Vaccine Investment Strategy 2024

Annex B: Vaccines for endemic diseases – Summary of analyses

Board Meeting, 6-7 December 2023

gavi.org

Summary of methodology: evaluation of vaccines for endemic diseases

- A vaccination strategy (or multiple strategies) was defined for each candidate based on disease epidemiology, vaccine product profiles, product pipeline, delivery strategy, consultations with disease experts and WHO recommendations.
- These strategies were used to forecast demand and price in current Gavi-supported countries and project health and economic impact of future potential Gavi investments for the period 2026-2040.
- Demand and health impact were also modelled for the original 45 countries eligible under Gavi's Middle-Income Country (MICs) Approach to contribute evidence and inform any future strategic approach.
- Qualitative analyses built on the criteria and indicators used in VIS 2018. Improvements to note include:
  - Mixed methods approach to assess the impact of vaccination on anti-microbial resistance (AMR) including estimating the deaths, morbidity and antibiotic use avoided due to resistant pathogens that have been averted by immunisation.
  - Climate change risks, which were evaluated based on an expert survey, and diagnostics availability and need.
- An evaluation framework with criteria and indicators guided the quantitative and qualitative analyses and outcome were rated (see next slides).
- Details of the methodology and vaccine specific analyses can be found in:
  - Appendix 1 (in PPC Library – Additional materials for October 2018 PPC meeting): Appendix 1 to Doc 7 Evaluation methodologies and consultation approach for vaccines
  - Appendix 2 (in PPC Library – Additional materials for October 2018 PPC meeting): Appendix 3a-3h to Doc 7 Vaccine-specific analyses

VIS 2024 Evaluation framework for vaccines for endemic disease

Ranking Criteria

Criteria	Indicators
Health impact	Total future deaths averted 2026-2040, and per 100,000 vaccinated
	Total future DALYs averted 2026-2040, and per 100,000 vaccinated
Value for money	Vaccine Procurement cost per death averted
	Vaccine Procurement cost per DALY averted
Equity and social protection impact	Disproportionate impact of disease on vulnerable groups
	Vaccination contributes to addressing underlying gender-related barriers faced by caregivers, adolescents and health workers and/or gender associated differences in immunisation coverage
Gavi comparative advantage	Degree of vaccine market challenges
	Gavi role in addressing challenges
Economic impact	Direct medical cost averted
	Indirect cost averted

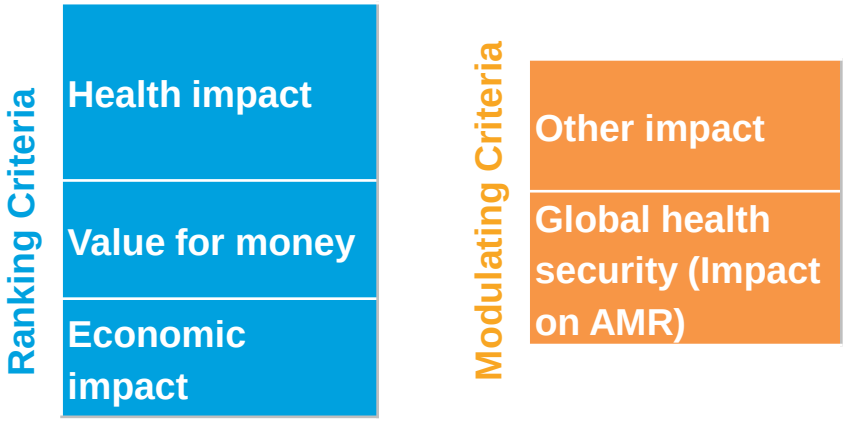
Modulating Criteria

Criteria	Indicators
Modulate up	
Global health security impact	Epidemic potential of disease
	Impact on AMR
	Climate change risks and mitigation
Other impact	Total U5 deaths averted 2026-2040, and per 100,000 vaccinated
Contribution to global agenda	Fit with global development (SDGs), immunization (IA2030) agendas and other relevant global targets
Broader health system benefits	No specific indicator – evaluated case-by-case
Contextual	
Implementation feasibility	Ease of supply chain integration
	Need for healthcare worker training/ behaviour change
	Requirements of vaccination timepoint
	Need for demand promotion (e.g., acceptability, understanding of disease burden)
	Availability of epidemiological data to inform programmes
	Diagnostics availability/ needs
Alternate interventions	Optimal use of current and future alternative interventions (prevention and treatment)

Rating vaccine scorecards

The pathogens were rated red, yellow or green against each indicator. The ratings were a result of **comparative ranking** derived from **quantitative analyses or subjective scoring** derived from qualitative analyses

Quantitative analyses



- Projections based on different scenarios and assessment of uncertainty
- Ranked outcomes across pathogens to determine relative score

Qualitative analyses

- Informed by disease experts
- Thresholds evaluated on whether they are more or less likely to suggest Gavi investment

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Scoring and prioritisation methodology

