

unicef | for every child

Malaria Vaccines: Questions and Answers on Supply, Price, and Market Shaping

UNICEF Supply Division

October 2023

Malaria Vaccine: Questions and Answers on Vaccine Supply, Price, and Market Shaping
October 2023

UNICEF has to date published three (3) iterations of Malaria Vaccines Questions & Answers on Supply, Price and Market Shaping. This update provides information on malaria vaccines supply, price and availability following WHO Recommendation of a second malaria vaccine, R21/Matrix-M. It reflects the current outcome of Malaria Vaccine Tender and highlights current key evolving dynamics in the Malaria Vaccine market.

This document has been developed by UNICEF in collaboration with partners including the World Health Organization (WHO), Gavi, the Vaccine Alliance (Gavi), and PATH. It provides general information on malaria vaccine supply, price, and the ongoing market shaping efforts to complement information that is publicly available on programmatic elements and Gavi application requirements. The information includes the current outcome of UNICEF's tender for malaria vaccine based on the extensive evaluation of the proposals received against this tender, in depth negotiations, and continued partner consultations. As market dynamics continue to evolve, this document will be updated with new information.

1. Supply Situation

Two malaria vaccines are currently recommended by WHO[1] for use to prevent P.*falciparum* malaria in young children, the RTS,S/A01 vaccine, currently manufactured by GlaxoSmithKline (GSK), and the R21/Matrix-M vaccine, manufactured by Serum Institute of India Pvt (SII).

a. What is the overall supply situation for malaria vaccines?

.

- The WHO recommendation of R21/Matrix-M malaria vaccine in October 2023 is anticipated to complement the ongoing rollout of the RTS,S/AS01 vaccine to ensure access to sufficient supply of malaria vaccines to benefit all children living in areas of risk and enable countries to broadly rollout vaccination.
- Following the prequalification of R21/Matrix-M vaccine by WHO, the combined expected supply availability of RTS,S/AS01 and R21/Matrix-M malaria vaccines is anticipated to be sufficient to enable countries that wish to roll out malaria vaccines as per WHO recommendations to do so without supply constraint from 2024. However, other constraints may delay malaria vaccine introductions, including competing health priorities at country level, availability of sufficient cold chain capacity and financial considerations. Timely availability of vaccine supply is to a certain degree a function of demand materialization, and it is therefore important that sufficient time is provided to manufacturers in respect to production lead times and necessary quality releases.
- In line with its award strategy, UNICEF may consider additional awards to existing and pipeline manufacturers of malaria vaccine, as additional sources of malaria vaccine become available, provided that this supports the objectives of the Gavi Market Shaping Roadmap working towards a healthier malaria vaccine market.

b. What is the supply situation for the RTS,S/AS01 malaria vaccine over the near and medium term?

- Over the 2023-2025 period, GSK, the developer and manufacturer, expects to produce approximately 18 million doses in total, with 4 million doses being available for supply from late 2023. Expected availability for 2024 is 6 million doses, and 8 million doses in 2025. UNICEF has secured access to these volumes through a supply agreement established between the parties. With initial demand exceeding supply, in July 2023, UNICEF, WHO, and Gavi announced the outcome of the first malaria vaccine supply allocation utilizing the 18 million doses of RTS,S/AS01 vaccine among 12 countries[2]. The allocations were determined by applying the principles as outlined in the framework for the allocation of limited malaria vaccine supply that prioritizes those areas of highest need, where the risk of malaria illness and death amongst children is highest, until supply fully meets demand. GSK is

[1] *WHO recommends R21/Matrix-M vaccine for malaria prevention in updated advice on immunization.*

[2] UNICEF, *18 million Doses of First-ever Malaria Vaccine Allocated to 12 African Countries for 2023-2025*, UNICEF, Copenhagen, July 2023.

working towards increasing production volumes, with a plan to produce 15 million doses annually from 2026 through 2028.

