7TH GLOBAL FORUM ON TB VACCINES | 8-10 October 2024 Rio de Janeiro, Brazil

Driving innovation from discovery to access

Facing up to reality— What to do if M72/AS01$_E$ doses are limited?

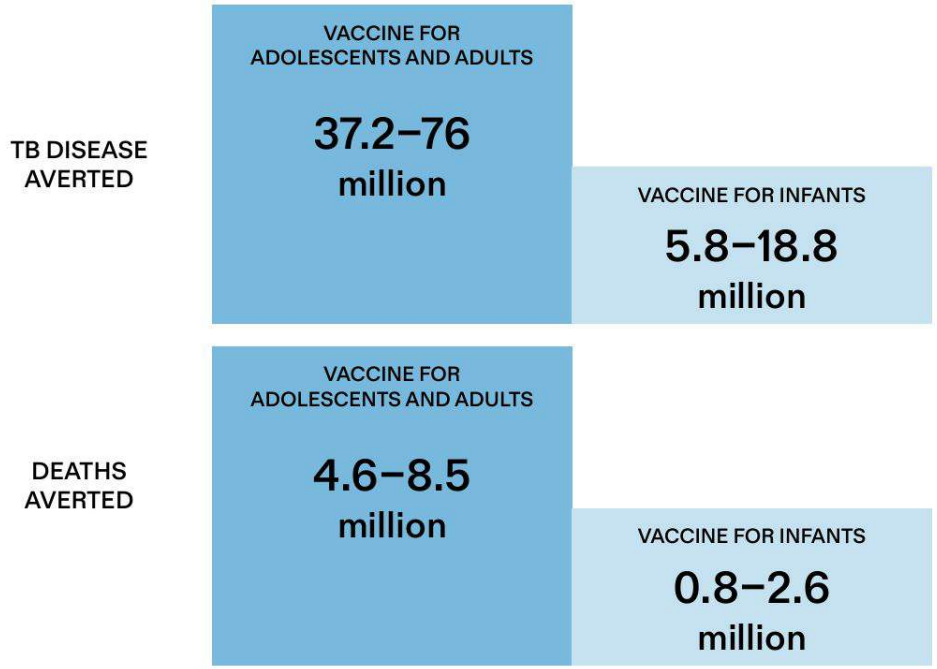
Rebecca Clark, LSHTM

10 October 2024

Background

Previous modelling of new vaccines demonstrated a positive health impact … but also assumed an unconstrained supply of doses.

For any new vaccine, there are likely to be a limited number of doses available, at least initially.



Rationale

As a global community, will need to make decisions on how to allocate limited doses for new TB vaccines.

Overall we want to deliver doses in a way that is equitable and impactful.

We used modelling to investigate the difference in impact from varying the number of vaccine doses available and varying the country-specific order of vaccine introduction.

Vaccine characteristics and delivery

Countries:

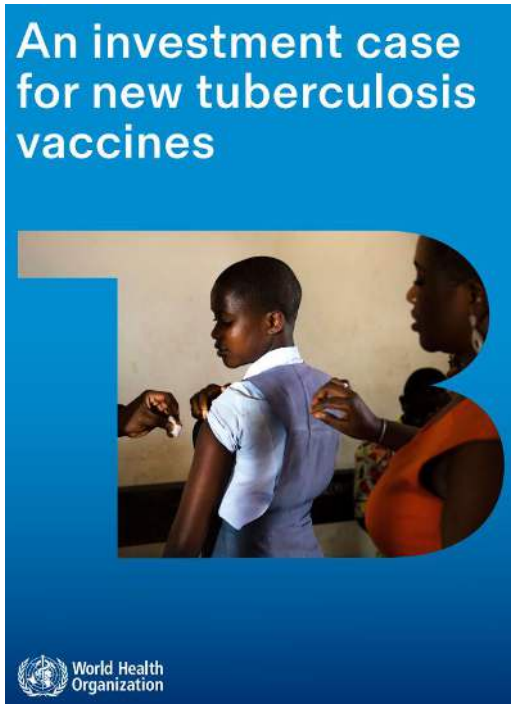
- 105 LMICs as in WHO Investment Case publications

Vaccine profile:

- 50% efficacy, prevention of disease, 10 year duration of protection, 2 doses

Ages targeted:

- Routine delivery to 15 year olds, 80% coverage



Scenarios

A. **Varying dose supply scenarios:**

How many doses will be available per year?

