Session 6 – Accelerating Elimination of Cervical Cancer:
Transforming current insights into equitable strategies for global success

Effective HPV vaccine resource reallocation given single-dose recommendation.

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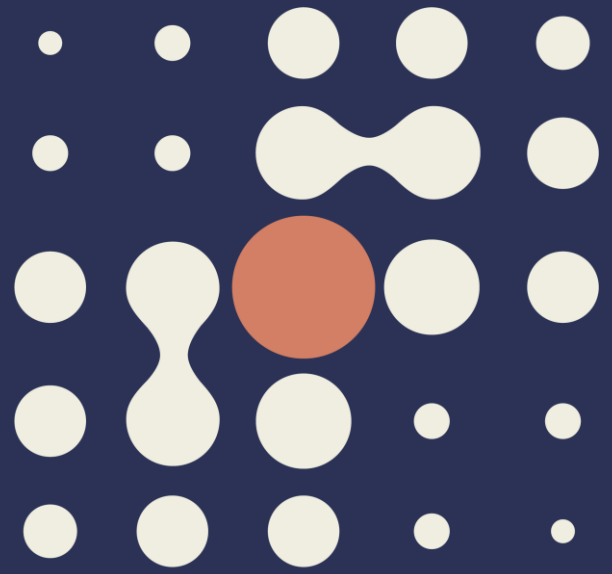
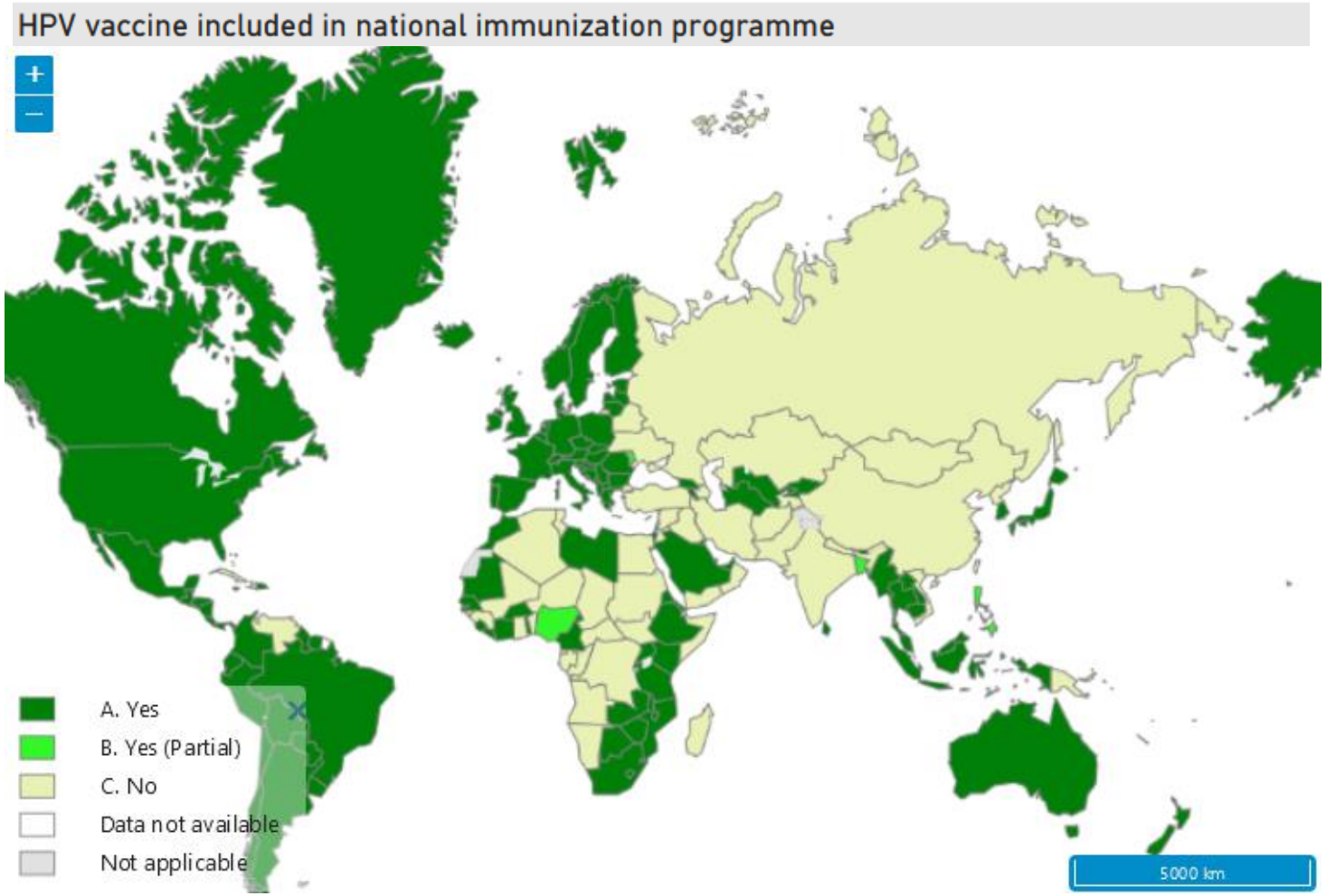
International Agency for Research on Cancer

World Health Organization



Resource reallocation given single-dose recommendation



Limited access to HPV vaccines in many LMICs

Strong evidence for **high single-dose efficacy**; less and less uncertainty on durability

Reallocate resources saved by switching to single dose to **vaccinate more people**

WHO, HPV Dashboard, accessed 5 June 2024

How to best reallocate resource saved in a given context?

Some factors to consider:

- Cervical cancer burden
- Existing vaccination & screening
- Subpopulations with high preventable burden



3 examples of LMICs

	India	Rwanda	Brazil
Cervical cancer burden			
Incidence (age-standardized, per 100,000 women-year)	17.7	18.9	12.7
Lifetime risk (per 100,000 women born)	1631	1723	1459
HPV vaccination			
Year introduction	2025 (planned)	2011	2013
Girls' coverage	NA	82%	88%
Boys' coverage	NA	NA	62%

Model-based impact projections of resource reallocation

Simulations:

- Reference: continuation of two-dose
  (without resource reallocation)
- Switch to single-dose in 2025
- With resource reallocation strategies,
  using doses saved in next 10 years:
  - Catch-up in older female cohorts,
    up to age 30, one-off in 2025
  - Improvement routine coverage
  - Switch to routine gender-neutral

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Analyses:

- Amount of resource to reallocate
- Individual reallocation strategies
  - Dose efficiency
- Prioritize and combine strategies
  - Gain in total impact, using the saved doses? (lifetime cervical cancer cases prevented, in cohorts aged 0-30 in 2025)
  - Elimination with sustained routine coverage?