Ranking criteria colours determine scoring of vaccines

VIS criteria	Indicator	Evaluation	Points
Health impact	Total deaths averted		1
	Deaths averted per 100K vaccinated		0
	DALYs averted per 100K vaccinated		1
Value for money	Procurement cost per death averted		1
	Procurement cost per DALY averted		0
Equity & social protection impact	Impact on vulnerable groups		1
	Addresses gender-related barriers		0.5
Gavi comparative advantage	Vaccine market challenges		0.5
	Alliance role in addressing challenges		0.5
Economic impact	Direct medical cost averted		1
	Indirect cost averted		1
		Total	X%
Modulating Criteria	*e.g. Elimination agenda by 2030, no alternative interventions*		

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Assign points to each vaccine based on its color on each of the ranking criteria on scale of 0 to 1

- Red = 0
- Yellow = 0-0.5[1]
- Green = 1

2

Weight the score for each criterion based on weighting[2] from Steering Committee and PPC consultations and add up point tally of each vaccine

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Modulating criteria can be used to adjust the ranking of a vaccine

1. Score of 0.5 for criteria that are evaluated as red, yellow or green; Score of 0 for criteria that are evaluated as yellow or green

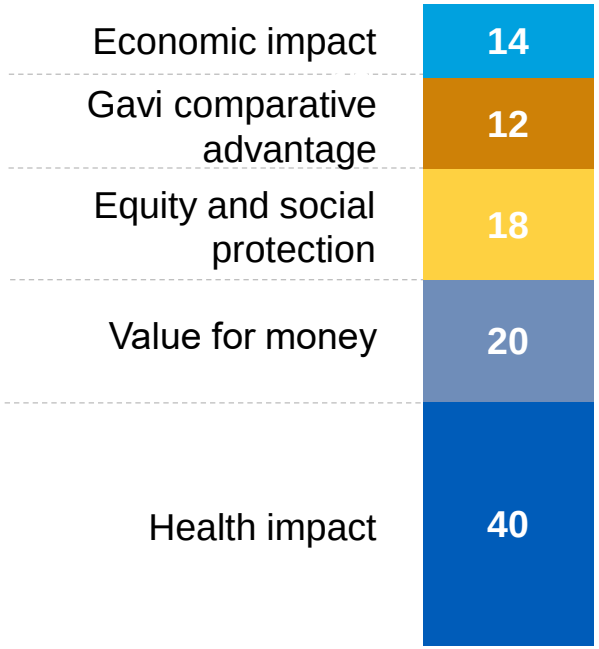
Key considerations of the ranking methodology

- This is the ‘pre-agreed’ methodology that was proposed to and agreed by the SC, and was also used in 2018
- The ranking aims to provide a quantitative measure by which to compare vaccines against one another
- The scoring is based on a point estimate (ie. Estimates from the base case scenario)
- This approach skews towards the extremes by assigning 1 or 0 to two vaccines, which aids in prioritisation.
- However, a score of 0 on a quantitative criteria does not imply no impact, only that it scores lowest of the four vaccines assessed.

Countries, CSOs, the Steering Committee and PPC have input into weightings for ranking criteria

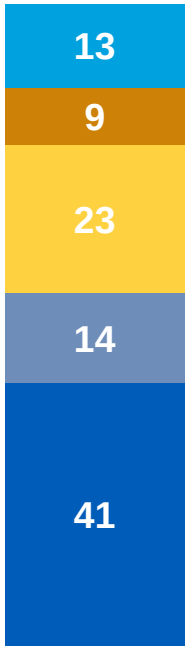
PPC survey

Board members predominantly favoured health impact and value for money as the key criteria



CSO Consultation (Aug 2023)

Health impact, and equity and social protection were the highest-ranking criteria



