

# Gavi update: OCV support and Vaccine Investment Strategy

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GTFCC Annual Meeting

**Adam Soble**

3-4 June 2018, Annecy, France



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# Agenda

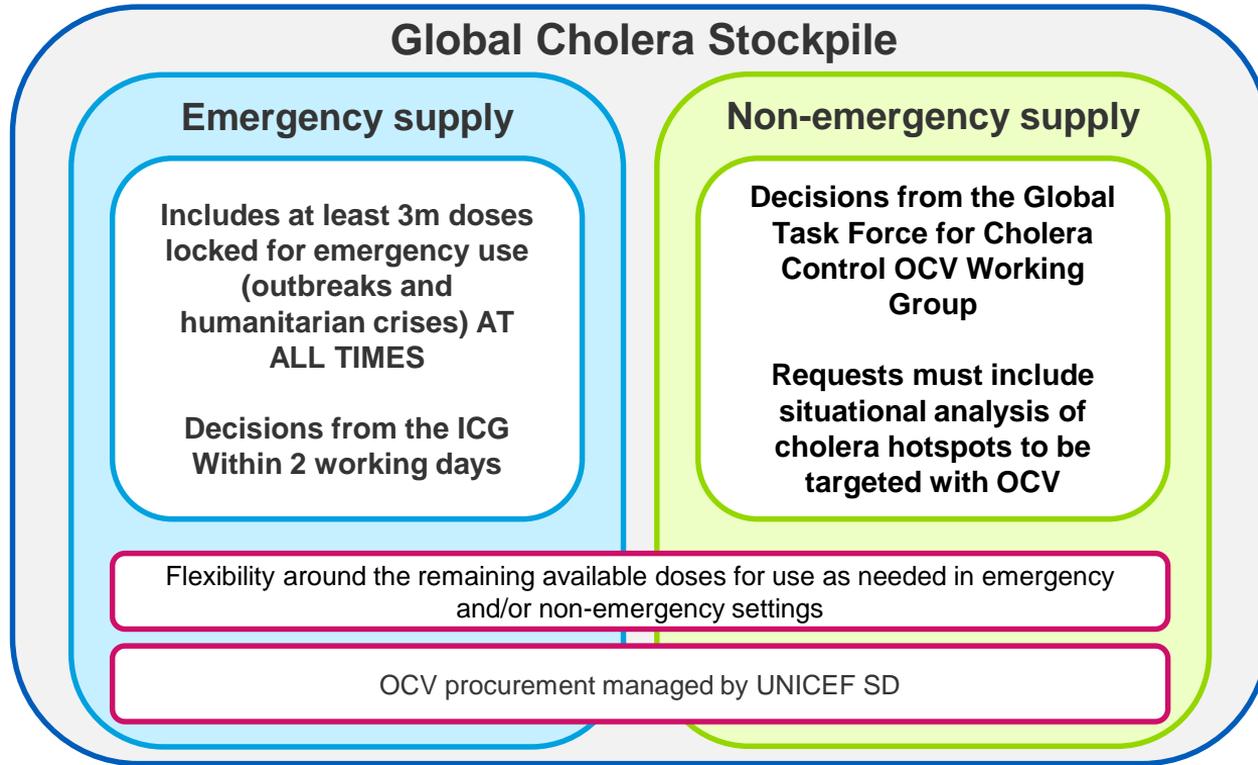
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1. **Gavi support for OCV**
2. **Update on Gavi's Vaccine Investment Strategy**
3. **Guiding principles for future Gavi cholera programme**

# 1

## Gavi support for OCV

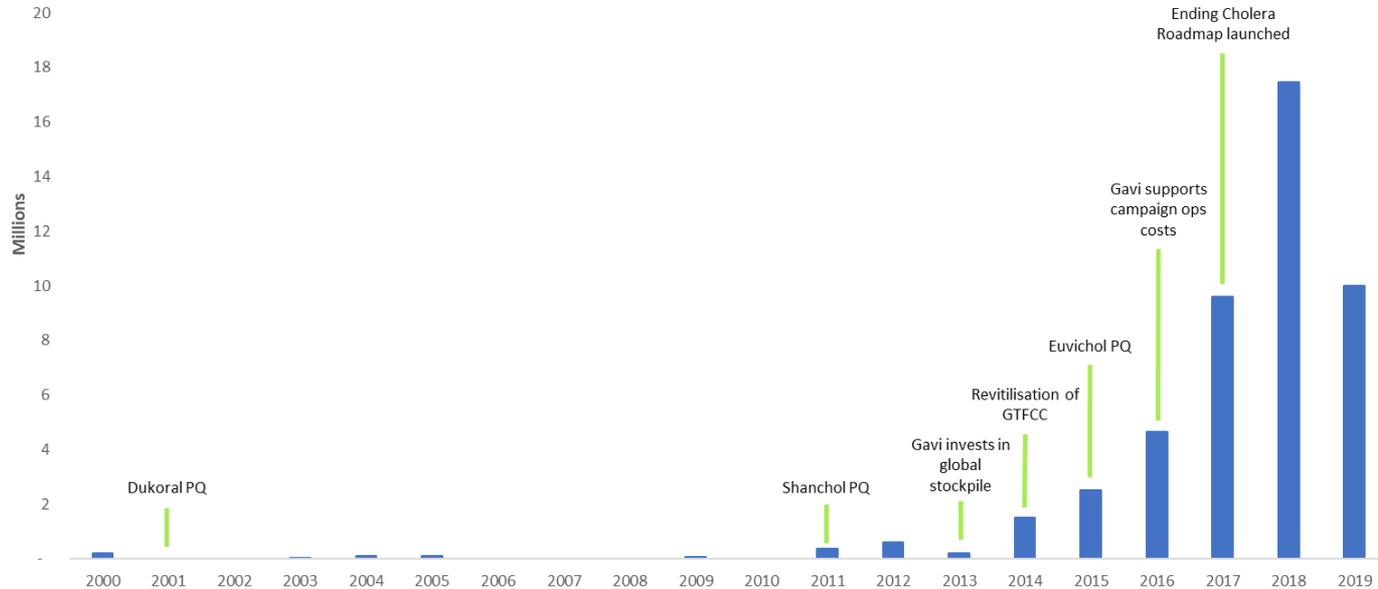
# Gavi supports the global cholera stockpile through which countries can access OCV



