



Investment Case for Malaria Vaccines

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Alan Brooks

Senior Program Officer, Policy & Access

PATH Malaria Vaccine Initiative



Why make an investment case?

- No malaria vaccine today...why?
- Need to begin improving data & answering questions with data:
 - Potential impact and costs to public sector
 - Financial returns to private sector
 - Common Ground?

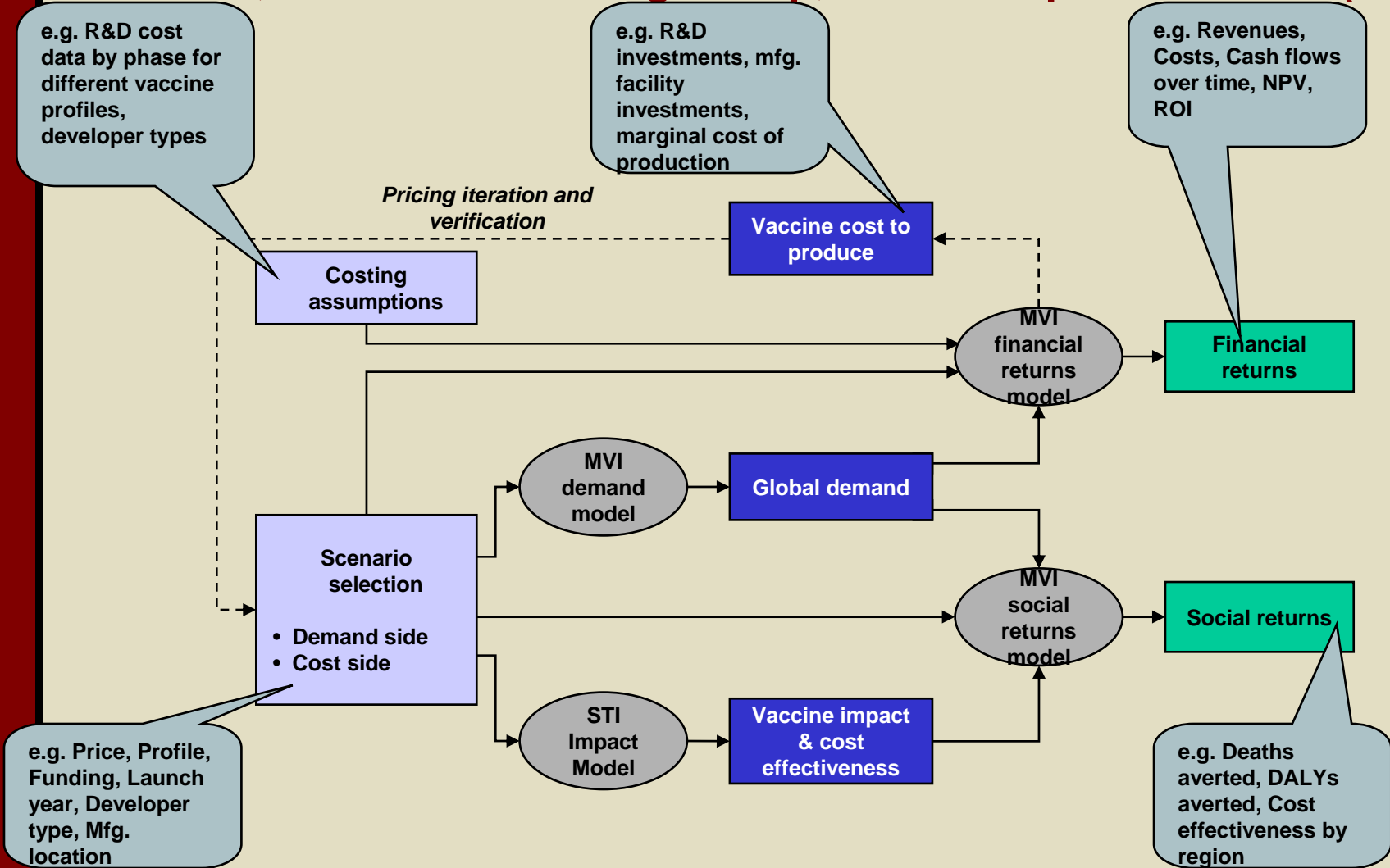
How to build an investment case?