- To ensure long-term sustainable supply, accessibility, and affordability of RTS,S/AS01 vaccine, GSK, Bharat Biotech (BBIL), and PATH announced in January 2021 the signing of a technology transfer agreement which is expected to be completed by 2028. This includes the transfer of manufacturing the RTS,S antigen component of the vaccine and grants BBIL the license to commercialize and supply the RTS,S/AS01. GSK will retain the production of the adjuvant component of the vaccine (AS01) and will supply it to BBIL.
- The technology transfer is underway and taking place in a phased manner, with the transfer of secondary activities (e.g., filling, freeze-drying, and packaging), initially using GSK-manufactured RTS,S bulk antigen prior to the completion of the full technology transfer. This may enable BBIL to initiate supply earlier than 2028.
- The technology transfer to BBIL is the pathway towards increased supply of RTS,S/AS01, as UNICEF expects BBIL to have a greater antigen manufacturing capacity than GSK (i.e., greater than 15 million doses per year).
  GSK confirmed it will double the production of its AS01 adjuvant for use in the RTS,S/AS01 malaria vaccine to enable increased production capacity at BBIL. GSK's commitment to supply the AS01 adjuvant currently extends until the end of 2042.

c. What is the supply situation for the R21/Matrix-M malaria vaccine over the near and medium term?

- Following the WHO recommendation for the R21/Matrix-M vaccine, and through a recently executed conditional supply agreement, UNICEF secured access to R21/Matrix-M. The agreement is conditional to the R21/Matrix-M vaccine achieving WHO prequalification.
- Based on current estimated demand from countries, and subject to approximately four (4) months production lead time from confirmed order, UNICEF expects sufficient supply availability to meet countries' needs in 2024 and beyond as per WHO recommendations.

2. Price

a. What is the expected price of the malaria vaccine?

- The RTS,S/AS01 malaria vaccine ceiling price is EUR 9.30 per dose for supply during 2023-2025. The price reflects the fact that vaccine production is still scaling up and the supply is not yet in a steady state or benefitting from economies of scale.
- GSK has committed to a price not exceeding the cost of manufacturing, plus a financial return of no more than five per cent, which would be reinvested into further product development. As an outcome of UNICEF's current tender, this price reflects the anticipated cost of manufacturing and GSK's agreement to supply the vaccine in 2023 at this price without a financial return. Further, as an outcome of negotiated terms, GSK has agreed to revisit the cost of manufacturing and adjust the price downwards should the cost of manufacturing decrease, and to reflect this reduction in a retroactively adjusted vaccine price, with a refund mechanism agreed with UNICEF to the benefit of countries and donors. To facilitate implementing country and donor budget planning, the price of EUR 9.30 per dose will be maintained as a ceiling price during the period of the current supply agreement between GSK and UNICEF, which means until the end of 2025.
- R21/Matrix-M malaria vaccine, has been secured at initial price of USD 3.90 per dose, for its two-dose vial presentation. The supply agreement with UNICEF includes tiered pricing and price per dose is expected to be further reduced when certain demand volumes materialize.
- Gavi approved in December 2022 an exceptional and time-limited co-financing modality for malaria vaccines, which would be reviewed no later than end-2027.
  - For initial self-financing countries, this exceptional co-financing modality would entail a country contribution of USD 0.20 per dose.
  - For preparatory transitioning countries, their co-financing of USD 0.20 per dose in the first year would increase by 15 per cent a year.
  - For countries in an accelerated transition phase, their contribution would be of 20 per cent of the price in the first year of introduction and will increase by 10 per cent annually. In addition, they will be eligible for eight years of Gavi support irrespective of timing of application during their accelerated transition phase.
- With the transfer of production of RTS,S/AS01 to BBIL, and the WHO Policy Recommendation for R21/Matrix-M vaccine and its entry into the market, countries can therefore expect the weighted average price per dose to decrease over time.

3. Summary of key information on malaria vaccines currently recommended for use by WHO:

	RTS,S/AS01	R21/Matrix-M
WHO position PQ status Availability	- Recommended by WHO since October 2021 - WHO PQ in July 2022 - Available in country from late 2023 for January 2024 introductions (for countries with a confirmed supply allocation)	- Recommended by WHO since October 2023 - WHO PQ is under review; best case scenario: PQ late 2023 - Availability to be confirmed, best case scenario: available in country Q2 2024
Indication	- To reduce P. falciparum malaria in young children living in areas where malaria is endemic, prioritizing areas of moderate to high transmission	
Schedule	- 4 doses: 3 monthly doses from 5 months of age and a 4th dose provided to prolong protection - A 5th dose may be considered where there is a significant malaria risk remaining in children a year after receiving dose 4	
Presentation	- Two vials clipped together (1 lyophilized, 1 liquid), reconstituted for 2 doses	- Single vial (liquid), 1 or 2 doses per vial (no reconstitution needed)
Shelf life	- 36 months shelf life	- 24 months shelf life
Cold chain **Safe Injection Equipment (SIE)**	- 2-8°C; - 9.92 cm^3 per dose (in secondary packaging) - Re-use Prevention (RUP) Syringe for reconstitution - Auto Disposable Syringe	- 2-8°C; - thermostability for 2 weeks at 25°C and 40°C, - 7,91 cm^3 per dose (in secondary packaging) - Auto Disposable Syringe