Note: Support for vaccine and operational costs available for Gavi-supported countries; countries not supported by Gavi are required to reimburse vaccine-related costs and do not receive operational cost support

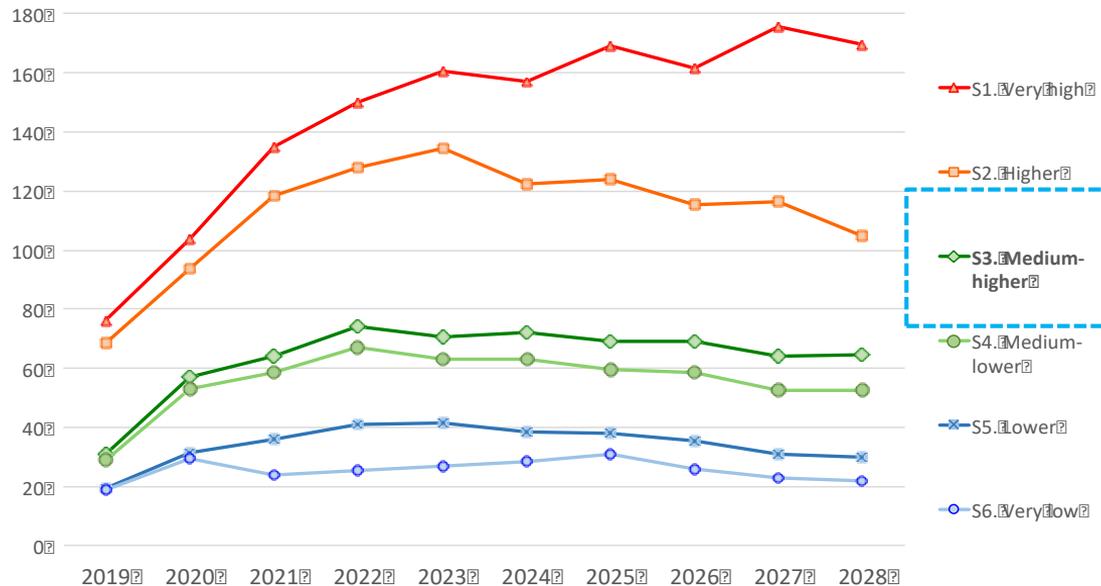
# Gavi's support for OCV has helped catalyse country adoption and uptake of OCV

Historical OCV use (millions of doses)



*Gavi has supported the shipment of over **45m doses** since its investment began in 2014*

# Estimated future OCV demand scenarios for Gavi40 countries (million doses)



S3 (Medium-higher) is the base case demand scenario used for RM and VIS analysis.

**Gavi forecast information:**  
Access to all Gavi forecast info be found via this [link](#)

Please contact [forecast@gavi.org](mailto:forecast@gavi.org) if you have any issues accessing files.

Note1: India demand is not included in this graph. India volumes in the scenarios S1-S6 could add an average of about 40md to 10md per year to the above estimated demand.

Note2: Based on the risk and epidemiology of cholera, 40 Gavi countries included in the analysis are: Afghanistan, Angola, Burkina Faso, DRC, Djibouti, Eritrea, Haiti, Ghana, Nigeria, Somalia, Cameroun, Guinea, South Sudan, Malawi, Zambia, Guinea Bissau, Tanzania and Zanzibar, Yemen, Nepal, Ethiopia, Kenya, Cote d'Ivoire, Papua New Guinea, Niger, Burundi, Zimbabwe., Republic of Congo, Benin, Bangladesh, Liberia, Mali, Myanmar, Mozambique, Pakistan, Sudan, Sierra Leone, Chad, Togo, Uganda.



# 2

## Update on Gavi's Vaccine Investment Strategy

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# Key findings and recommended investment for oral cholera vaccine

## KEY FINDINGS

- 2.9M cases/yr – disease of poverty / vulnerability
- Optimise current investment: planned, not just reactive
- Learning agenda demonstrated feasibility, increased interest
- Greater predictability of demand helps shape market (supply, price)
- Multi-sectoral approach (e.g. WASH)

## RECOMMENDED INVESTMENT

- **Support preventive immunisation (hotspots)**
- **Country financing (under review) and requirement for comprehensive control plan**
- **For 2020, bridge funding for continued use of stockpile for endemic settings**

# Gavi Board VIS decision and next steps

## November 2018 Gavi Board decision for VIS

- Approved a transition of the oral cholera vaccine programme to include a preventive immunisation programme, beginning in 2021, subject to availability of funding following Gavi replenishment and alignment with Gavi 5.0 in June 2019
- Approved extension of Gavi support for use of the global cholera stockpile in endemic settings for 2020
- Approved 2019-2020 funding for cholera learning agenda activities