- Unconstrained, 20, 50, 100, or 150 million doses available per year
- Assumed the number per year was fixed over 2030–2050
- New countries only added if enough doses to continue to vaccinate all previously included countries

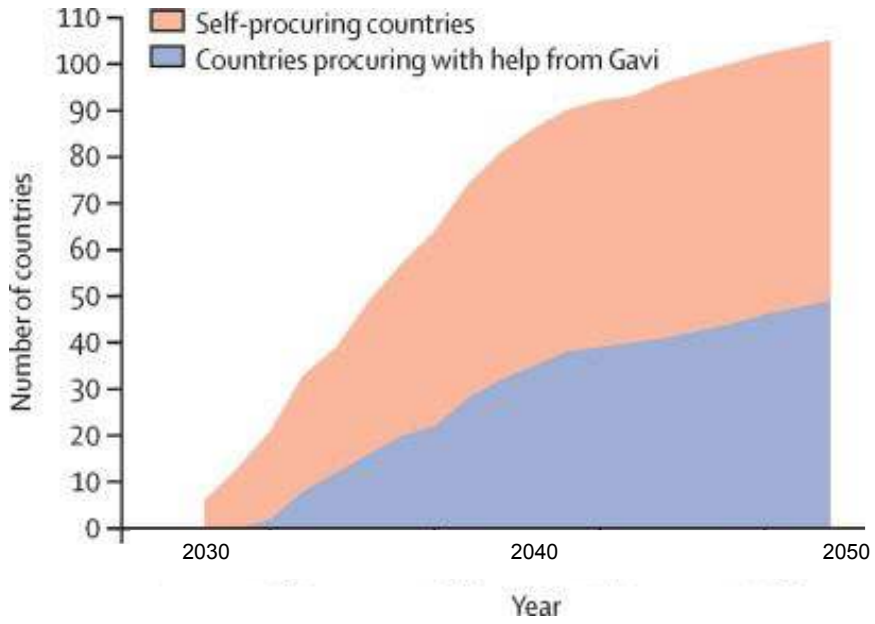
B. **Country specific introduction order:**

Which order will countries be prioritised for introduction of a new TB vaccine?