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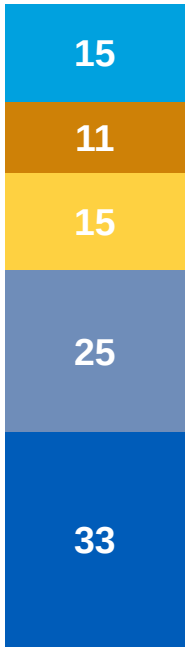
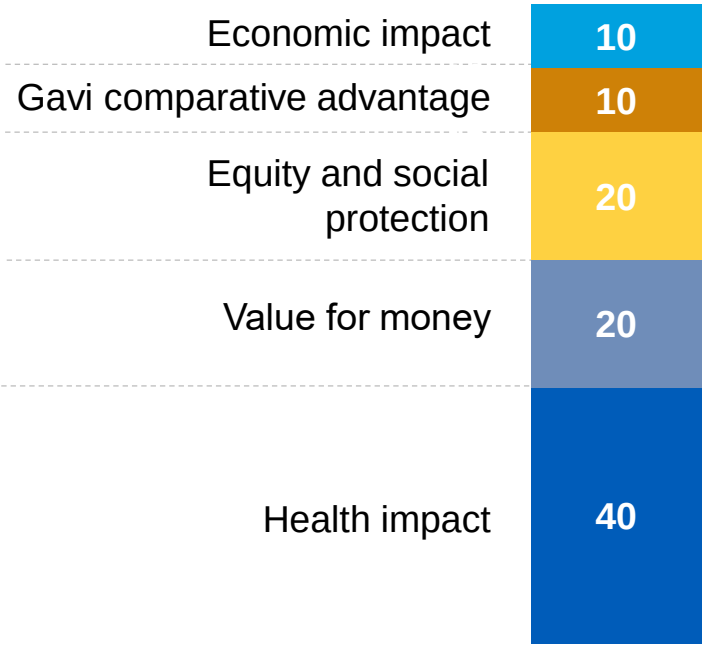
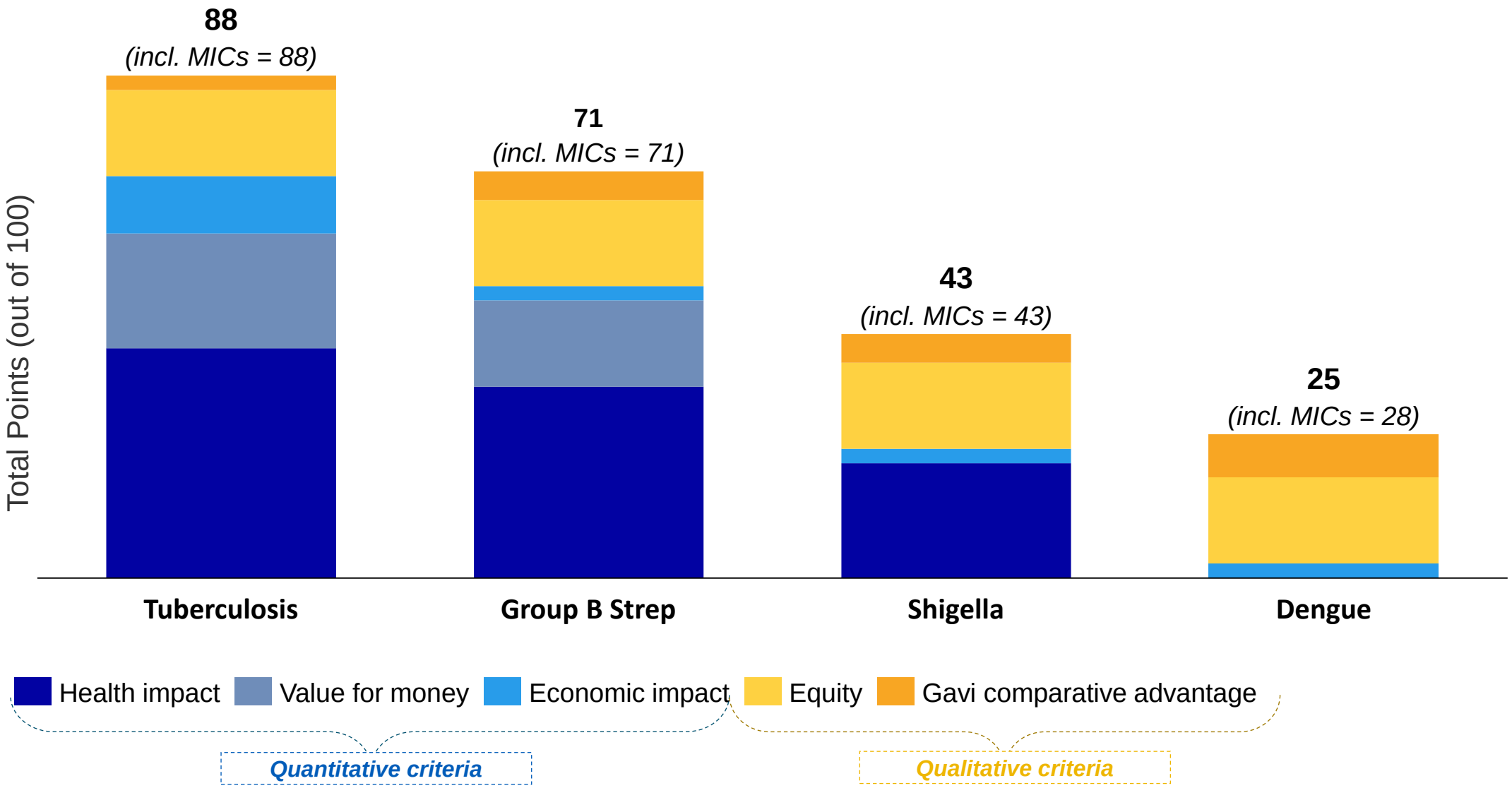


Final weightings used



Vaccine scores from assessment against ranking criteria



Please note that a score of 0 on a quantitative criteria does not imply no impact, only that it scores lowest of the four vaccines assessed

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Cross-vaccine analyses

Vaccine scorecards are populated based on both quantitative and qualitative analyses

Qualitative analyses

- Transparent scoring method for each qualitative criterion
- Informed by disease experts