## Activities and timelines to final VIS decision in 2019

- Questions raised by VIS vaccine candidates considered as Gavi 5.0 goals and principles were identified (e.g. Gavi collaboration approach to support integration)
- Gavi 5.0 approach assumed inclusion of VIS vaccine candidate in Gavi's portfolio to evaluate potential impact of different strategic options for 2021-2025 period
- **Final Board decision to be taken for VIS vaccine candidates in June 2019**

# 3

## Guiding principles for future Gavi cholera programme

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# Principles for consideration

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## Principles

1

**GTFCC-validated national cholera control plan**

2

**Independent review of application for Gavi vaccine support**

3

**Country financing for planned campaigns targeting hotspots**

## Rationale

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- Countries demonstrate a multisectoral approach to controlling cholera transmission, including targeted OCV use
- GTFCC ensures country plans are robust, technically sound and feasible for countries to implement
- Consistent criteria based on Gavi policies
- Leverage synergies from past or planned introductions/campaigns (e.g. OCV/TCV campaign)
- Optimise use of cash grants to support campaigns (e.g. HSS, TCA for surveillance and evaluation)
- Country ownership for implementation of critical preventive interventions detailed in cholera control plans
- Supports appropriate use of OCV and can catalyse increased investment longer term interventions (e.g. WASH)

**Thank you**

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# BACKUPS

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# Oral Cholera Executive Summary (1/2)

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**Cholera causes ~2.9M cases per year which result in ~95,000 deaths per year, mostly among poor and vulnerable populations in Sub-Saharan Africa, South Asia, and parts of the Americas**

- Significant under-reporting of disease burden due to socio-political and economic disincentives
- Cholera has high epidemic potential with associated risks of large-scale societal disruption and political / economic consequences
- Vaccination can have broader impact (beyond health) given its ability to prevent spread of disease and control outbreaks

**VIS 2013 decision to support the global cholera stockpile and strengthen evidence base for preventive campaigns has led to strong stakeholder and country momentum as well as:**

- Significant increase in use of oral cholera vaccine (OCV) stockpile for outbreak response and preventive vaccination (from 4-5M doses to over 20M doses 2014-2019)
- Improved supplier landscape with new manufacturer (2015), reduced vaccine price, and innovative presentation (2017)
- Insights on questions identified in VIS 2013 regarding duration of protection (at least 3 years) and feasibility of campaigns
- Improved understanding of disease burden and OCV impact in endemic countries

**WHO-recommended periodic immunisation would move away from ad hoc emergency requests towards comprehensive planning of OCV campaigns within broader disease control strategies**

- Modelled vaccination strategy would be planned, periodic immunisation among high-risk populations in sub-national hotspots to serve as near-medium term response to cholera as a complement to longer-term investments in health interventions such as water, sanitation and hygiene ( WASH)
- Supporting preventive campaigns would unlock stronger market-shaping potential by improving the predictability of demand
- Decreasing outbreak occurrence would reduce stockpile use in emergency settings

# Oral Cholera Executive Summary (2/2)

**As currently modelled, cholera vaccination strategy could avert ~61,000 – 608,000 deaths and ~3-25M cases between 2021-2035 (~\$2-21K per death averted)**

- Medium procurement cost per deaths averted relative to other VIS vaccines

**OCV use sits within a multisectoral disease control strategy that includes WASH, enhanced surveillance, social mobilisation and case management**

- Planned, periodic vaccination would serve as a time-limited near-term response to cholera as a complement to longer-term investments in health interventions such as WASH, which has broader health benefits beyond reduced incidence of cholera
- Could catalyse comprehensive approach to cholera control by use of OCV campaign planning as opportunity to take a broader approach to identifying and implementing additional, sustainable interventions
- Establishment of the Global Task Force for Cholera Control and the development of the Ending Cholera Roadmap provides context and incentive to apply holistic lens to cholera control

**Improved vaccines, and optimised schedule and campaign frequency could contribute to improved value for money**

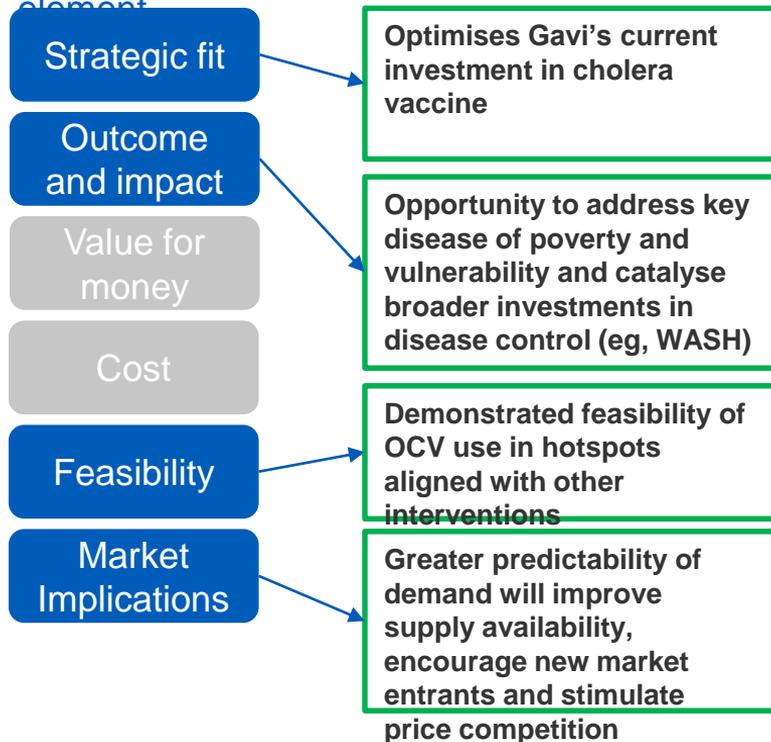
- Ongoing research and proposed learning agenda to identify opportunities to reduce number of doses and increase campaign intervals
- Improved cholera vaccines in the pipeline could provide greater protection through enhanced efficacy and longer duration of protection

