</table>

- Limited overall supply of 18m doses for 2023-25; will get focused on fewer countries enabling those countries to scale up with the RTS,S doses available
- Technology transfer of RTS,S to Bharat Biotech is underway, with prospects of increased supply and reduced prices

Source: UNICEF Malaria vaccine questions and answers. October 2023
https://www.unicef.org/supply/documents/malaria-vaccine-questions-and-answers
Gavi supported Technical Assistance for Vaccine Introduction

### Introduction planning
- Support microplanning
- Support phased introduction strategies
- Conduct & disseminate research to inform vaccine introduction
- Develop/strengthen platforms to reach children at new RI contact points

### Training & Communication
- Develop training materials & conduct trainings at all levels of health system
- Support RCCE plans & IEC materials to promote vaccine confidence

### Monitoring & planning
- Maintain/update monitoring tools
- Support comprehensive vaccine mgt. plans (reduce wastage & stock-outs)

### Learning
- Document & disseminate lesson learnt (e.g.: to inform scale-up)

### Coordinate & support
- NMCP & EPI coordination mechanism should be developed and/or maintained
- Supportive supervision aiming at continuous improvement of the programme
Co-financing implications for countries

Exceptional, time-limited approach for malaria vaccine\(^1\) applicable to both RTS,S and R21

<table>
<thead>
<tr>
<th>Co-financing status</th>
<th>Implications</th>
<th>Product choice implications</th>
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<tbody>
<tr>
<td><strong>Initial self-financing country</strong></td>
<td>• Country <strong>contributes US $0.20 per dose</strong> (no annual increase)</td>
<td>• No difference across RTS,S and R21</td>
</tr>
</tbody>
</table>
| **Preparatory transition country**       | • Country co-financing **starts at US $0.20** per dose in the first year of introduction  
  • **Increases by 15% annually** (for example US $0.23 in second year) | • No difference across RTS,S and R21                             |
| **Accelerated transition country**       | • Country contributes **20% co-financing in first year of introduction** and increases co-financing by 10 percentage points annually (20% first year, 30% second year and so on)  
  • Country should reach 100% co-financing after 8 years | • **Link to product market price. Higher price = higher co-financing** |