VIS criteria	Indicator	Results	Evaluation[1]
Health impact	Total deaths averted	~300-720K future deaths averted, ~300-720K averted, 2025-2040	
	Deaths averted per 100K vaccinated	~5,790-6,930 future deaths averted, 2025-2040, per 100K vaccinated population	
	DALYs averted per 100K vaccinated	~5,790-6,930 future DALYs averted, 2025 – 2040, per 100K vaccinated population	
Value for money	Procurement cost per death averted	~$ 330-380 procurement cost per death averted	
	Procurement cost per DALY averted	~$ 330-380 procurement cost per DALY averted	
Equity & social protection impact	Impact on vulnerable groups	Burden concentrated among low socioeconomic groups, rural poor	
	Addresses gender-related barriers		
Gavi comparative advantage	Vaccine market challenges	Some potential to influence the market (e.g., support demand forecasting)	
	Alliance role in addressing challenges		
Economic impact	Direct medical cost averted	High average consumption per capita averted in out-of-pocket medical costs	
	Indirect cost averted	~$ 1,810-2,860 productivity loss averted, 2025 – 2040, per vaccinated person	
Global health security impact	Epidemic potential of disease	Not IHR notifiable, unless it crosses borders; shift to new hosts possible, but currently no indication	
	Impact on AMR	Low impact of vaccination on AMR (1.1/10 points in expert consultation)	
	Climate change risks and mitigation		
Other impact	U5 deaths averted, total	~30-71K U5 deaths averted, 2025 – 2040	
	U5 deaths averted, per 100K	~571-684 U5 deaths averted, 2025 – 2040, per 100K vaccinated population	
Implementation feasibility	Ease of supply chain integration	Packed volume of 20-174cc; 24-48 months shelf life at 2-8°C; VVM = 30	
	Need for HCW behaviour change	Strong need for HCW change: Training of new HCW group required, use of primary and secondary health facilities for delivery, change in HCW practices for intradermal administration	
	Feasibility of vaccination time point	Ad-hoc vaccination, not aligned with other schedules	
	Acceptability in target population	Ranked 3/9 in country stakeholder survey, but need for demand education	
	Availability of epi data to inform	TBD	
	Diagnostics availability/ needs	TBD	
Alternative interventions	Alternative interventions	Alternative interventions: Pre-exposure prophylaxis, dog vaccination	
Contribution to global agenda	Fit with SDGs, IA2030, other agendas, Regional manufacturing		
Broader health system impact	Broader health system impact	Ability to test and establish innovative supply chains, health systems strengthened by increased HCW training, enhanced surveillance of acute encephalitis syndromes	n/a

Quantitative analyses

- Several analytical activities drive assessment of health, economic and cost indicators
- Projections based on different scenarios and assessment of uncertainty and leveraging multiple models where available
- Assumptions informed by disease experts
- Ranked outcomes across vaccines to determine relative score

Ranking criteria: Overview

	Criteria	Indicators	TB	TB *incl. MICs*	Group B Strep	Group B Strep *incl. MICs*	Shigella	Shigella *incl. MICs*	Dengue	Dengue *incl. MICs*
Quantitative criteria	**Health impact**	Total future deaths averted 2026-2040								
		Total future deaths averted 2026-2040 per 100,000 vaccinated								
		Total future DALYs averted 2026-2040 per 100,000 vaccinated								
	Value for money	Vaccine Procurement cost per Death averted								
		Vaccine Procurement cost per DALY averted								
Qualitative criteria	**Equity and social protection**	Disproportionate impact of disease on vulnerable groups								
		Address gender related barriers								
	Gavi comparative advantage	Degree of vaccine market challenges								
		Alliance role in addressing challenges								
Quant.	**Economic impact**	Direct medical cost averted per 100,000 vaccinated								
		Indirect cost averted per 100,000 vaccinated								