## RECOMMENDATION

**Transition the oral cholera vaccine programme to include a preventive immunisation programme with vaccine co-financing, beginning in 2021**

# Key vaccine benefits

## Investment framework element

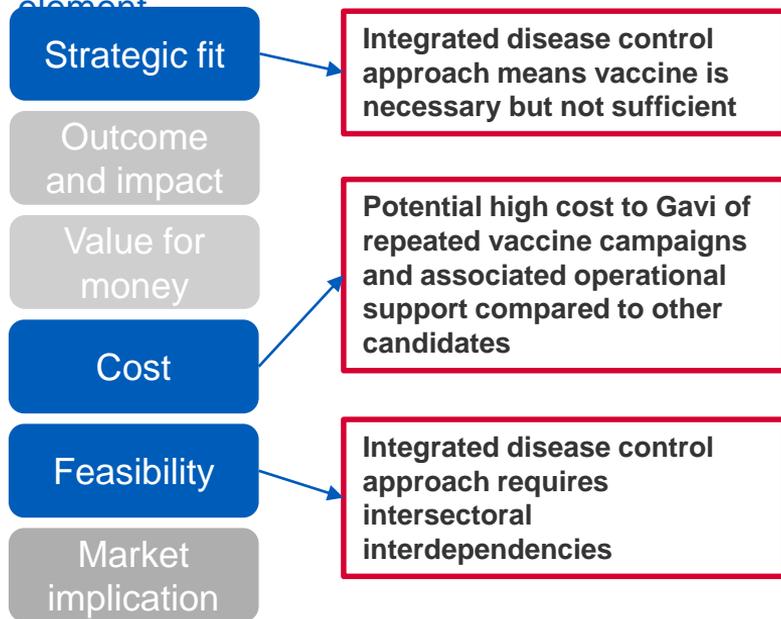


## Comments

- Moves towards more predictable planning for future OCV campaigns vs outbreak response
- Supports enhanced learning agenda to improve feasibility and efficiency in cholera campaigns, and measure impact of OCV on global transmission
- Mitigates risk of large-scale socio-political and economic consequences from outbreaks
- Supports the global strategy for cholera control (*Ending Cholera – Global Roadmap to 2030*)
- Targeted campaigns in difficult-to-reach areas have been shown to be feasible
- Opportunity for collaboration to catalyse investments in non-vaccine interventions (eg, WASH) and support multisectoral disease control
- Short-term outbreak response gives manufacturers limited visibility to future demand
- Improved demand forecasting could also incentivise improved vaccines

# Key vaccine challenges

Investment  
framework  
element



## Comments

- OCV is complementary measure implemented in the short-medium term<sup>1</sup>, long-term programmatic success is dependent on activities outside of Gavi's mandate (i.e., WASH)
- Hotspot vaccination targets wide age groups for maximum protection, resulting in higher costs due to larger use of doses and high cost of implementing campaigns
- Long-term cholera control requires scale-up of WASH, which is more difficult to implement than OCV campaigns
- Political will and policy and regulatory enabling environment unclear for WASH and broader integrated cholera control

1. WHO Position Paper, 2017

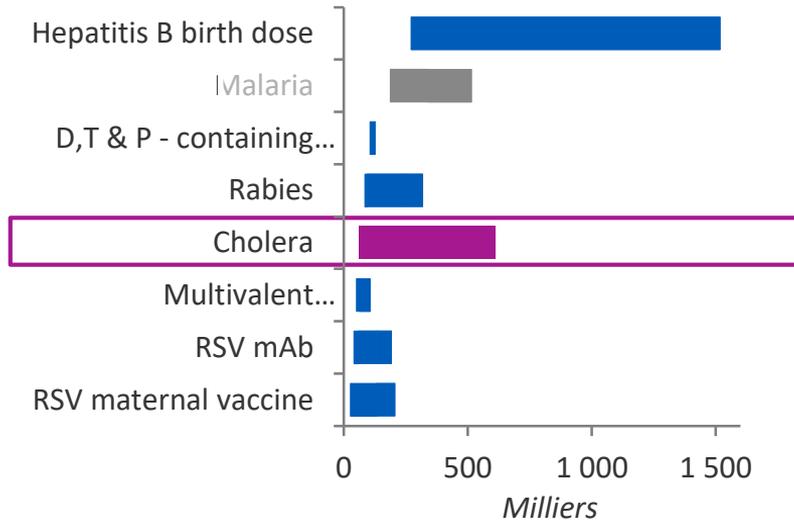
# Health impact compared across VIS candidates