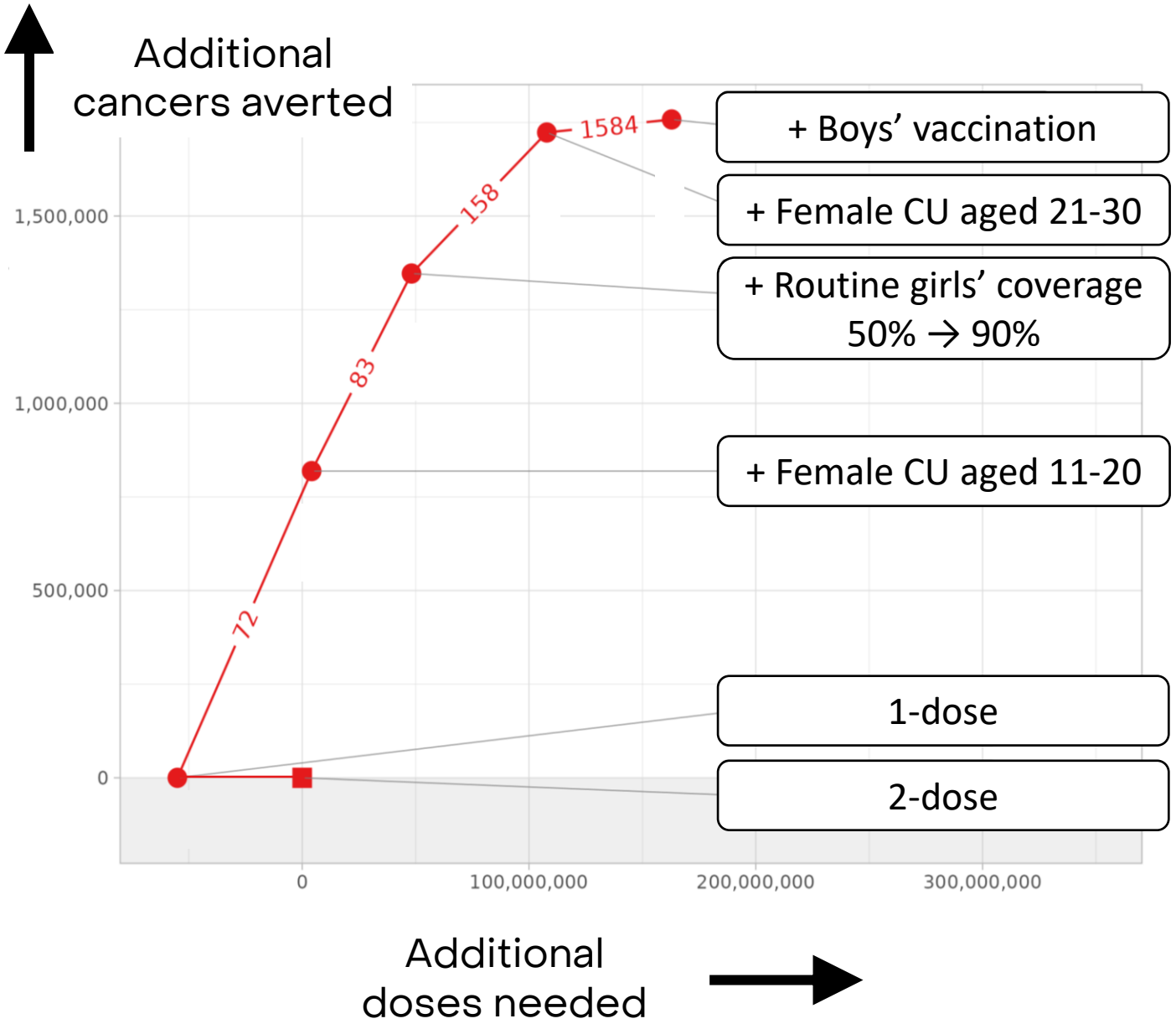
Resource to reallocate by switching to single-dose

Savings in the next 10 routine cohorts

	India *(assuming girls-only 50% coverage)*	**Rwanda** *(assuming current 82% coverage)*	**Brazil** *(assuming current 88% coverage)*
Vaccine doses	55 million	1.5 million	20 million
Vaccine costs [1]	435 million US$	12 million US$	156 million US$

[1] Assuming 8.00 US$ per dose for [vaccine + delivery]