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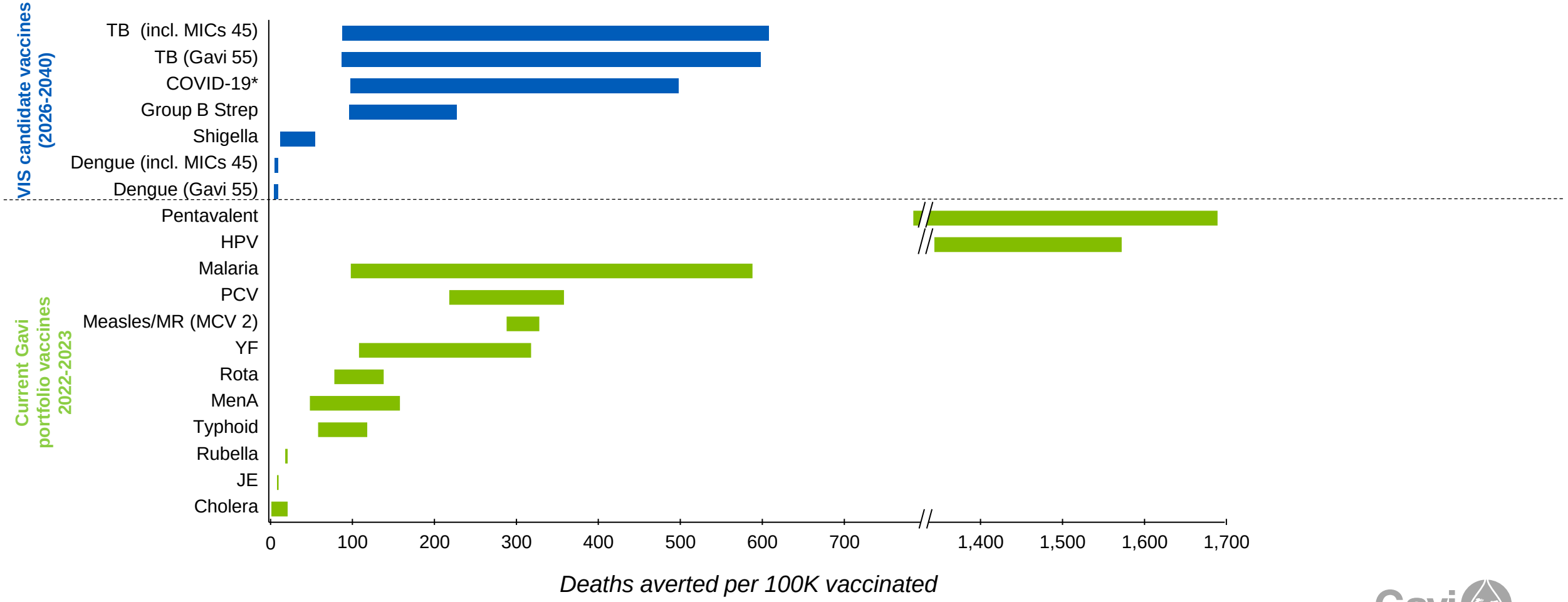
VIS 2024 candidate vaccines vs. Current portfolio of Gavi-supported vaccines: Deaths averted per 100K vaccinated

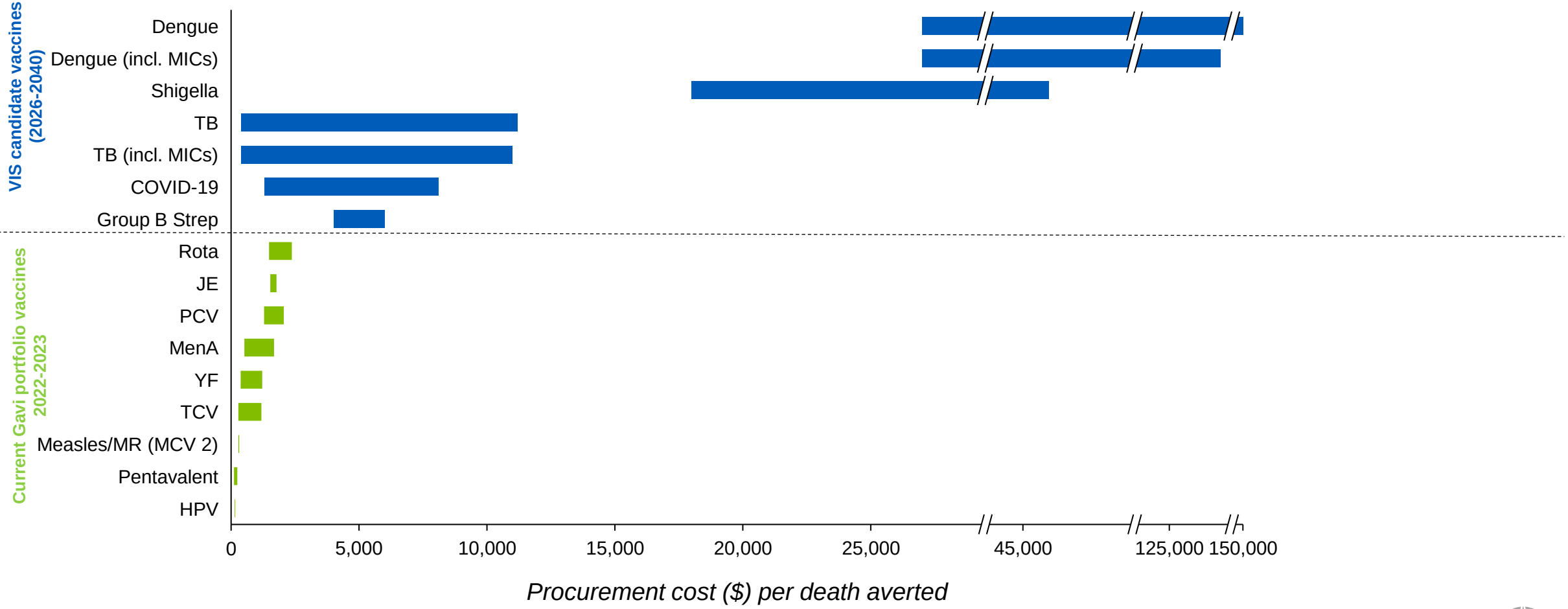
Note: Many of Gavi's current portfolio vaccines have been widely introduced and scaled in Gavi-supported countries. Many VIS candidates will still be in a period of introduction and ramp-up between 2026-2040.