Information about:

- Market (Demand) for how an intervention
- Impact anticipated from estimated demand
- How impact relates to other interventions
- Costs to purchase and deliver related to demand
- Costs to development and produce the vaccine, including risks of failure and borrowing resources over time

Integrated Model

PATH MVI, Boston Consulting Group, Swiss Tropical Institute (STI)

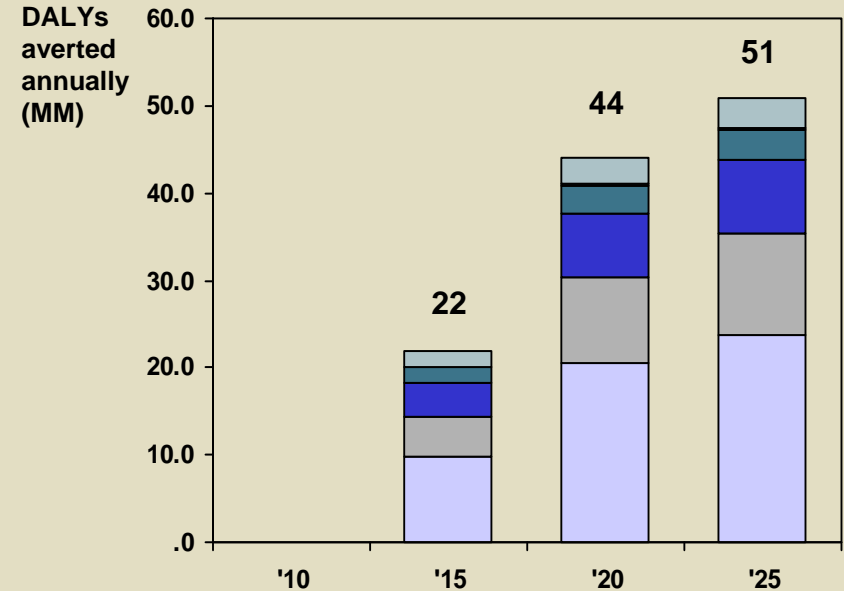
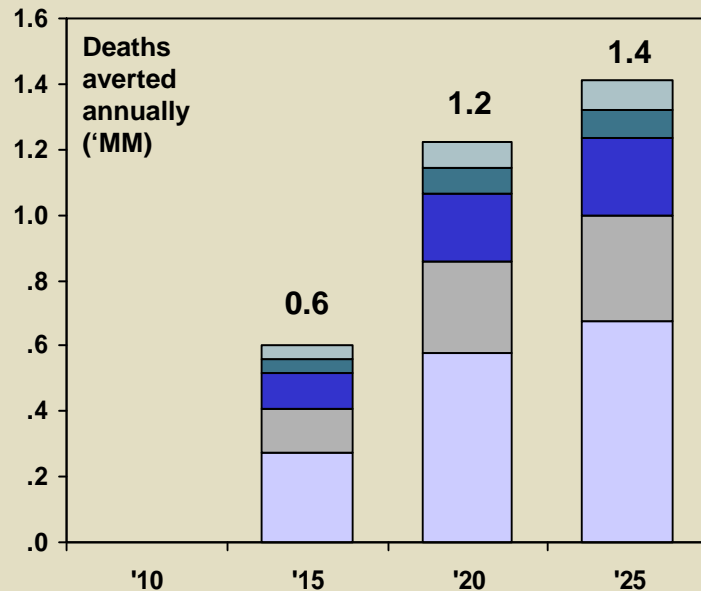


Public Sector Case for Malaria Vaccines

MALARIA VACCINE COULD AVERT 1.4 MM DEATHS AND 51 MM DALYS ANNUALLY IN 2025...