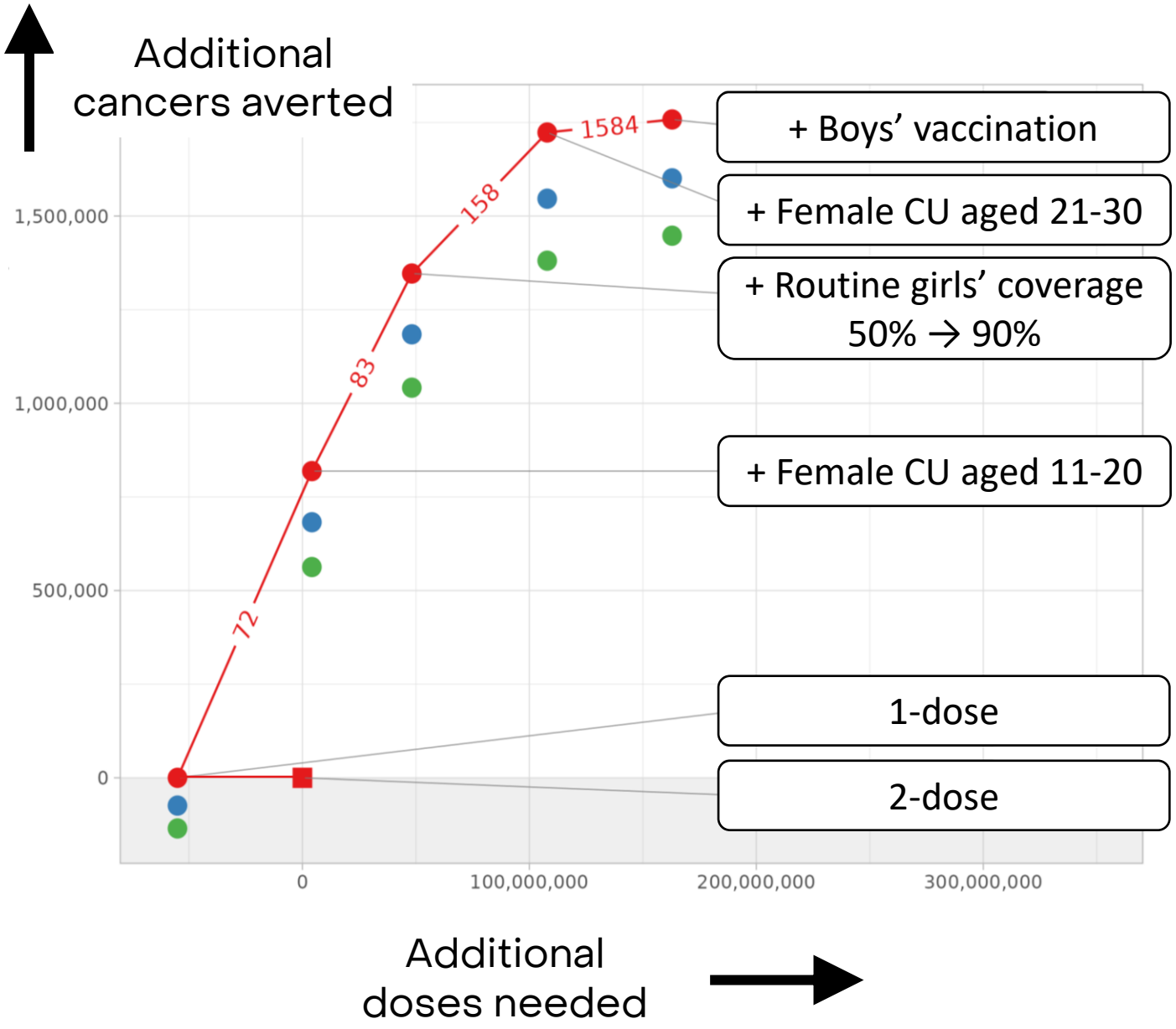
Prioritizing & combining strategies – India



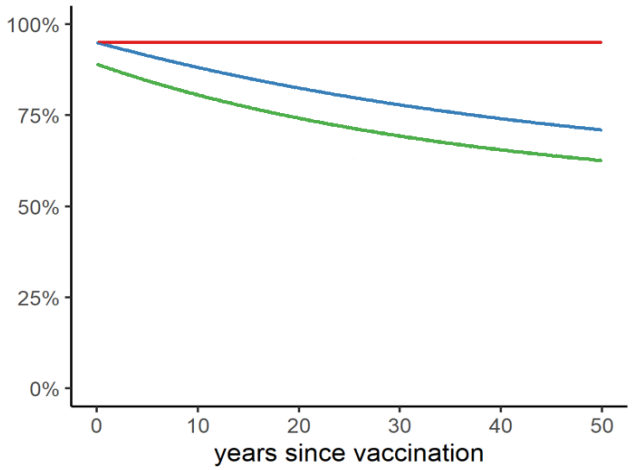
Assumptions:

- 50% girls-only routine vaccination
- Non-inferior 1-dose efficacy

Prioritizing & combining strategies – India



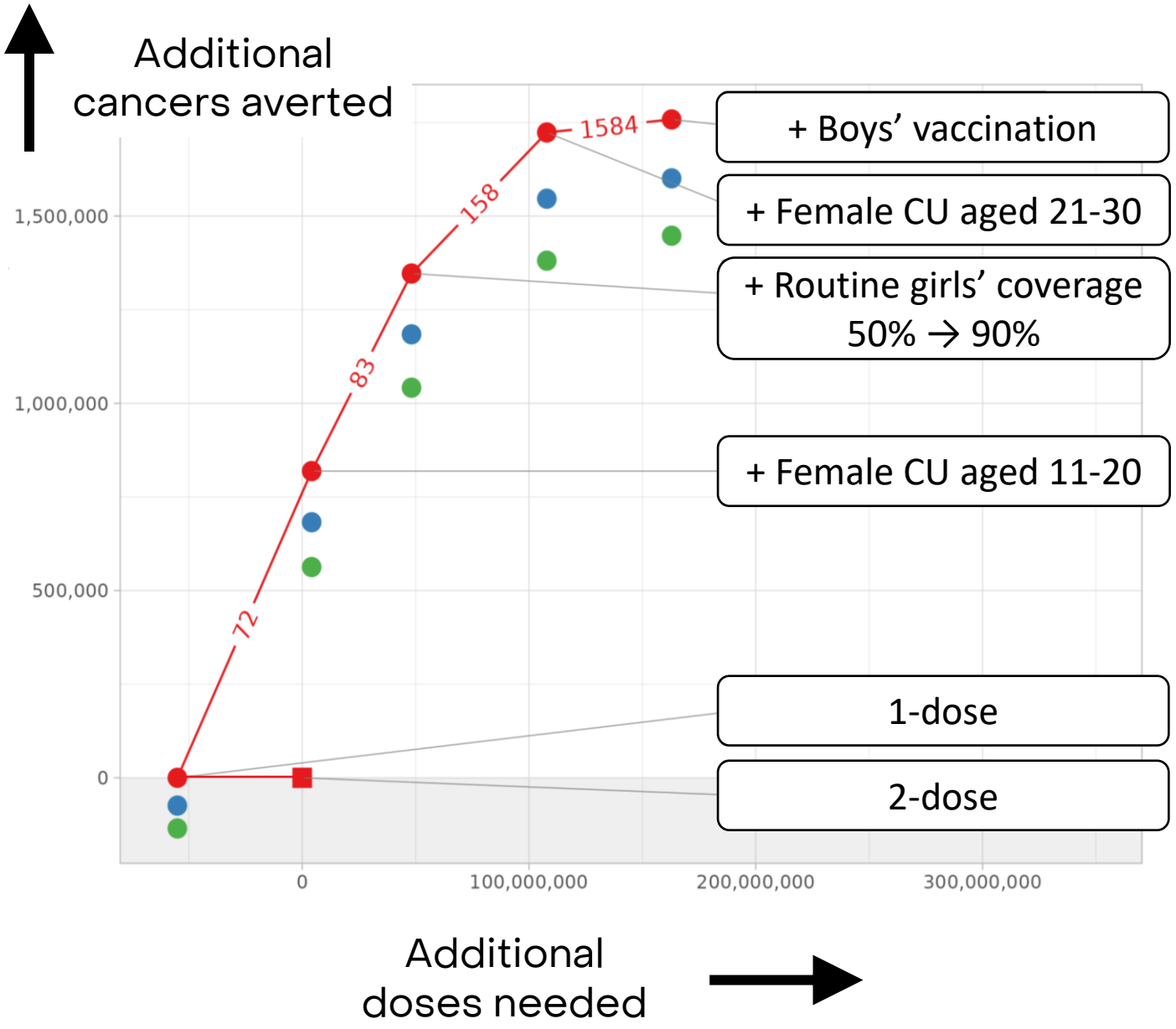
Scenarios of HPV 16/18 efficacy



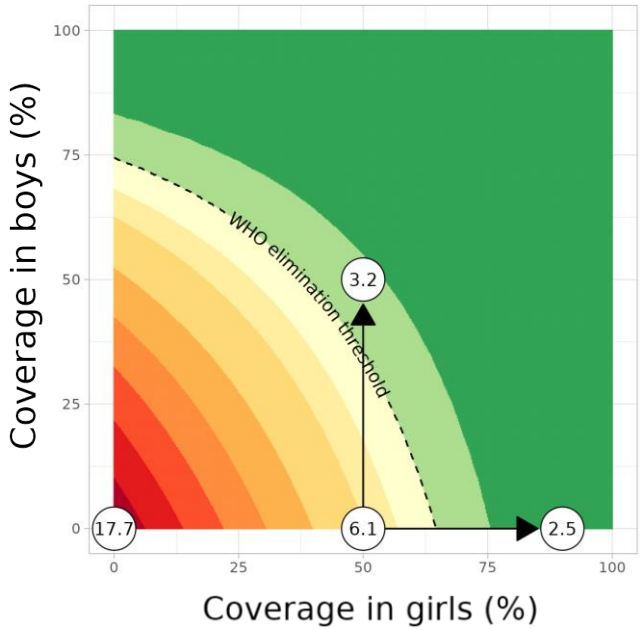
Key findings:

- Increased total impact, even in worst-case single-dose protection

Prioritizing & combining strategies – India



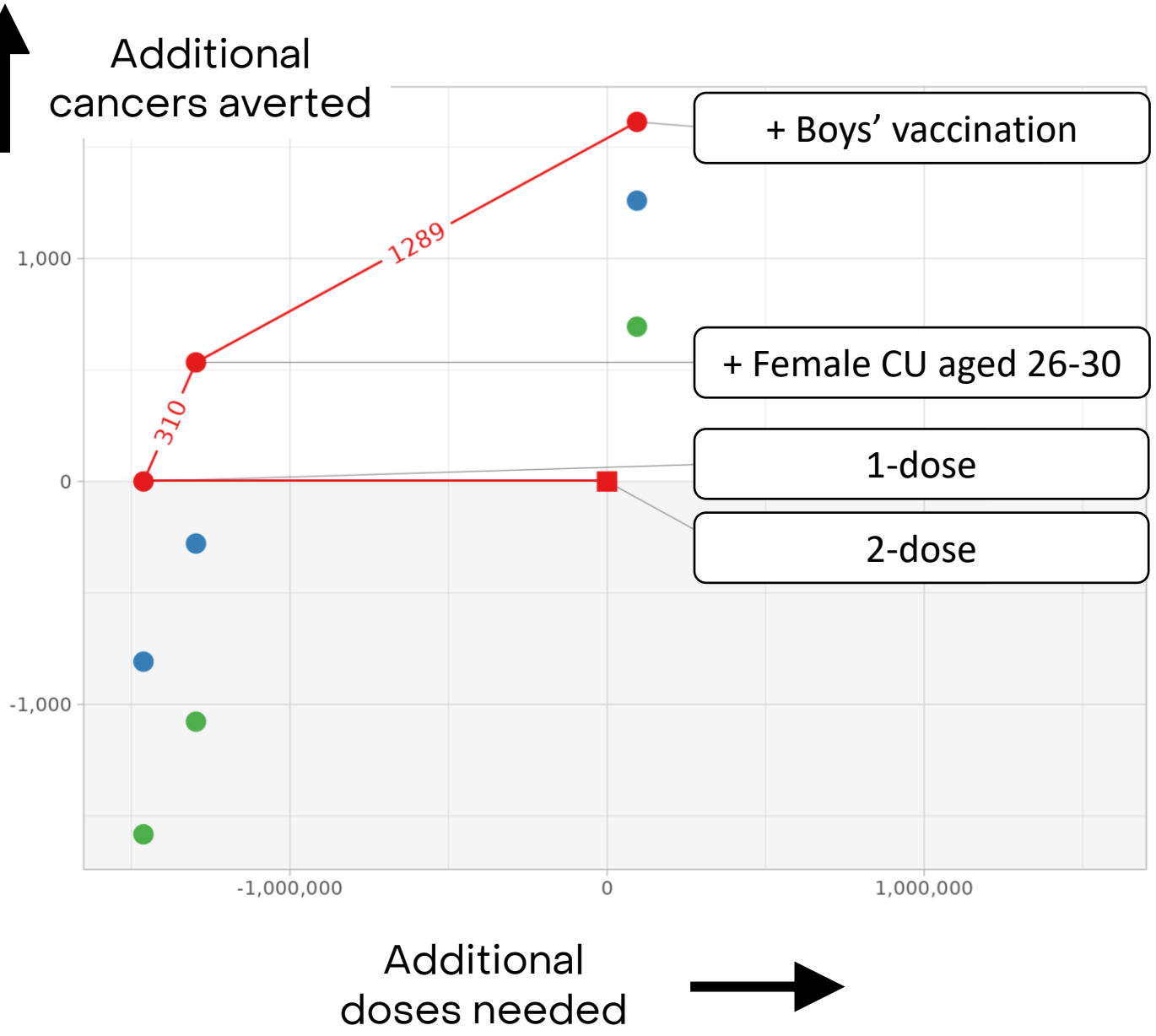
Cervical cancer incidence
(with sustained routine coverage, per 100,000 women-years)