Vaccine impact for current Gavi portfolio vaccines is based on Gavi operational forecasting version 20 (2022-2030). Vaccine impact for VIS candidate vaccines (2026-2040), COVID-19 (2026-2023)
The future deaths averted are not available for the current Gavi portfolio for the time period of 2025-2040. *Lower end of the range represents worst-case epi scenario (new variant with increased transmission and corresponding immune escape and severity comparable to the Delta variant) // Malaria data from Malaria Investment case (2021).
Source: External modellers, Gavi portfolio data

VIS candidate vaccines vs. Current portfolio of Gavi-supported vaccines: Procurement cost (US$) per death averted

Note: Many of Gavi's current portfolio vaccines have been widely introduced and scaled in Gavi-supported countries. Many VIS candidates will still be in a period of introduction and ramp-up between 2026-2040.



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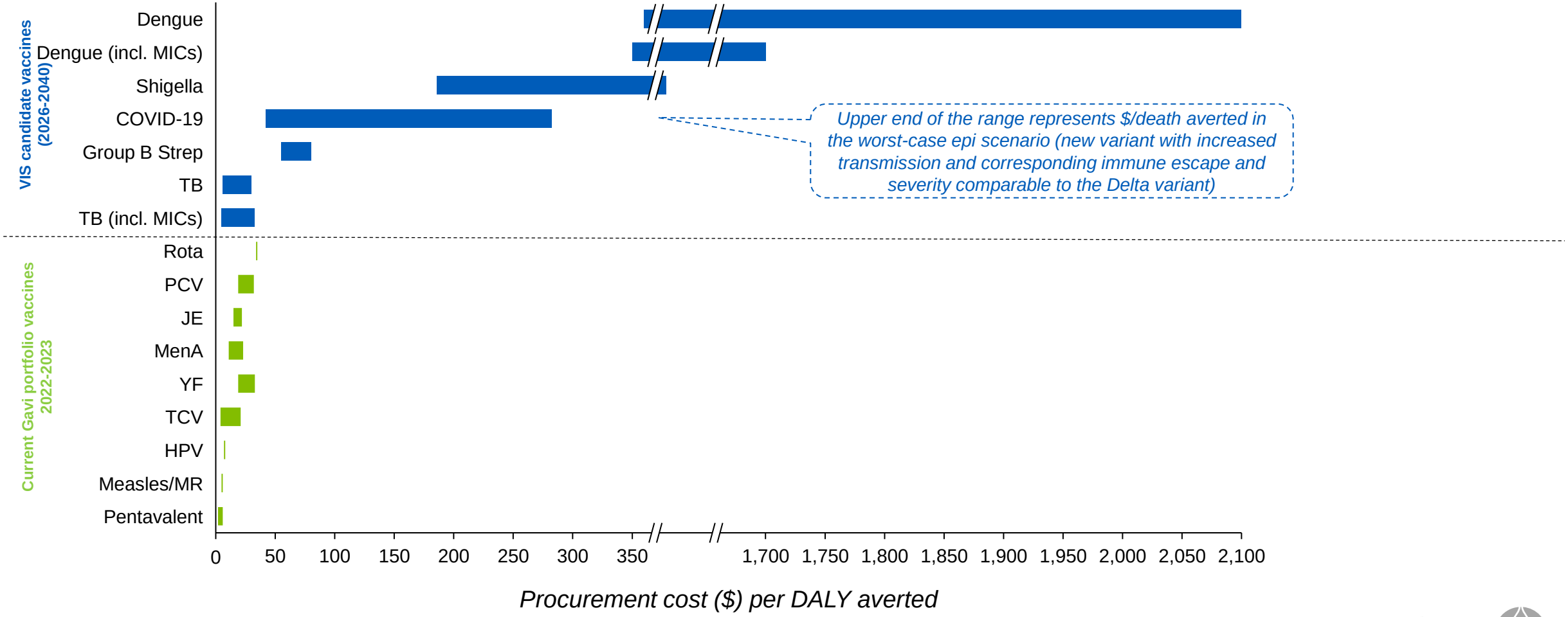
Source: External modellers, Gavi portfolio data

VIS candidate vaccines vs. Current portfolio of Gavi-supported vaccines: Procurement cost (US$) per DALY averted

Note: Many of Gavi's current portfolio vaccines have been widely introduced and scaled in Gavi-supported countries. Many VIS candidates will still be in a period of introduction and ramp-up between 2026-2040.