- Three scenarios of country-specific introduction order

Country introduction order scenarios: #1 Historically informed

1. Introduced in historically informed country-specific introduction order from WHO IC work (shifted to 2030 start)



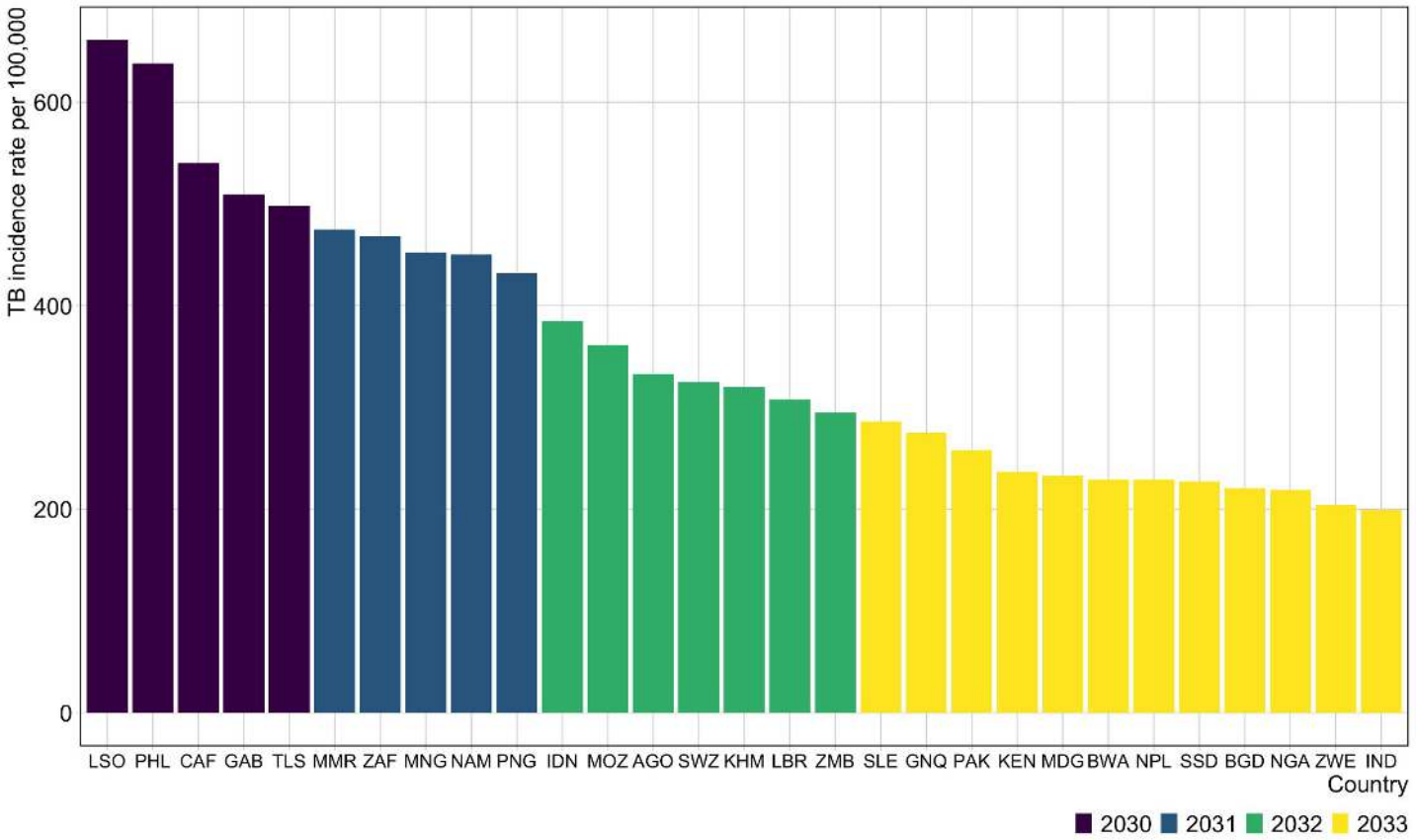
Order based on

- Disease burden
- Immunisation capacity
- Regulatory barriers
- Prior early adopter status
- Gavi eligibility

In general, countries introducing earlier were more likely to have lower disease burden

Country introduction order scenarios: #2 Prioritising by TB incidence rate

2. Prioritise introduction order based on WHO estimates of TB incidence rate from largest to smallest, using same pace as WHO IC work