1.4 MM deaths averted annually by vaccine in 2025

51 MM DALYs averted annually by vaccine in 2025



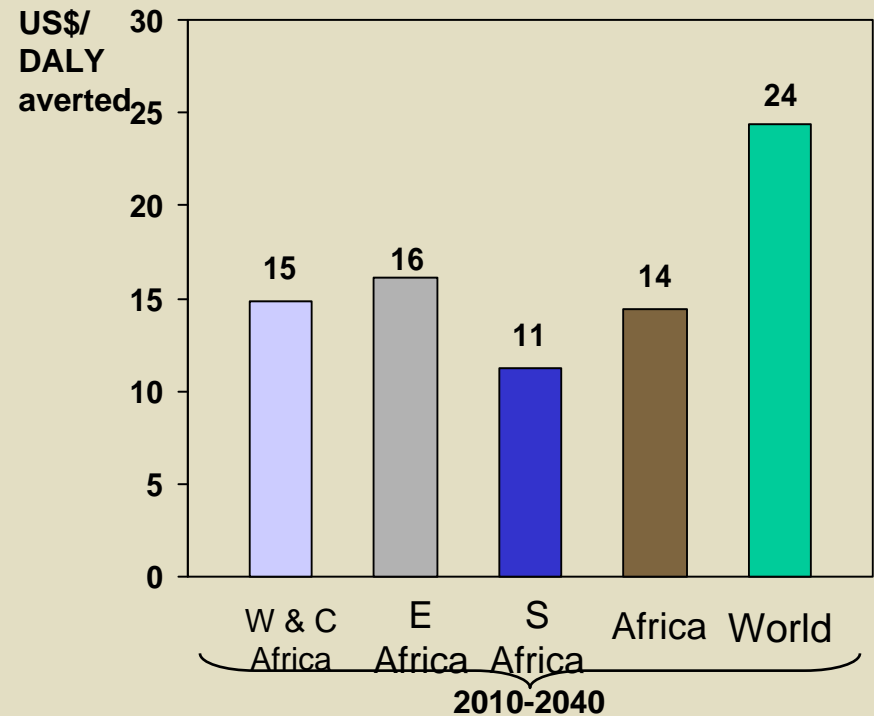
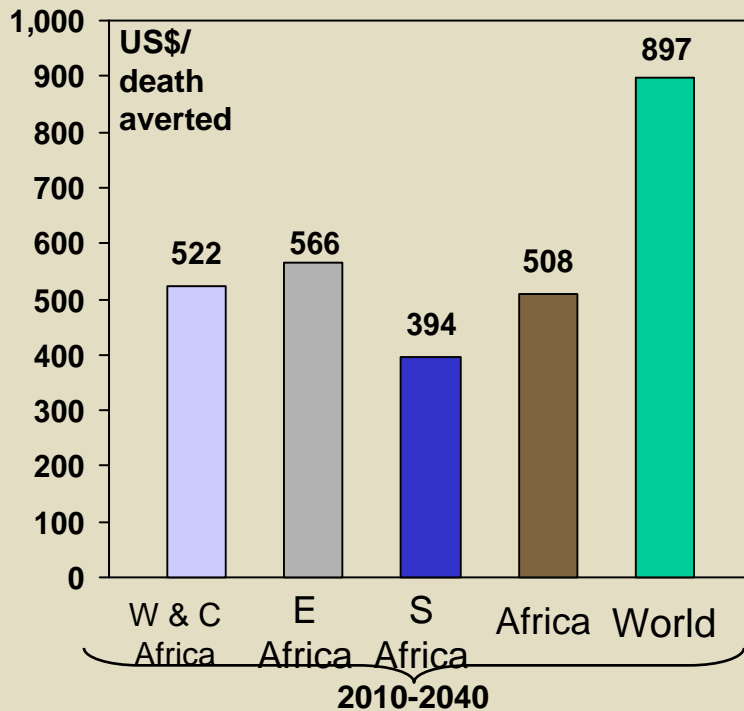
(1) Program assumed in place 2010-2025, burden averted by vaccine modeled till 2040 to capture long-term impact of the vaccine

Note: All US\$ figures refer to 2005 US\$ in real terms

Source: Swiss Tropical Institute, Mathematical modeling of the impact of malaria vaccines on the clinical epidemiology and natural history of Plasmodium falciparum malaria, BCG analysis