Oral Cholera

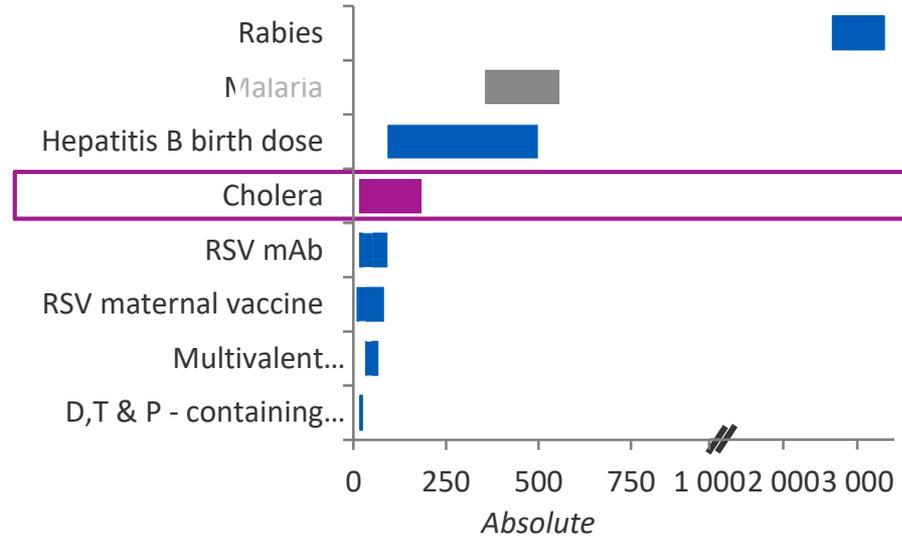
**Nigeria excluded**

Scenario: 2 doses for >1 yo. every 3 years with WASH scale-up variable effectiveness and disease burden

Total future deaths averted (K), 2021-2035



Total future deaths averted per 100K vaccinated, 2021-2035



1. IPM (direct impact only) and JHU models; data includes projected impact for 2 doses to at risk population >1 yo, with variable vaccine effectiveness (62%, 76%, 85%), duration of protection of 3 years and variable burden of disease (low/base/high). Assumes a scale-up of WaSH interventions complementing OCV as described in the Ending Cholera Roadmap. Range in impact outcomes driven mainly by uncertainty in burden data. Consideration for Gavi support to Nigeria for VIS candidates would be considered separately through the Nigeria-specific strategy which was approved by the Gavi Board in June 2018

Range of projected impact

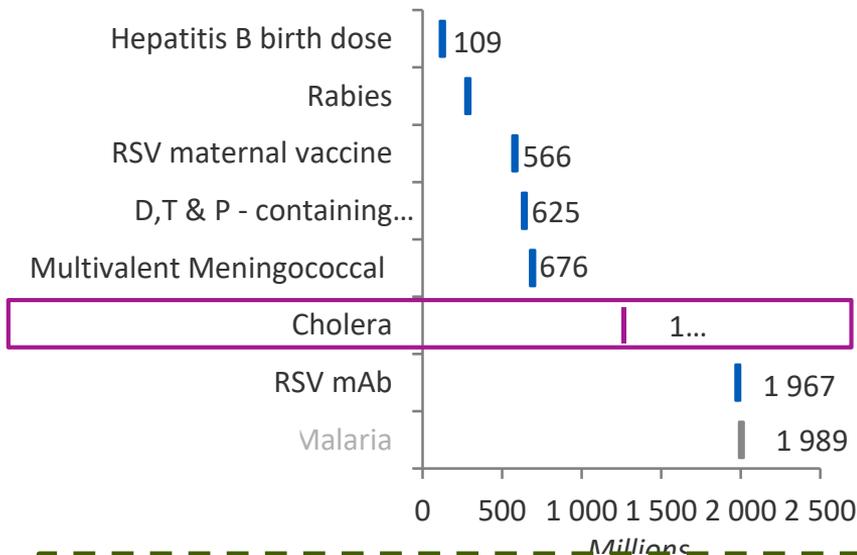


**Nigeria excluded**

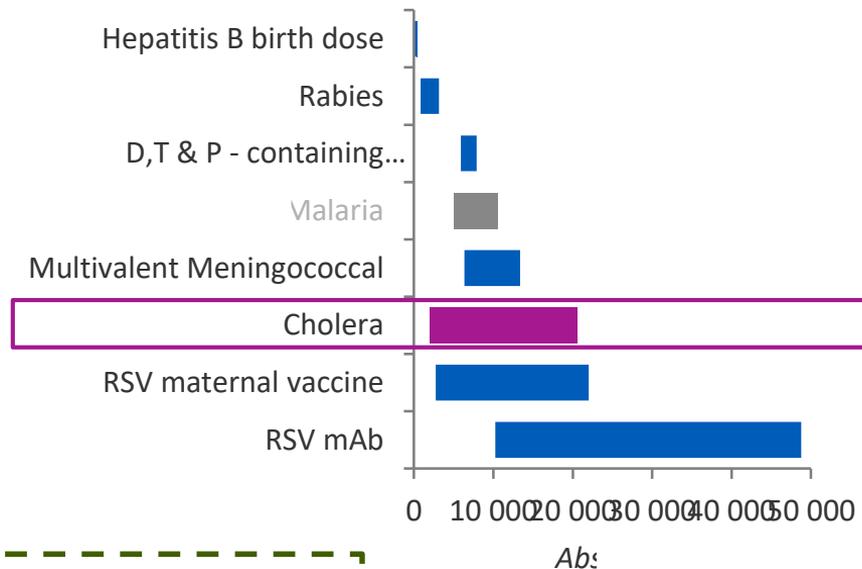
Scenario: 2 doses for >1 yo. every 3 years with WASH scale-up: variable effectiveness and disease burden<sup>1</sup>