Key findings:

- Elimination possible, if enough coverage / resource

Prioritizing & combining strategies – Rwanda



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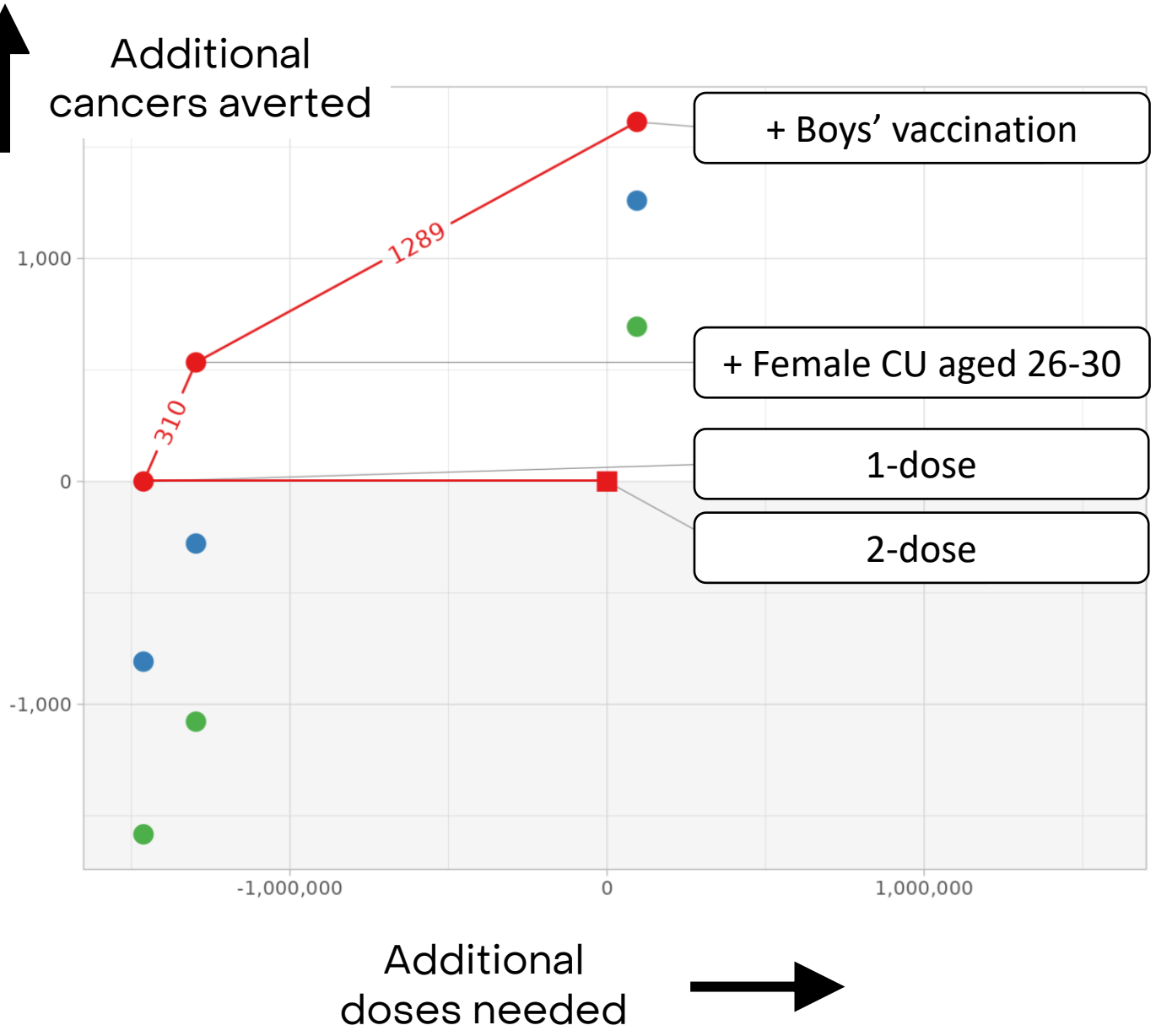