WITH A COST EFFECTIVENESS OF US\$ 508/DEATH AND US\$ 14/DALY AVERTED IN AFRICA

Cost effectiveness of malaria vaccine implemented between 2010-2025



- US\$ 21/course vaccine cost and US\$5/course incremental delivery cost
- Costs from '10 to 25
- Impact from '10 – '40 in vaccinated populations

Note: Analysis includes the impact of vaccine for 15 years beyond vaccination date in cost effectiveness calculations, hence costs are considered for vaccine delivery from 2010-2025

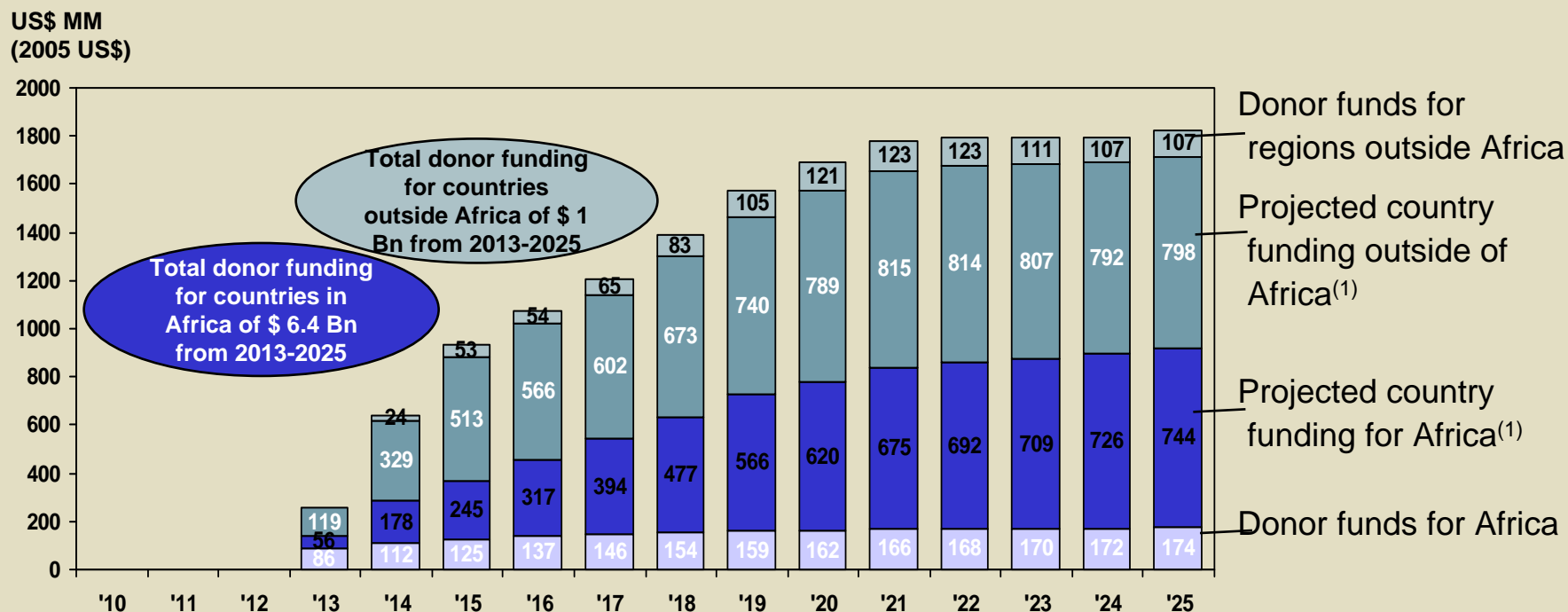
and impact in the vaccinated populations from 2010-2040. Analysis also includes cost offsets and productivity gains to calculate cost effectiveness

Note2: All US\$ figures refer to 2005 US\$ in real terms

Source: STI report, BCG analysis

OVERVIEW OF FUNDING REQUIRED TO IMPLEMENT MALARIA VACCINE AT DEFINED PRICE LEVELS

Total funding required to purchase and deliver vaccine at defined price level (2010-2025)