4. Market Shaping

a. What is being done to improve the health of the malaria vaccine market?

- When WHO issued its malaria vaccine recommendation in 2021, it also published its global Market Information for Access to Vaccines (MI4A) market study. The study highlighted the key challenges in this market to help and support the work of partners in market shaping and access.[3]
- Gavi partners developed a market shaping roadmap that outlines how the Gavi Alliance will help to shape and develop the malaria vaccine market into a healthier state, in the short, medium, and long term.
- Guided by the roadmap, Gavi Alliance partners have also been taking actions to improve the health of the market, primarily through UNICEF's tender for malaria vaccines.
- In addition, Gavi's agreement with MedAccess and GSK sought to accelerate access to first available supply and ensure the RTS,S antigen's continued production prior to WHO's recommendation and Gavi's approval for the malaria programme.
- Gavi, UNICEF, WHO, and partners are working together to streamline and accelerate key processes to help increase supply, such as regulatory and policy pathways and establishing demand forecasts that are informed by countries, amongst other processes.
- The Gavi Alliance considers addressing the short-term supply constraints as among the highest priority objectives of UNICEF's tender and the Gavi's roadmap. With the two supply agreements in place for RTS,S/AS01 and R21/MatrixM vaccines this Roadmap goal is considered to be within reach.
    - The roadmap's main objective in the short to medium term is to increase the availability of supply to meet full country demand, and to significantly reduce the price per dose of malaria vaccines, compared to the 2023 pricing

[3] The World Health Organization, *Global Market Study: Malaria Vaccine*, WHO, Geneva, September 2021.

levels. By making malaria vaccine prices more affordable and supply sustainable, it will substantially help to broaden country access to this lifesaving malaria control tool in combination with other malaria control measures such as long-lasting insecticidal nets (LLINs),[4] and Artemisinin-based combination therapy (ACT) and ensure the sustainability of malaria vaccine programmes.

- The roadmap will also aim to help establish long-term supply security by developing a diversified, competitive, secure, and sustainable supplier base. Key to achieving this goal is to ensure that timely and sustainable demand can be developed, which would provide an important incentive for research and developers to continue product innovation and supply scale up.
- Gavi and its Alliance partners will implement the roadmap's action plan, of which a high-level summary is included in the roadmap's Public Summary.[5] Roadmaps are reviewed on an annual basis and updated as and when market evolution indicates a new strategic approach may be warranted.

For further questions or additional information, please contact:

Andrew Owain Jones
Principal Adviser, Vaccine Centre
UNICEF Supply Division
+45 45 33 58 90
anjones@unicef.org

Olga Kosyak
Contracts Specialist
UNICEF Supply Division
+45 45 33 5835
okosyak@unicef.org

Manisha Mishra
Communication Manager
UNICEF Supply Division
mamishra@unicef.org

Other UNICEF information notes can be found at: https://www.unicef.org/supply/market-notes-and-updates

UNICEF issues market and information notes on products and supplies that are essential for the needs of children, and by extension their families. While some products are easily available and affordable, the availability of others can be limited, or in some instances, non-existent in the quality and price required. UNICEF places a strategic focus on these supplies to shape healthy markets. Ensuring a sustainable planet for children continues to be a priority for UNICEF including through its operations and supply management. UNICEF seeks to influence the market to achieve greater coverage, affordable prices, diversified supplier bases, environmental sustainability, and product quality that is fit for purpose and in the right form for children.

[4] UNICEF, *Long-lasting Insecticidal Nets Market and Supply Update*, UNICEF, Copenhagen, October 2022.
[5] Gavi, the Vaccine Alliance, *Malaria Vaccine Market Shaping Roadmap*, Gavi, Geneva, January 2023.