Cervical cancer incidence
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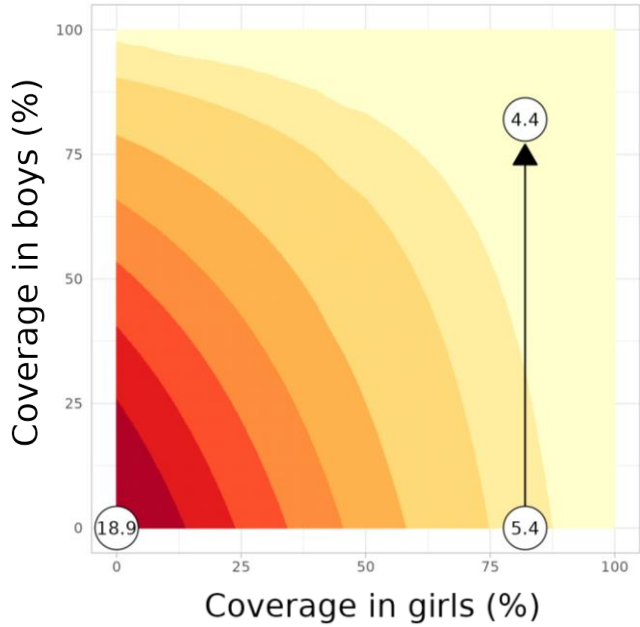
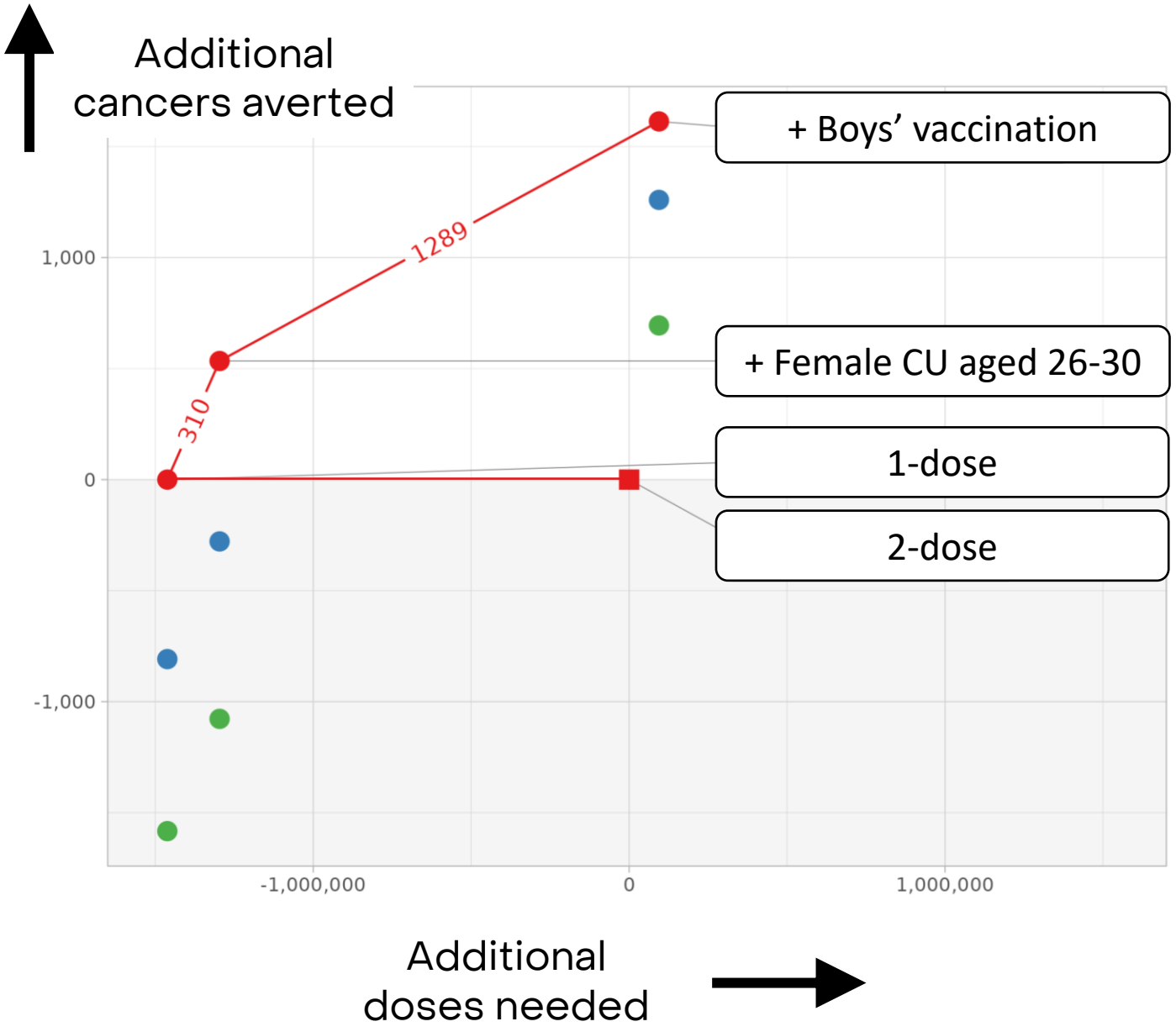


Key findings:

- 4-valent vaccine: no elimination (9-valent vaccine / screening?)

Prioritizing & combining strategies – Rwanda



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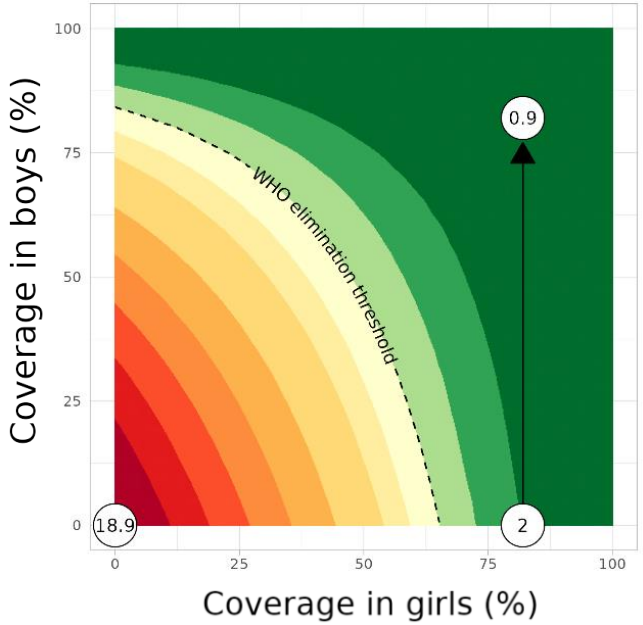

[9-valent]

Key findings:

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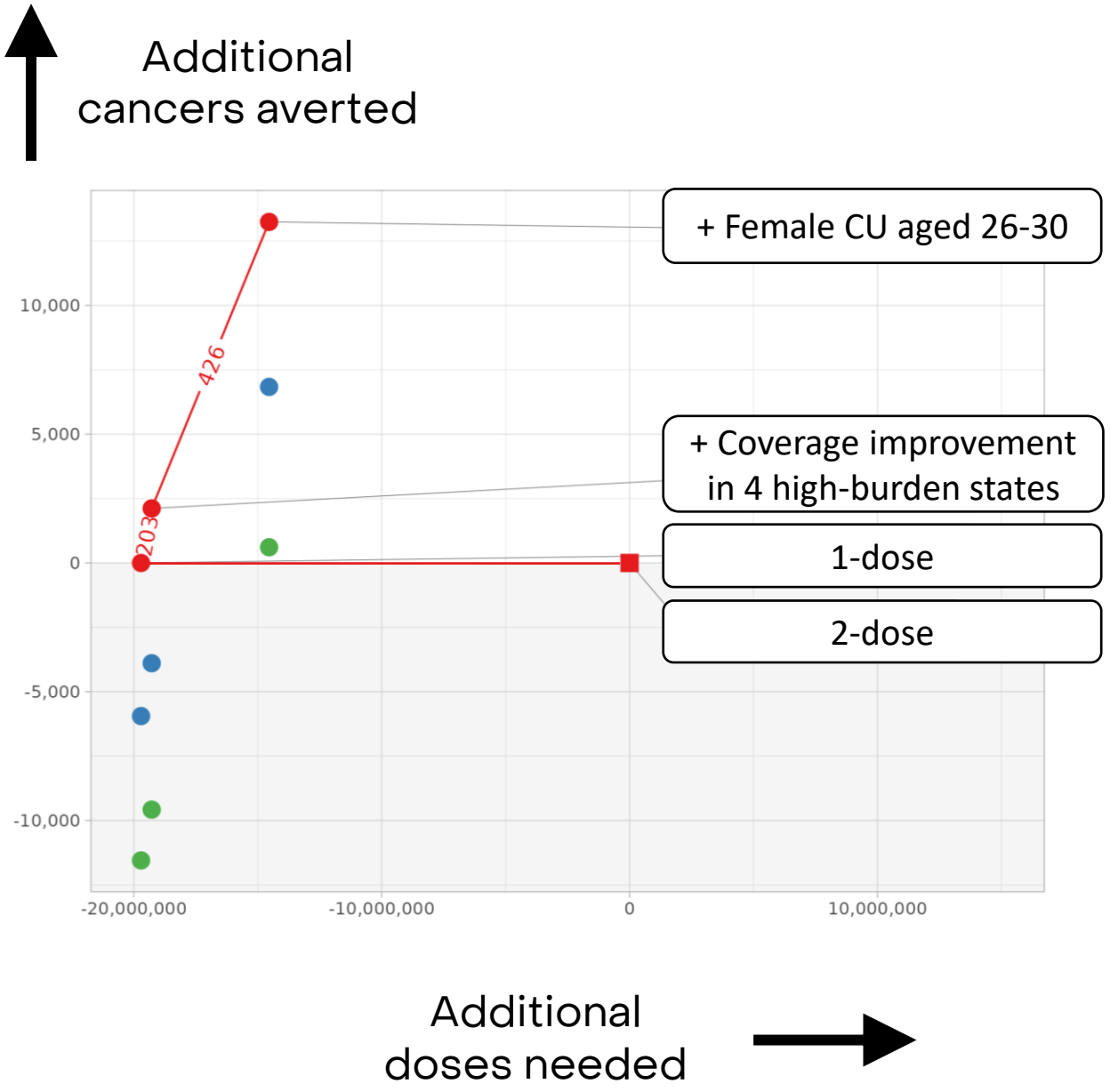
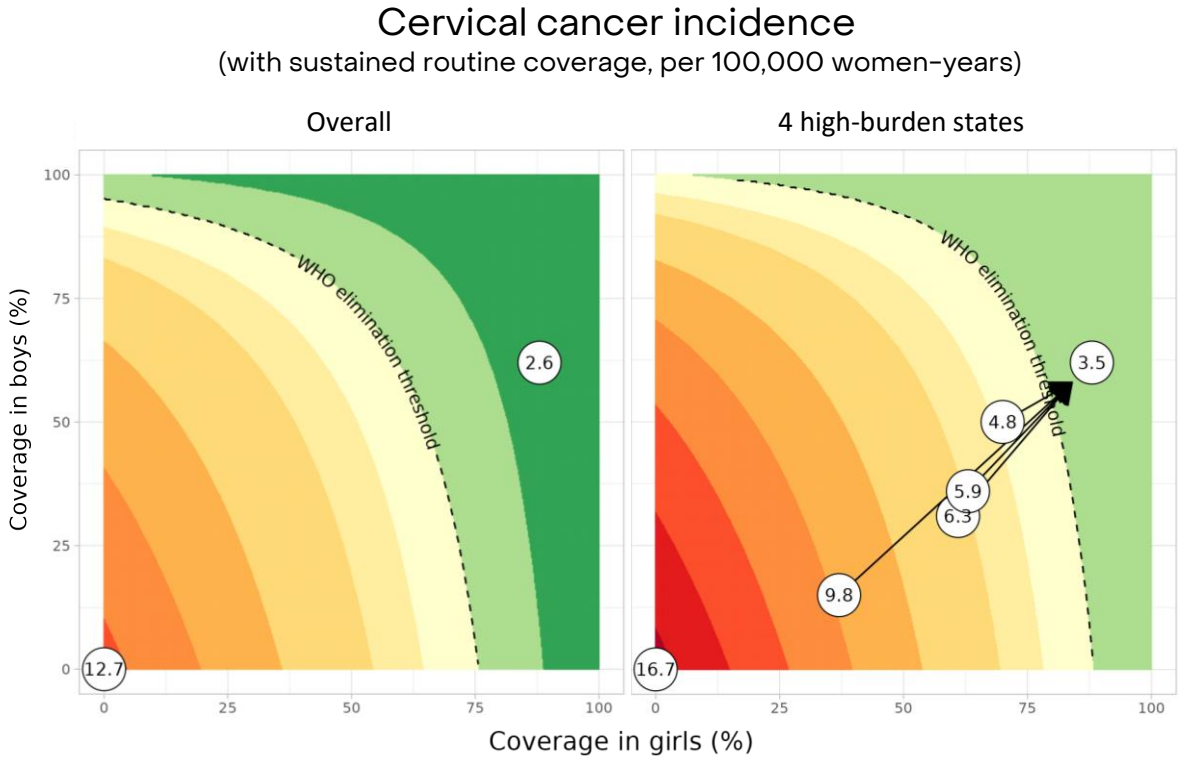
Prioritizing & combining strategies – Brazil





Key findings:

- Coverage improvement in 4 state: elimination, equity, only ~3% doses saved
- Increased total impact, but resources left (Where else to reallocate?)

Conclusions

Single-dose + resource reallocation

- Increase overall impact
  even in worst-case scenario of single-dose protection
- Accelerate elimination
- More equitable access

Finetuning strategies to countries:

- Countries not yet / recently started:
  many options; female catch-up, gender-neutral
- Countries started for a while:
  underserved populations, 9-valent, screening

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Discussions & Limitations

Dose-efficiency
- Useful for prioritization
- Proxy for cost-effectiveness
- More resource needed to deliver vaccines to older cohorts / hard-to-reach populations?

Higher coverage → lower costs per immunization?

Innovative and efficient delivery methods.
Could learn from experience of other vaccines.