• US\$ 21/course vaccine cost and US\$5/course incremental delivery cost

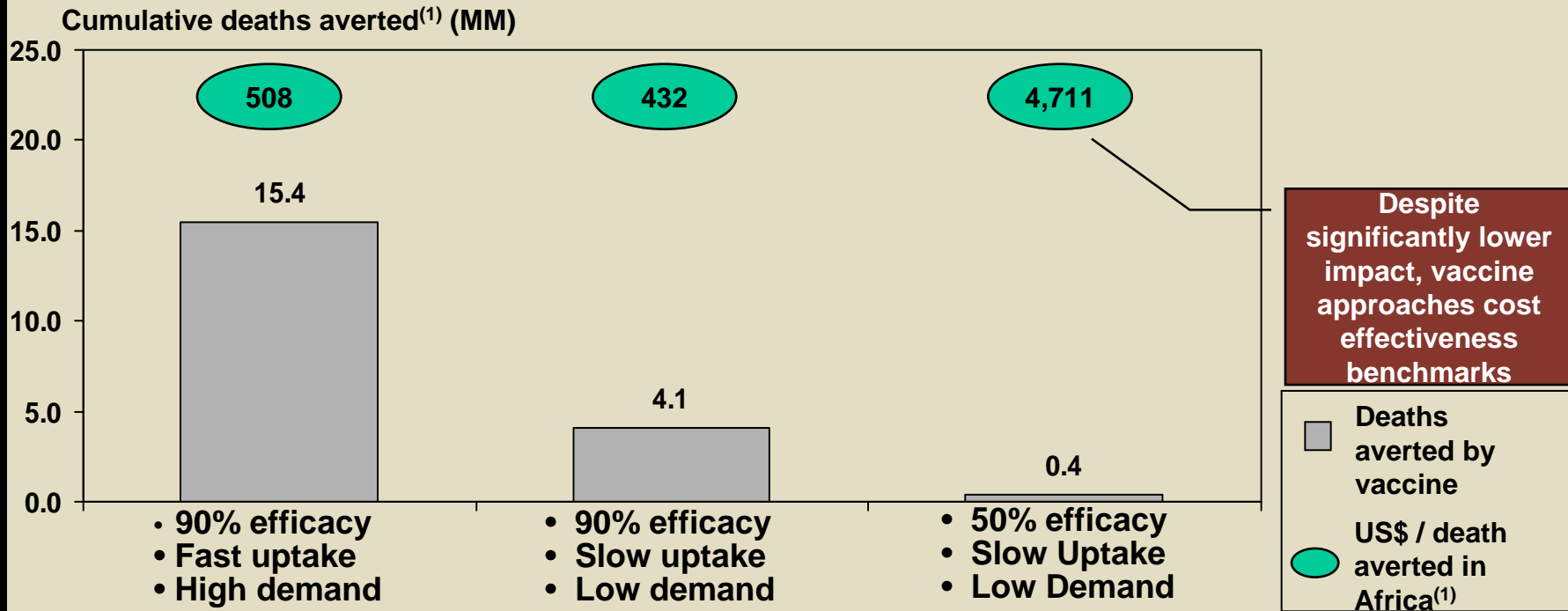
(1) Based on current health budgets and malaria expenditures of countries projected into the future at a conservative growth rate proportional to past GDP growth

Note: All US\$ figures refer to 2005 US\$ in real terms

Source: BCG analysis

SLOW IMPLEMENTATION OF 50% EFFICACY VACCINE WITH ONE YEAR DURATION SIGNIFICANTLY REDUCES IMPACT

Deaths due to malaria averted by vaccine – Worldwide, vaccine implemented 2010-2025



- US\$ 21/course vaccine cost and US\$5/course incremental delivery cost
- Costs from '10 to 25
- Impact from '10 – '40 in vaccinated populations

(1) Averted by vaccine implemented between 2010-2025, both immediate as well as long term impact of vaccine till 2040

(2) Post licensure lag in Africa, in other regions considered to be 1 – 2 years less than Africa

Note: Efficacy defined as 50% efficacy against clinical disease and 50% efficacy against severe disease. Higher initial efficacy against infection required to reach this level.