and so on until 2049…

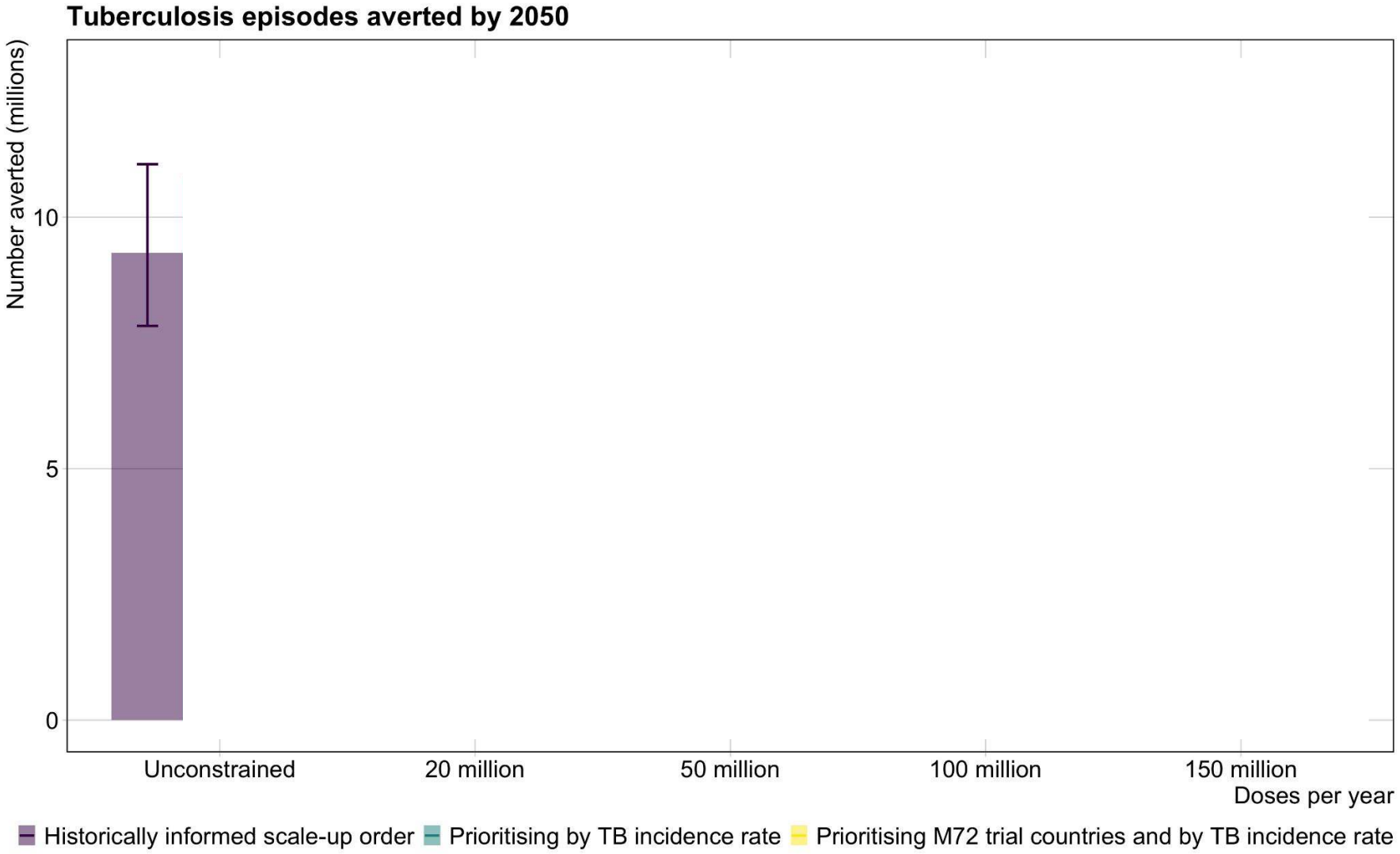
Country introduction order scenarios: #3 M72 trial countries first, then by TB incidence rate