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The future deaths averted are not available for the current Gavi portfolio for the time period of 2025-2040. *Lower end of the range represents worst-case epi scenario (new variant with increased transmission and corresponding immune escape and severity comparable to the Delta variant) // Malaria data from Malaria Investment case (2021). // DALY estimates for COVID-19 are currently not available, in this instance YLL is being used for a comparator as evidence suggests YLLs account for >95% of DALYs for the majority of vaccine preventable diseases.
Source: External modellers, Gavi portfolio data

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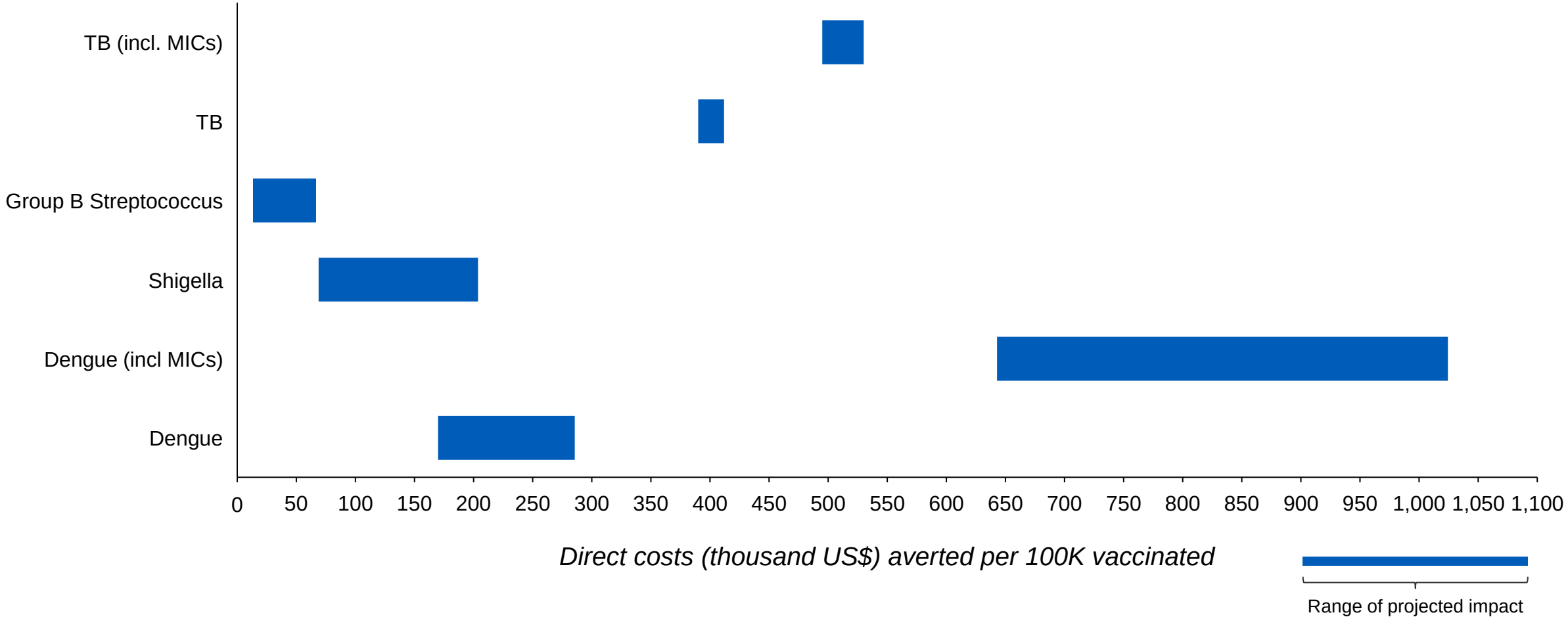
VIS 2024 candidate vaccines: Direct medical costs averted per 100K vaccinated