# Procurement cost and cost per death averted compared across VIS candidates

Total procurement cost to Gavi & countries (M\$), 2021-2035

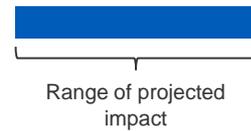


Procurement cost to Gavi & countries per death averted (\$), 2021-2035



**Cost projections are unconstrained. Values do not account for anticipated introduction of current portfolio and other VIS candidate vaccines that may reduce the number of planned OCV campaigns.**

1. IPM (direct impact only) and JHU models; data includes projected impact for 2 doses to at risk population >1 yo, with variable vaccine effectiveness (62%, 76%, 85%), duration of protection of 3 years and variable burden of disease (low/base/high). Assumes a scale-up of WaSH interventions complementing OCV as described in the Ending Cholera Roadmap. Range in impact outcomes driven mainly by uncertainty in burden data. Note: D,T&P –containing boosters represent Penta as first booster Consideration for Gavi support to Nigeria for VIS candidates would be considered separately through the Nigeria-specific strategy which was approved by the Gavi Board in June 2018



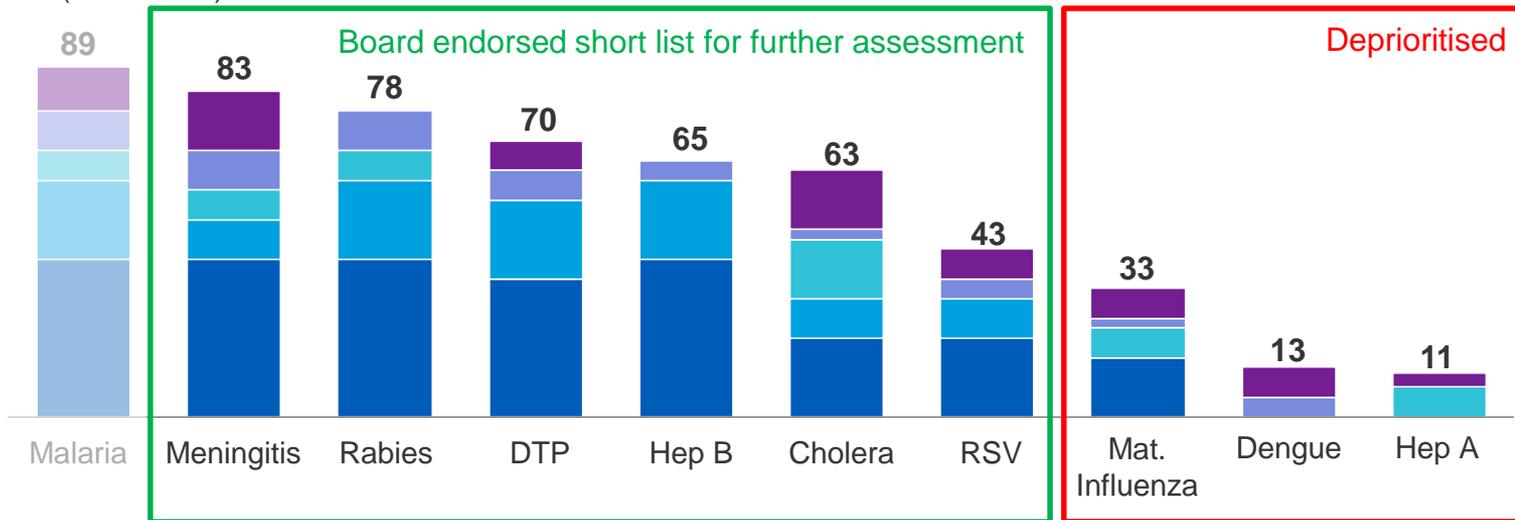
# Evaluation criteria and indicators for vaccines for endemic disease prevention

	Criteria	Indicators
Ranking criteria:	Health impact	Total future deaths averted 2020-2035, and per 100,000 vaccinated Total future cases averted 2020-2035, and per 100,000 vaccinated
	Value for money	Vaccine procurement cost per death averted Vaccine procurement cost per case averted
	Equity and social protection impact	Disproportionate impact of disease on vulnerable groups Special benefits of vaccination for women and girls
	Economic impact	Direct medical cost averted Indirect cost averted
	Global health security impact	Epidemic potential of disease Impact of vaccination on antimicrobial resistance (AMR)

	Criteria	Indicators
Secondary criteria:	Other impact	Total U5 deaths averted 2020-2035, and per 100,000 vaccinated Total DALYs averted 2020-2035, and per 100,000 vaccinated Vaccine procurement cost per DALY averted
	Gavi comparative advantage	Degree of vaccine market challenges Potential for Gavi support to catalyse additional investment
	Implementation feasibility	Ease of supply chain integration Need for health care worker behaviour change Feasibility of vaccination time point Acceptability in target population Long-term financial implications
	Alternate interventions	Optimal use of current and future alternative interventions (prevention and treatment)
	Broader health system benefits	<i>No specific indicator – evaluated case-by-case</i>
Financial implications:	Vaccine cost	Total procurement cost to Gavi and countries, 2020-2035
	Operational cost	Incremental in-country operational costs per vaccinated person
	Additional implementation costs	Additional costs for introduction