3. Prioritise the seven M72 trial countries for delivery in 2030, return to scenario #2 TB incidence rate order in 2031

Indonesia
Kenya
Malawi
Mozambique
South Africa
Vietnam
Zambia

Account for 17% of disease episodes and 20% of deaths globally in 2022

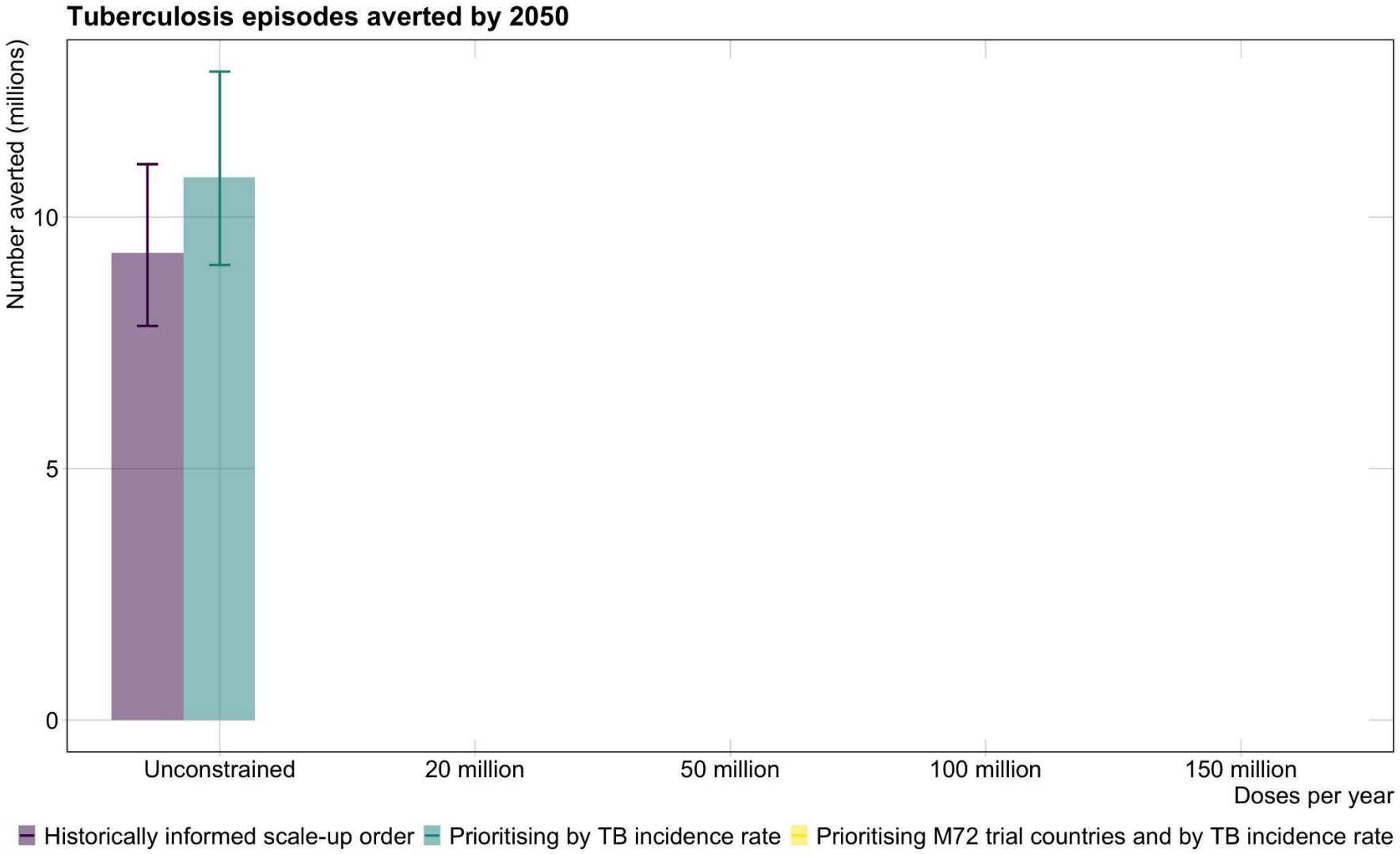
Results – Unconstrained doses (as WHO IC)



Unconstrained doses

Historically informed order:
~9.3 million averted

Results – Unconstrained doses (as WHO IC)