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1. Exceptional co-financing policy to be reviewed no later than 2027; should market conditions change significantly (for instance if significantly cheaper vaccine becomes available), Secretariat will return to Programme and Policy Committee to discuss Malaria co-financing policy (likely for 2025 and beyond)
<table>
<thead>
<tr>
<th>#</th>
<th>Country</th>
<th>Product</th>
<th>Doses (per first approved application)</th>
<th>Intro target</th>
<th>Decision Letter</th>
<th>Scale up/ additional application timeline</th>
<th>TA for implementation</th>
<th>1st shipment and timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ghana (MVIP, AT)</td>
<td>R21 / To be confirmed</td>
<td>2,880,000</td>
<td>Jan</td>
<td>Issued; revised DL to be issued basis of country plans</td>
<td>Approved in Sep ’23 (43 districts and 1.4M doses)</td>
<td>NA</td>
<td>480K; 14 Nov</td>
</tr>
<tr>
<td>2</td>
<td>Kenya (MVIP, AT)</td>
<td>R21 / To be confirmed</td>
<td>1,770,000</td>
<td>Jan</td>
<td>Issued; revised DL to be issued basis of country plans</td>
<td>Applied in Jan ’24 (12 additional sub counties)</td>
<td>NA</td>
<td>320K; 20 Nov</td>
</tr>
<tr>
<td>3</td>
<td>Malawi (MVIP)</td>
<td>RTS,S</td>
<td>2,250,000</td>
<td>Jan</td>
<td>Issued</td>
<td>Planned for H2 ‘24</td>
<td>NA</td>
<td>370K; 17 Nov</td>
</tr>
<tr>
<td>4</td>
<td>Burkina Faso</td>
<td>RTS,S</td>
<td>1,817,045</td>
<td>Feb 5</td>
<td>Issued</td>
<td>To be confirmed</td>
<td>Agreement signed (JHPIEGO)</td>
<td>658K; arrived</td>
</tr>
<tr>
<td>5</td>
<td>Niger</td>
<td>RTS,S</td>
<td>1,629,494</td>
<td>TBC</td>
<td>DL issued Jan 23 (incl. top up)</td>
<td>To be confirmed</td>
<td>Agreement signed (Dalberg)</td>
<td>285K; pending country confirmation</td>
</tr>
<tr>
<td>6</td>
<td>Cameroon (PT)</td>
<td>RTS,S</td>
<td>1,387,045</td>
<td>Jan 22</td>
<td>Issued</td>
<td>To be confirmed</td>
<td>Agreement signed (Dalberg)</td>
<td>331K; arrived</td>
</tr>
<tr>
<td>7</td>
<td>Sierra Leone</td>
<td>RTS,S</td>
<td>1,782,133</td>
<td>Mar</td>
<td>Issued</td>
<td>To be confirmed</td>
<td>Agreement signed (CHAI)</td>
<td>550K; arrived</td>
</tr>
<tr>
<td>8</td>
<td>Benin (PT)</td>
<td>RTS,S</td>
<td>976,517</td>
<td>April</td>
<td>Issued</td>
<td>To be confirmed</td>
<td>Agreement signed (AMP)</td>
<td>216K; arrived</td>
</tr>
<tr>
<td>9</td>
<td>Liberia</td>
<td>RTS,S</td>
<td>231,485</td>
<td>Apr 8</td>
<td>Issued</td>
<td>No immediate plans</td>
<td>Agreement signed (JHPIEGO)</td>
<td>112K; arrived</td>
</tr>
<tr>
<td>10</td>
<td>DR Congo</td>
<td>R21</td>
<td>1,437,942</td>
<td>Jul</td>
<td>Issued on Jan 19</td>
<td>Applied in Jan ’24</td>
<td>Agreement signed (PATH/ CHAI)</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>11</td>
<td>Uganda</td>
<td>R21</td>
<td>1,457,046</td>
<td>Oct</td>
<td>Issued on Jan 19</td>
<td>Applied in Jan ’24 (nationwide)</td>
<td>To be signed (PATH)</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>12</td>
<td>Burundi</td>
<td>R21 / To be confirmed</td>
<td>1,445,427</td>
<td>Jul</td>
<td>Issued; revised DL to be issued basis of country plans</td>
<td>To be confirmed</td>
<td>Agreement signed (Dalberg)</td>
<td>Pending PO issue</td>
</tr>
<tr>
<td>13</td>
<td>Mozambique</td>
<td>R21</td>
<td>1,687,115</td>
<td>Jul</td>
<td>Issued on Jan 23</td>
<td>Scale up planning underway</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>14</td>
<td>Sudan</td>
<td>R21</td>
<td>924,812</td>
<td>TBC</td>
<td>AR being prepared</td>
<td>Scale up planning underway</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>15</td>
<td>Nigeria (AT)</td>
<td>R21</td>
<td>3,000,440</td>
<td>Nov</td>
<td>Issued on Jan 19</td>
<td>Applied in Jan ’24</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>16</td>
<td>CAR</td>
<td>R21</td>
<td>452,083</td>
<td>Jul</td>
<td>Issued on Jan 23</td>
<td>To be confirmed</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>17</td>
<td>South Sudan</td>
<td>R21</td>
<td>1,604,599</td>
<td>Jul</td>
<td>Issued on Jan 17</td>
<td>Scale up planning underway</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>18</td>
<td>Chad</td>
<td>R21</td>
<td>553,306</td>
<td>May</td>
<td>Issued on Jan 18</td>
<td>Scale up app. planning underway</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>19</td>
<td>Guinea</td>
<td>R21</td>
<td>1,347,326</td>
<td>TBC</td>
<td>To be issued</td>
<td>To be confirmed</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
<tr>
<td>20</td>
<td>Cote d’Ivoire (AT)</td>
<td>R21</td>
<td>836,719 (for 2024)</td>
<td>TBC</td>
<td>To be issued</td>
<td>To be confirmed</td>
<td>To be operationalised</td>
<td>Pending mfg. PO issue</td>
</tr>
</tbody>
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Malaria Vaccine Coordination Team (MVCT)

Organizations currently represented:

- Co-chaired by WHO and Gavi Secretariat, created in early 2022
- MVCT provides a platform for coordination and information sharing
- Initial focus on support to design of the Gavi malaria vaccine programme
- Overtime, expected to support the ongoing implementation of the Gavi programme & coordination among partners
Gavi Funding Guidelines provide an overview of the support available through Gavi & the process to apply

Gavi Support Guidelines
Main page with links to all relevant documents
French / English

Gavi Application Process Guidelines
French / English

Gavi Vaccine Funding Guidelines
With malaria vaccine programme requirements in chapter 3.5
French p.37 / English, p.31

Interim Malaria Vaccine Funding Guidelines
With interim guidelines ahead of formal guidelines in Q2, 2024
English, p.31
Tools and resources to support planning and implementation

**Malaria vaccine introduction guide** – advanced draft PDF shared via WHO country offices with countries planning introductions
- Available upon request (English and French)
- Published version online in late 2023 will reflect the recent WHO recommendation

**Generic training materials** for country adaptation – English versions to be shared 13 Oct (French versions week 23 Oct) with countries planning introduction
- Modules on malaria, vaccine characteristics (RTS,S/AS01) and storage conditions, schedule and contraindications, vaccine administration, recording and monitoring, communications, AEFI monitoring, and missed opportunities for vaccination

**Other tools and resources** will be posted on [TechNet-21 malaria vaccine page](#)
- Evidence available on both malaria vaccines
- Further examples and lessons from the pilot introductions
- Demand promotion planning guide and risk communications guidance
- Introduction readiness tracking tool in Excel

These will be shared via WHO country offices
And shortly made available online:
- [WHO website](#)
- [TechNet-21](#) malaria vaccine page
Useful links

• TechNet-21 malaria vaccine page

• UNICEF Malaria vaccine questions and answers
Malaria vaccine questions and answers | UNICEF Supply Division

• Malaria Vaccine Implementation Programme
https://www.who.int/initiatives/malaria-vaccine-implementation-programme

• WHO Press release on R21 recommendation
WHO recommends R21/Matrix-M vaccine for malaria prevention in updated advice on immunization
Thank you