# Board shortlisted six VIS candidates for further assessment and investment case development

Total Points (out of 100)<sup>1</sup>



■ Health impact 
 ■ Value for money 
 ■ Equity and social protection 
 ■ Economic impact 
 ■ Global health security

1. Maximum 40pts for health impact (30pts for total deaths averted, 10pts for deaths averted per 100k), 20pts for value for money (cost per death averted), 15pts for equity and social protection impact, 10pts for economic impact and 15pts for global health security  
 Note: Malaria not up for investment decision. Used as comparator with Health impact and economic impact based on high-level estimates

# Phase II scorecard: Oral cholera (June 2018)

Modelled strategy: campaigns with 2 doses to at risk population  $\geq 1$  year old

VIS criteria	Indicator	Results	Evaluation <sup>1</sup>
Health impact	Total impact averted	~21-660K future deaths, ~2-26 million future cases averted, 2020-2035	Yellow
	Impact averted per 100K	~6-180 deaths, ~560-7140 cases averted, 2020-2035, per 100K vaccinated population	Yellow
Value for money	Procurement cost	~\$ 1,490-47,600 procurement cost per death, ~\$ 40-480 procurement cost per case averted	Yellow
	Impact on vulnerable groups	Burden concentrated among lower socioeconomic groups and displaced populations	Green
Equity & social protection impact	Benefits for women and girls	Some evidence for increased burden in women >5 yo and differences in access to treatment	Green
	Direct medical cost averted	~1% of average consumption per capita averted in out-of-pocket medical costs	Red
Economic impact	Indirect cost averted	~\$2-47 productivity loss averted, 2020-2035, per vaccinated person	Yellow
	Epidemic potential	IHR notifiable; antigenic changes previously caused epidemics; outbreaks in areas of low sanitation and poor access to clean water	Green
Global health security impact	Impact on AMR	High impact of vaccination on AMR (4.1/10 points in expert consultation)	Green
	Total procurement cost	~\$ 1.0-1.8 billion total procurement cost to Gavi and countries, 2020-2035	Red
Vaccine cost			
Relevant second. criteria	Vaccine market challenges / Catalytic investment	High potential for Gavi to manage demand and supply and catalyse add. investments, e.g., WaSH, data/surveillance, GTFCC	

## Additional considerations

- Significant under-reporting of disease burden due to socio-political and economic disincentives, which may drive large incidence ranges and lower impact estimates
- Strong stakeholder momentum and improved understanding of implementation feasibility since 2013
- In 2016, the Gavi Board confirmed future Gavi support for vaccine procurement and operational costs for emergencies
- Reduced impact of future propensity for illness following exposure to diarrheal diseases

1. Evaluation based on comparison with other VIS 2018 candidates. For Health impact and Value for money, evaluation based on deaths averted. Details on evaluation methodology can be found in Methodology appendix

# Phase II secondary criteria and financial implications: Oral cholera (*June 2018*)

Modelled strategy: campaigns with 2 doses to at risk population  $\geq 1$  year old

VIS criteria	Indicator	Results	Evaluation <sup>1</sup>
Other impact	U5 deaths averted, total	~1-80K U5 deaths averted, 2020 – 2035	Yellow
	U5 deaths averted, per 100K	~0-22 U5 deaths averted, 2020 – 2035, per 100K vaccinated population	Yellow
	DALYs averted (cost per DALY)	~0.7-20 million DALYs averted, 2020 – 2035, ~\$ 50-1370 cost per DALY	Yellow
	DALYs averted, per 100K	~190-5,420 DALYs averted, 2020 – 2035, per 100K vaccinated population	Yellow
Gavi comp. advantage	Vaccine market challenges	High potential to influence the market (e.g., stabilize supply by increasing supplier base, further decreases in price)	Green
	Catalytic investment	High potential to catalyse investments in complementary investments (e.g., WASH, data/surveillance, GTFCC)	Green
Implementation feasibility	Ease of supply chain integration	Packed volume of 3-17cc; 24-30 months shelf life at 2-8°C; VVM = 14-30	Green
	Need for HCW behaviour change	Some need for HCW behaviour change: Campaign with outreach requiring some training	Yellow
	Feasibility of vaccination time point	Campaigns outside routine vaccination schedule	Red
	Acceptability in target population	Ranked 5/9 in country stakeholder survey, but likely need for high-level advocacy	Yellow
	Long-term financial implications	Falls within the category of price per course \$ 2-10	Yellow
Alt. interventions	Alternative interventions	No alternative interventions but complementary prevention measures include improvements in water and sanitation (e.g., WaSH), effective ORS treatment, antibiotics and case management	Yellow
Broader health system impact <sup>2</sup>	Broader health system impact	Opportunity to promote WaSH interventions	Yellow
Operational cost <sup>3</sup>	Incremental costs per vac. person	High incremental cost of ~\$ 1.80: Already used in ~20 Gavi countries; costs mostly due to technical assistance, micro-planning, and data-related costs	Red
Implementation costs	Additional costs for introduction	Medium: already used in ~20 Gavi countries; costs mostly due to technical assistance, micro-planning, and data-related costs	Yellow

1. Evaluation based on comparison with other VIS 2018 candidates 2. Contextual information, not evaluated 3. Generic methodology based on routine campaigns. Details on evaluation methodology can be found in Methodology appendix