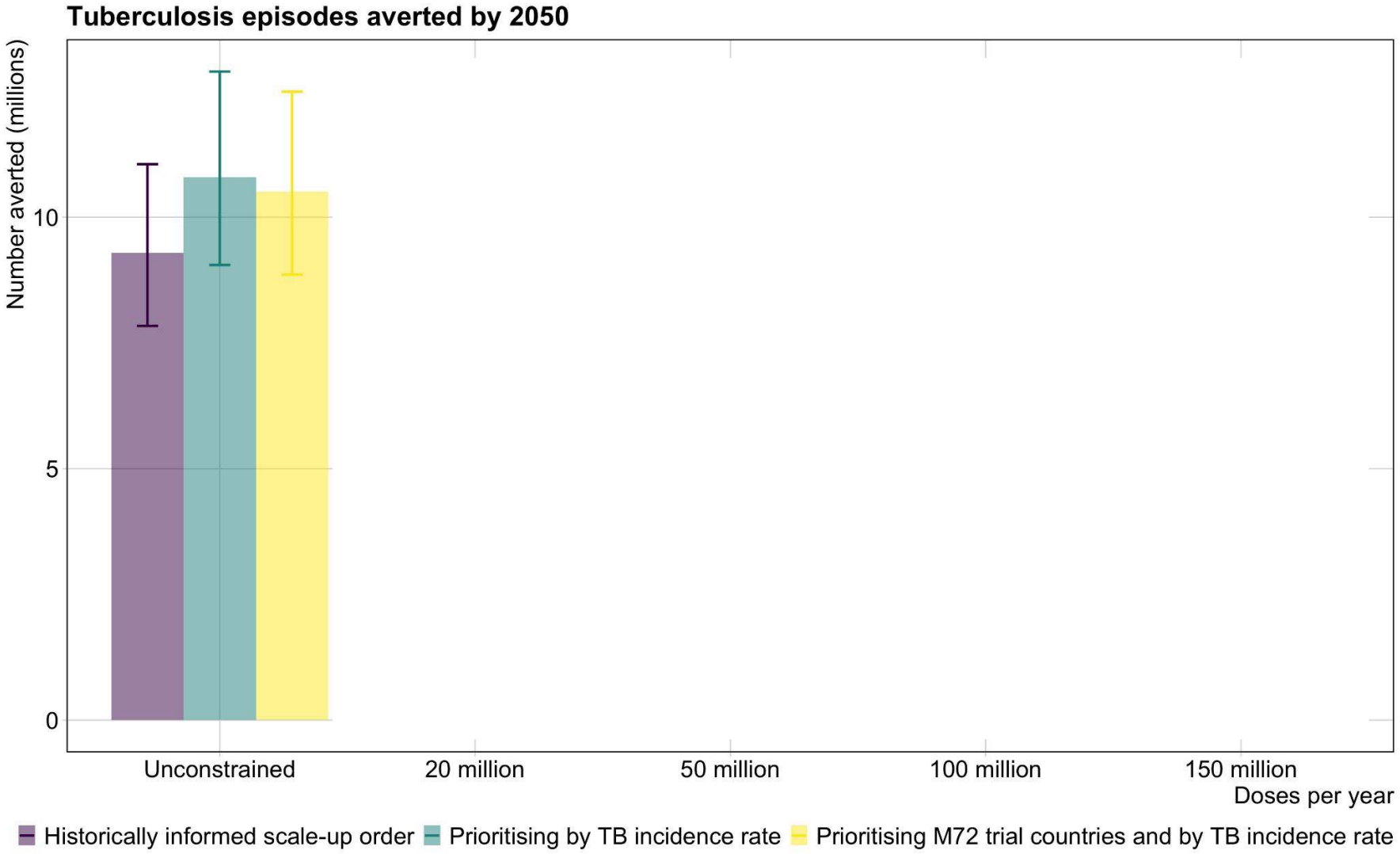


Unconstrained doses

Historically informed order:
~9.3 million averted

TB incidence rate order:
~10.7 million averted

Results – Unconstrained doses (as WHO IC)