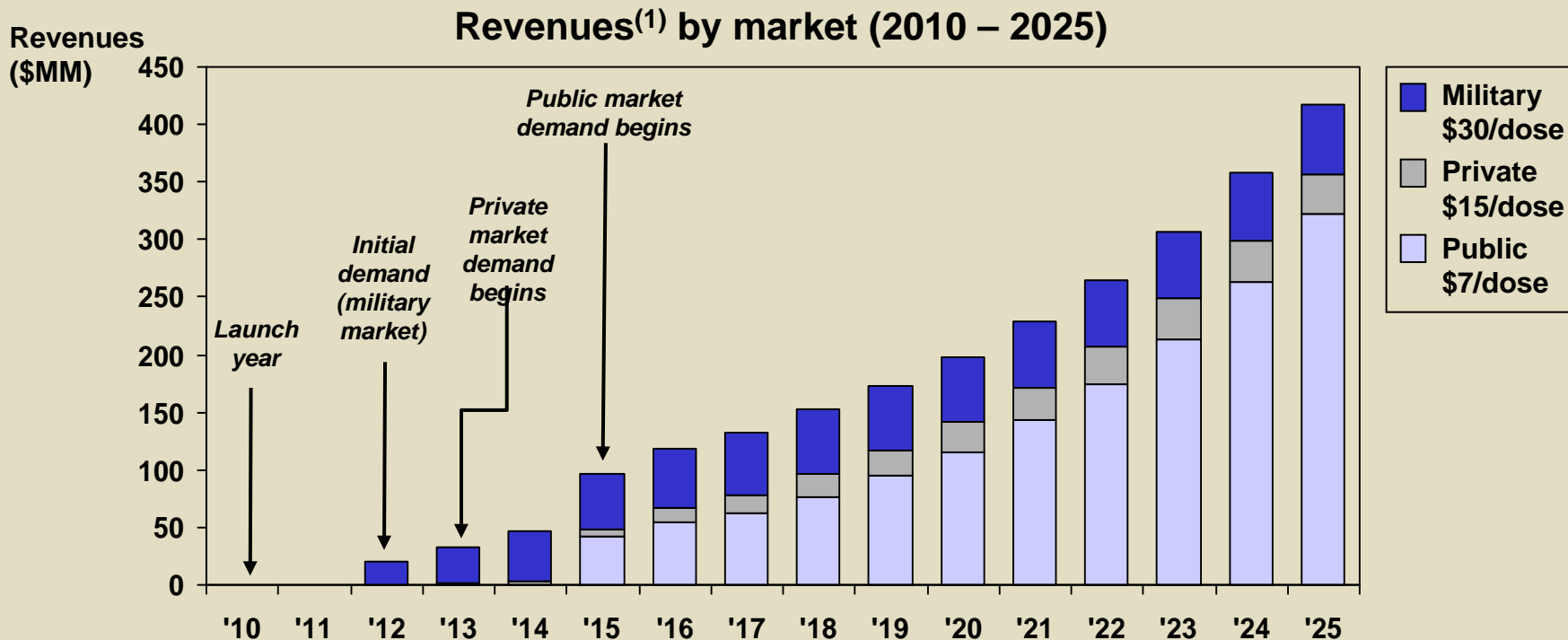
Note2: All US\$ figures refer to 2005 US\$ in real terms