Acknowledgement

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Partha Basu

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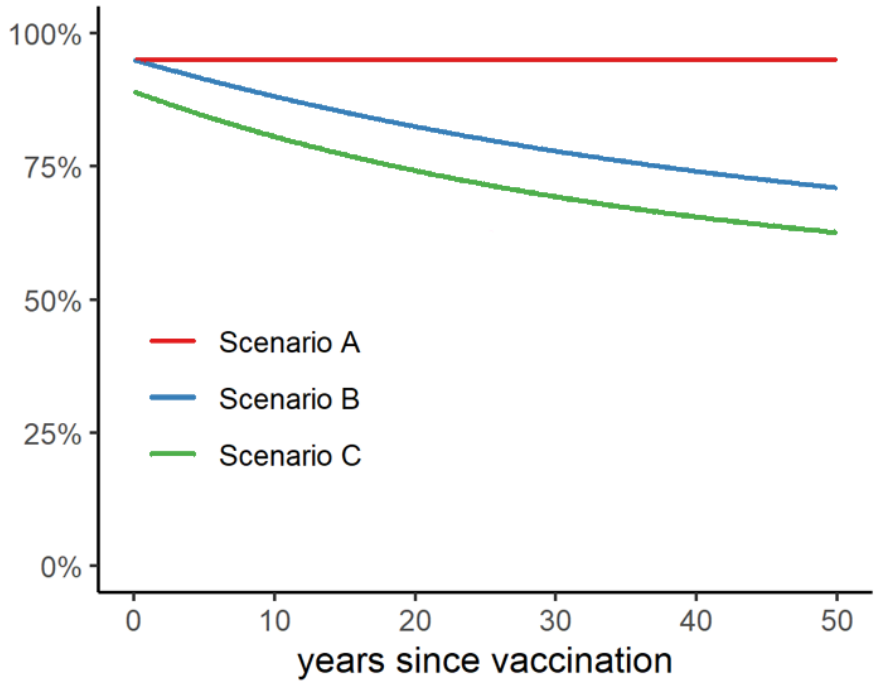
Thank you for your attention!

Evidence-based scenarios of single-dose protection

Scenarios of HPV 16/18 efficacy



Scenario A

- IARC India vaccine trial's efficacy data
- Lifelong efficacy
  - HPV 16/18: 95%
  - HPV 31/33/45: 9% (cross-protection)
- Supported by immunological reasoning [1]

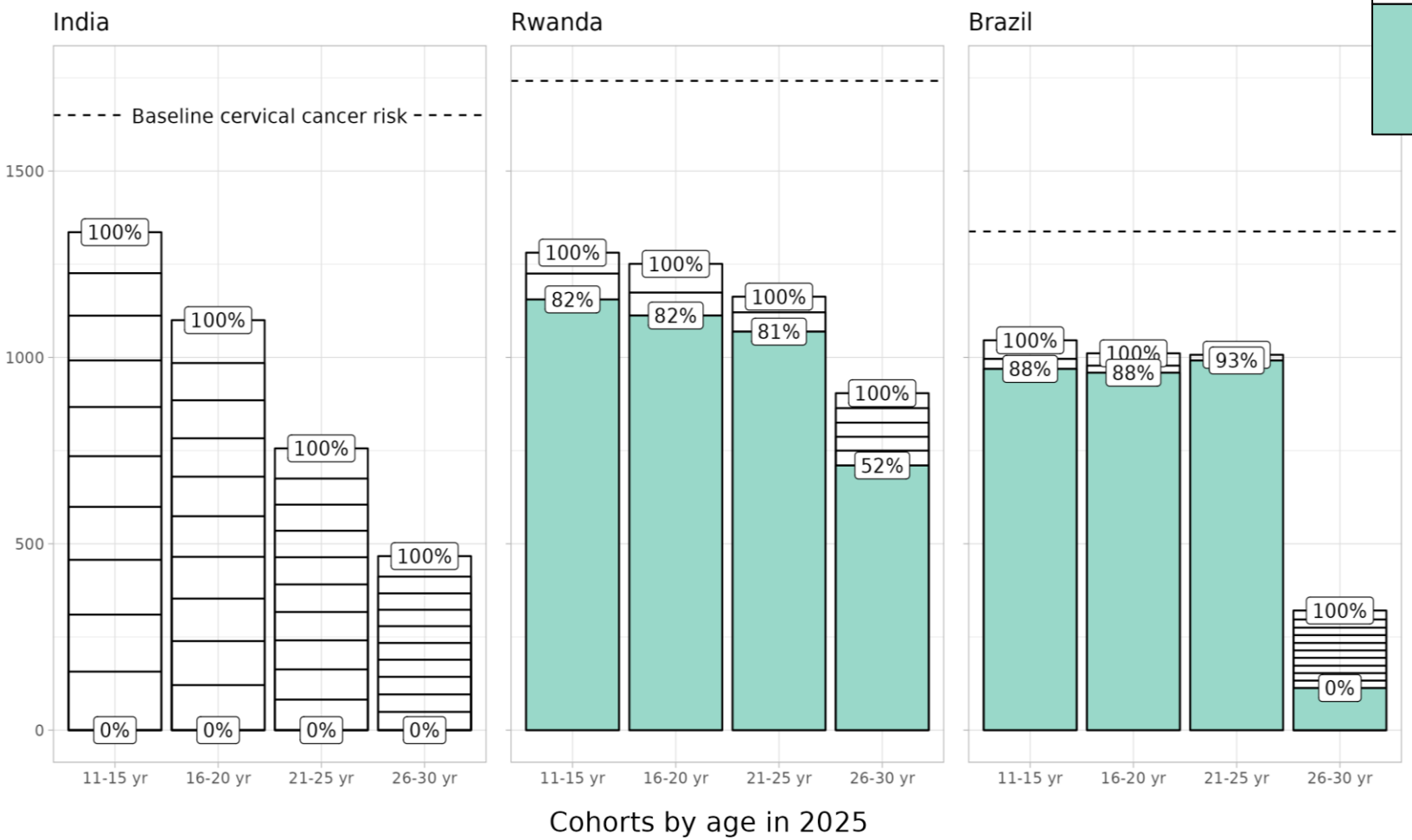
Scenarios B-C

- IARC India vaccine trial's antibody data
- Possible lower initial efficacy
- Extrapolating antibody until below given thresholds (seropositivity, detection) [2]

[1] Schiller et al., Vaccine (2018)
[2] Panicker et al., Journal of Immunological Methods (2021)

Impact of catch-up in older female cohorts in 2025

Lifetime cervical cancer cases preventable
(per 100,000 women born)



Impact of one-off catch-up in 2025 by +10% coverage

Impact of past vaccination

Dose efficiency

Key findings:

- Not yet / recently started vaccination → high impact (India)
- Dose-efficiency decreases with age, is context-specific (catch-up still worthwhile at age 30?)

Elimination frontier map in single-dose waning scenarios

Scenario A

Scenario B

Scenario C