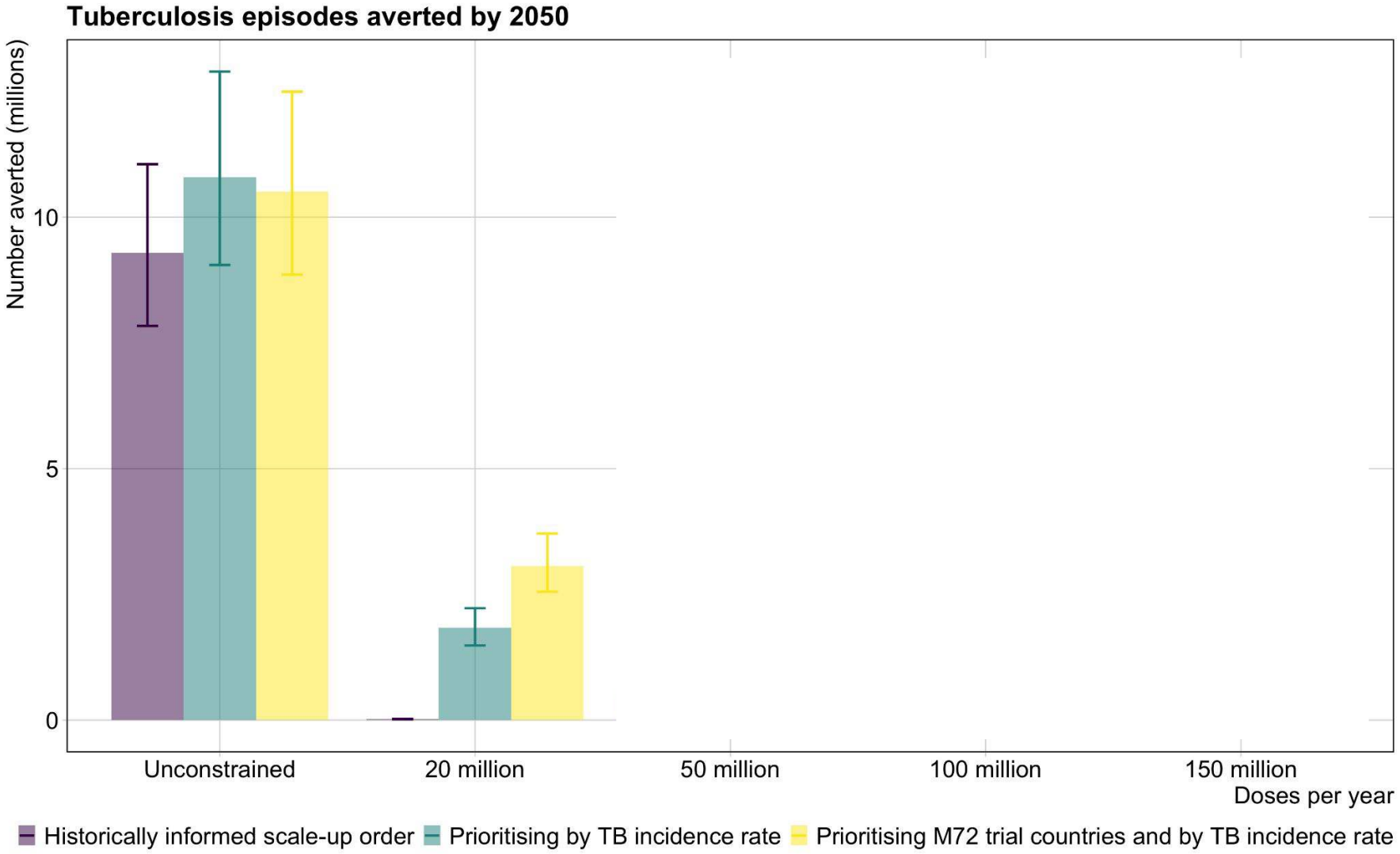
Unconstrained doses

Historically informed order:
~9.3 million averted

TB incidence rate order:
~10.7 million averted

M72 trial countries order:
~10.4 million averted

Results - 20 million doses per year