Source: External modellers

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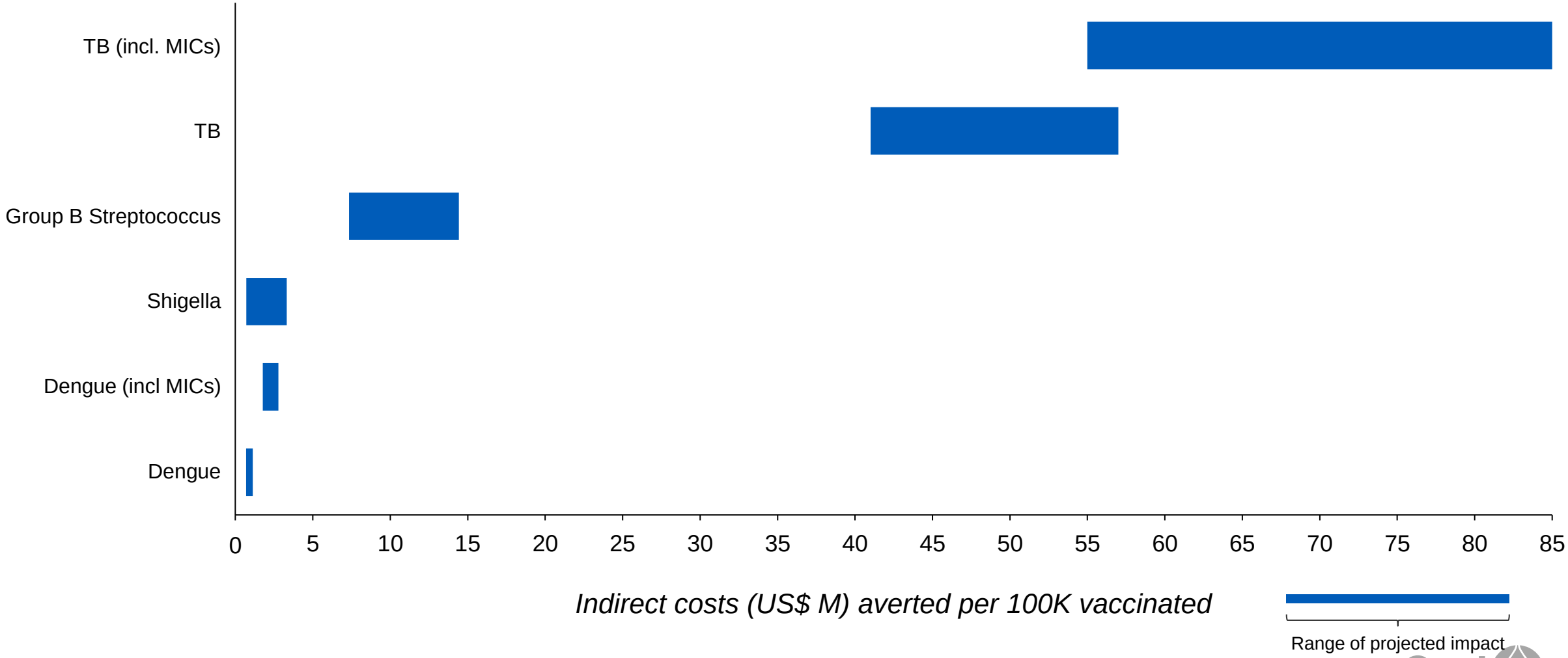
VIS 2024 candidate vaccines: Indirect costs averted per 100K vaccinated



Source: External modellers, WHO, World Bank

Gavi comparative advantage

	Indicator	Description	Assessment
TB	Market shaping challenges	Risk of **potential delays in terms of licensure, policy recommendation and/or WHO PQ for most advanced candidates**, as well as supply constraints depending on which vaccine is available and recommended.	
	Alliance role in addressing challenges	Gavi is well positioned to work with manufacturers and Alliance partners to **proactively shape market outcomes** for Gavi-eligible countries and countries in-scope of potential 6.0 MICs strategy if it includes tuberculosis.	
Group B Strep	Market shaping challenges	**No major market shaping challenge** for the GBS market; however, it will be important to understand: • The potential need for a Phase IV effectiveness study and timing of SAGE recommendation to assess implications for demand from a market shaping perspective. • The demand signal from countries for market shaping as potential implementation may be less straightforward as maternal immunisation and ANC are new platforms for Gavi.	
	Alliance role in addressing challenges	Gavi has a unique advantage in terms of **understanding how GBS could fit as part of the portfolio of vaccines used in Gavi-eligible countries** and ensuring demand generation.	
Dengue	Market shaping challenges	**No major market shaping challenge** for the dengue market; however, understanding demand risk (especially given the precedent of Dengvaxia) will be important to manage market shaping implications, as well as ensuring product characteristics meet LMICs needs.	
	Alliance role in addressing challenges	Gavi is well positioned to engage with manufacturers to **ensure supply of a presentation more suitable to LMICs immediately at programme launch** and to work with partners to **understand demand signal** (from Gavi-eligible countries and countries in-scope of potential 6.0 MICs strategy if it includes dengue given important dengue burden in MICs) and **ensure demand generation.**	
Shigella	Market shaping challenges	**Risk of stalled development due to unclear market attractiveness** for manufacturers based on **unclear LMIC demand linked to low awareness of Shigella and small dual market.** There is a potential risk that without a signal from VIS, a Shigella vaccine may not enter late-stage development.	
	Alliance role in addressing challenges	Gavi is well positioned to **ensure there is a market if approved by VIS and subsequently ensure demand generation.**	

Modulating criteria: Overview

Criteria	Indicators	TB	Group B Strep	Shigella	Dengue
Global health security impact	Epidemic potential of disease				
	Impact on AMR				Not scored
	Climate change risks and mitigation				
Other impact	Total U5 deaths averted 2026-2040				
	Total U5 deaths averted 2026-2040, per 100,000 vaccinated				
Implementation feasibility	Ease of supply chain integration				
	Need for healthcare worker training/ behaviour change				
	Requirements of vaccination timepoint				
	Need for demand promotion (e.g., acceptability, understanding of disease burden)				
	Availability of epidemiological data to inform programmes				
	Diagnostics availability/ needs				
Alternate interventions	Optimal use of current and future alternative interventions (prevention and treatment)				
Contribution to global agenda	Fit with global development (SDGs), immunization (IA2030) agendas and other relevant global targets				
Broader health system impact	Broader health system impact			Not scored	