Source: STI report, BCG analysis

Private Sector Case for Malaria Vaccines

TOTAL REVENUES OF \$417 MM POSSIBLE IN 2025

Public Market Share of Revenue Increases from 43% in 2015 to 77% in 2025



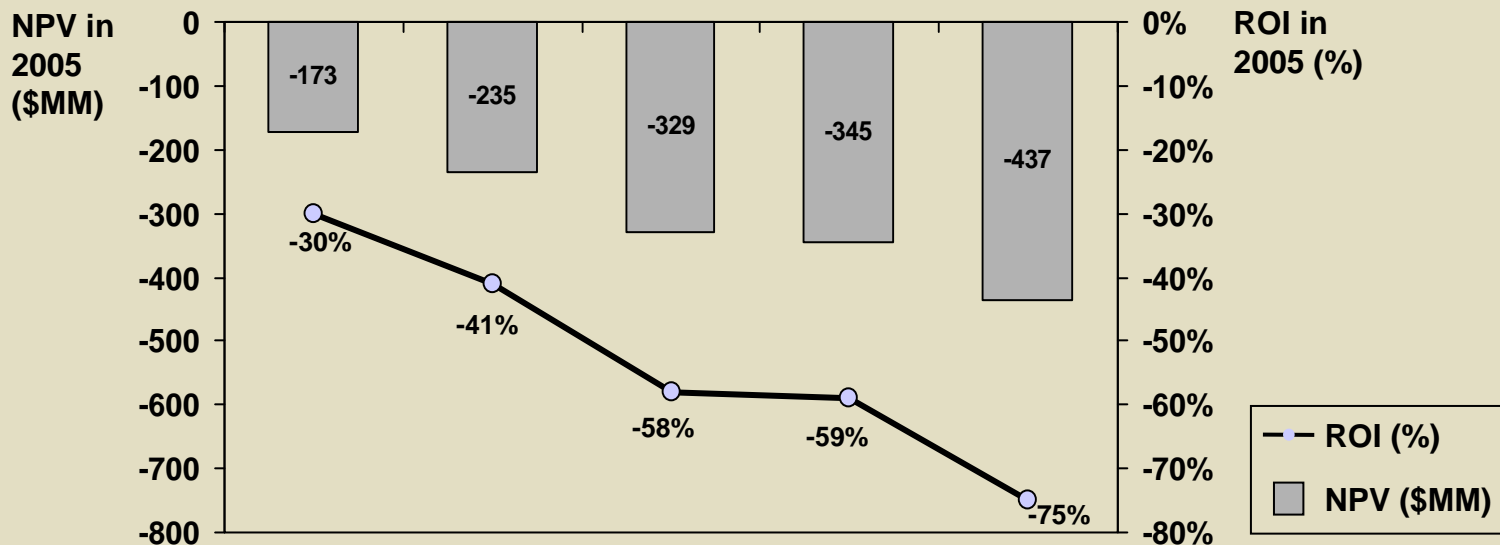
Assumes \$517 MM in cumulative country funding⁽²⁾, would require \$1,050 MM in cumulative donor funding⁽²⁾ to purchase vaccine for 15 years

(1) Revenues projected assume sufficient donor funding allocated to purchase all doses demanded in public market
 (2) Cumulative funding figures reflect public market vaccine purchase price of \$7/dose (\$21/course) only, do not include any incremental delivery cost
 Note: No Travelers market at 50% observed efficacy level
 Source: MVI market assessment, BCG analysis

RETURNS HIGHLY SENSITIVE TO PRICE ASSUMPTIONS

Reducing Public Market Price Per Dose from \$7 to \$2 Results In 28% Decline in ROI

NPV and ROI in 2005



Price (\$/dose)