# Rationale for vaccination strategy

Element	Modelled strategy	Rationale/Source
<b>Vaccination schedule</b>	<ul style="list-style-type: none"> <li>Campaigns every 3 years for all countries except those in protracted crisis; crisis countries campaigns every 2 years (Primary strategy)</li> </ul>	<ul style="list-style-type: none"> <li>2017 WHO position paper</li> <li>Variation on interval between doses: Expert inputs; Kanungo S. et al. Flexibility of oral cholera vaccine dosing; and submitted article from campaign conducted in Zambia indicates feasibility of approach</li> </ul>
<b>Age group</b>	<ul style="list-style-type: none"> <li>≥ 1 year olds</li> </ul>	<ul style="list-style-type: none"> <li>2017 WHO position paper</li> <li>Vaccine insert</li> </ul>
<b>Target population</b>	<ul style="list-style-type: none"> <li>At risk population</li> <li>Estimated at risk population decreases over time based on assumptions in the WHO Ending Cholera: A Global Roadmap to 2030 which includes increases in WaSH interventions</li> </ul>	<ul style="list-style-type: none"> <li>Defined via estimates from Johns Hopkins University based on cholera reporting and hotspot mapping</li> <li>Likely underestimated given underreporting</li> <li>Uncertainty exists in the future estimates of the at risk population, various scenarios to be modelled assuming different</li> <li>95% confidence intervals modelled as part of strategic demand scenarios</li> </ul>

# Demand forecasting assumptions

Element	Assumptions	Rationale/Source
Country scope	<ul style="list-style-type: none"> <li>48 endemic countries;               <ul style="list-style-type: none"> <li>Includes 7 non Gavi 73 countries (not modelled in VIS)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Expert inputs</li> <li>WHO Ending Cholera: A Global Roadmap to 2030</li> </ul>
Target population	<ul style="list-style-type: none"> <li>≥ 1 year olds</li> </ul>	<ul style="list-style-type: none"> <li>2017 WHO Position Paper &amp; vaccine insert</li> </ul>
Delivery Strategy	<ul style="list-style-type: none"> <li>Preventive campaigns</li> </ul>	<ul style="list-style-type: none"> <li>2017 WHO Position Paper</li> </ul>
Introduction dates	<ul style="list-style-type: none"> <li>First introduction: 2019, modelled as a continuation of Gavi support</li> </ul>	<ul style="list-style-type: none"> <li>Expert inputs</li> </ul>
Vaccine uptake	<ul style="list-style-type: none"> <li>100%</li> </ul>	<ul style="list-style-type: none"> <li>'Instant' uptake</li> </ul>
Coverage	<ul style="list-style-type: none"> <li>Medium higher scenario:</li> <li>Demand: 100% 1st dose / 95% 2nd dose</li> <li>FVP: 90% 1st dose / 85% 2nd dose</li> </ul>	<ul style="list-style-type: none"> <li>Similar assumptions used across different vaccines</li> <li>M&amp;E OCV campaigns completed since 2013</li> <li>Additional low and high scenarios to be modelled</li> </ul>
Products	<ul style="list-style-type: none"> <li>Both products are PQed</li> <li>Presentation: 1-dose glass vial or plastic tube</li> </ul>	<ul style="list-style-type: none"> <li>Shanchol packet insert</li> <li>Euvichol packet insert</li> </ul>
Logistics	<ul style="list-style-type: none"> <li>Wastage Factor: No wastage factor</li> <li>Buffer stocks = 0%</li> </ul>	<ul style="list-style-type: none"> <li>Based on M&amp;E results from OCV campaigns and WHO guidance on planning OCV campaigns</li> </ul>

# Cholera key assumptions

xx: included in model uncertainty range  
 xx: not included

<b>Models</b>	 IPM direct	Johns Hopkins University
<b>Vaccination strategies</b>	 2 doses to at risk population $\geq 1$ yo Every 3 years; Crisis countries vaccinate every 2 years <sup>1</sup>	2 doses to at risk population $\geq 1$ yo Every 5 years <sup>3</sup>
<b>Uncertainty analysis driving ranges</b>	 Effectiveness (62%, 76%, 85%) Burden estimated (Low <sup>2</sup> , Base, High) Duration of protection (3yr, 5yr)	
<b>Other key assumptions</b>	 Fully vaccinated persons: Gavi Strategic Demand Scenarios (S2, S3 and S5) Estimated at risk population decreasing over time based on Ending Cholera Roadmap assumptions	

1. Applies to base and high scenario; three crisis countries currently included in model; 2. Low burden estimates not included for JHU model, as overall cholera burden likely underestimated; 3. Not modelled but currently being investigated by researchers
2. Consideration for Gavi support to Nigeria for VIS candidates would be considered separately through the Nigeria-specific strategy which was approved by the Gavi Board in June 2018

# Cholera: key experts

## Experts consulted

Abdinasir Abubakar - WHO EMRO

Justin Lesser – JHU

Andrew Azman - JHU

Myron M. “Mike” Levine – U of MD

Hans Christiansen - UNICEF

Tina Lorenson – BMGF

Kashmira Date - CDC

Imran Mirza – UNICEF

Johanna Fihman – WHO HQ

Vittal Mogasale - IVI

Guillermo Gimeno – UNICEF

Francisco Luquero – Epicentre

Tracey Goodman – WHO HQ

Julia Lynch – IVI

Linda Omar Haj – WHO AFRO

Helen Matzger – WHO HQ

Alan Hinman – independent

Lorenzo Pezzoli – WHO HQ

Shannon Larsen - BMGF

David Sack – JHU

Dominique Legros – WHO HQ