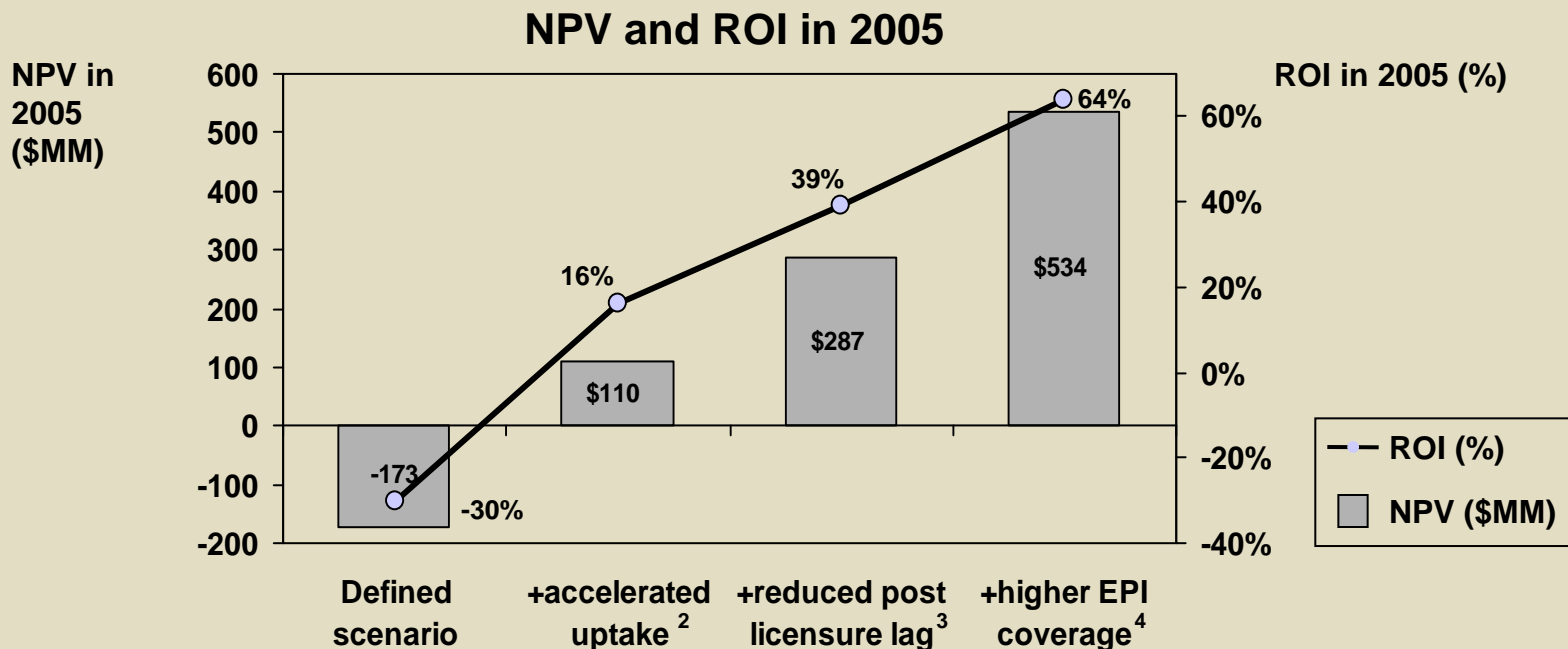
• Public market	7	5	2	2	2
• Private market	15	15	15	5	5
• Military market	30	30	30	30	10

Cumulative funding⁽¹⁾ to purchase vaccine for 15 yrs (\$MM)

• Assumed Country funding	517	533	305	305	559
• Required Donor funding	1,050	587	143	143	262

(1) Cumulative funding figures reflect public market vaccine purchase price of \$7/dose (\$21/course) only, do not include any incremental delivery cost
 Note: All other assumptions as detailed in scenario definition for partial efficacy vaccine, slow implementation
 Source: BCG analysis

ALTERNATELY, STRONG IMPLEMENTATION OF VACCINE COULD IMPROVE RETURNS



Cumulative funding⁽¹⁾ to purchase vaccine for 15 yrs (\$MM)

• Assumed Country funding	517	657	772	790
• Required Donor funding	1,050	3,482	4,298	6,327

(1) Cumulative funding figures reflect public market vaccine purchase price of \$7/dose (\$21/course) only, do not include any incremental delivery cost

(2) Accelerated uptake based on HepB vs. DPT in defined scenario

(3) Reduced post licensure lag of 3 years vs. 5 years in Africa, 1-2 years vs. 3-4 years in ROW in defined scenario

(4) Max EPI coverage of 90% in all African countries vs. current levels in defined scenario

All other assumptions as detailed in scenario definition for partial efficacy vaccine, slow implementation

Source: BCG analysis

Key Messages

Integrated analyses of public and private returns for investing in a new technology are a critical tool to bridge the public and private sectors, develop new interventions and achieve health impact.

Even if you build the best intervention, limited delivery systems can undermine potential; similarly imperfect interventions can have a powerful impact if used well.

The relationship of different incentives in successfully developing and implementing malaria vaccines and other new technologies can be identified, analyzed, and with advance planning, positively impacted.