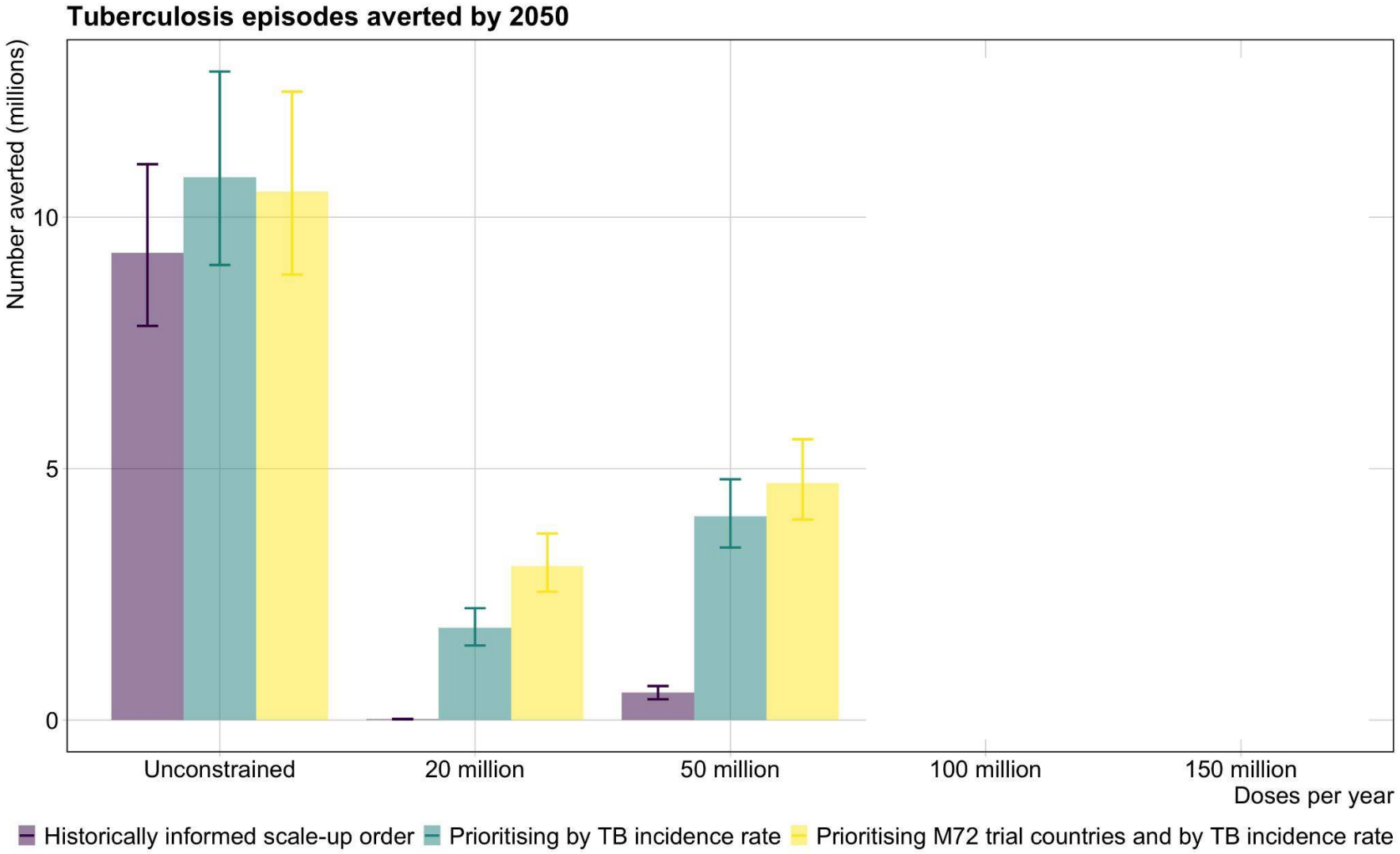
20 million per year

Historically informed order:
~19 thousand averted

TB incidence rate order:
~1.8 million averted

M72 trial countries order:
~3.1 million averted

Results - 50 million doses per year



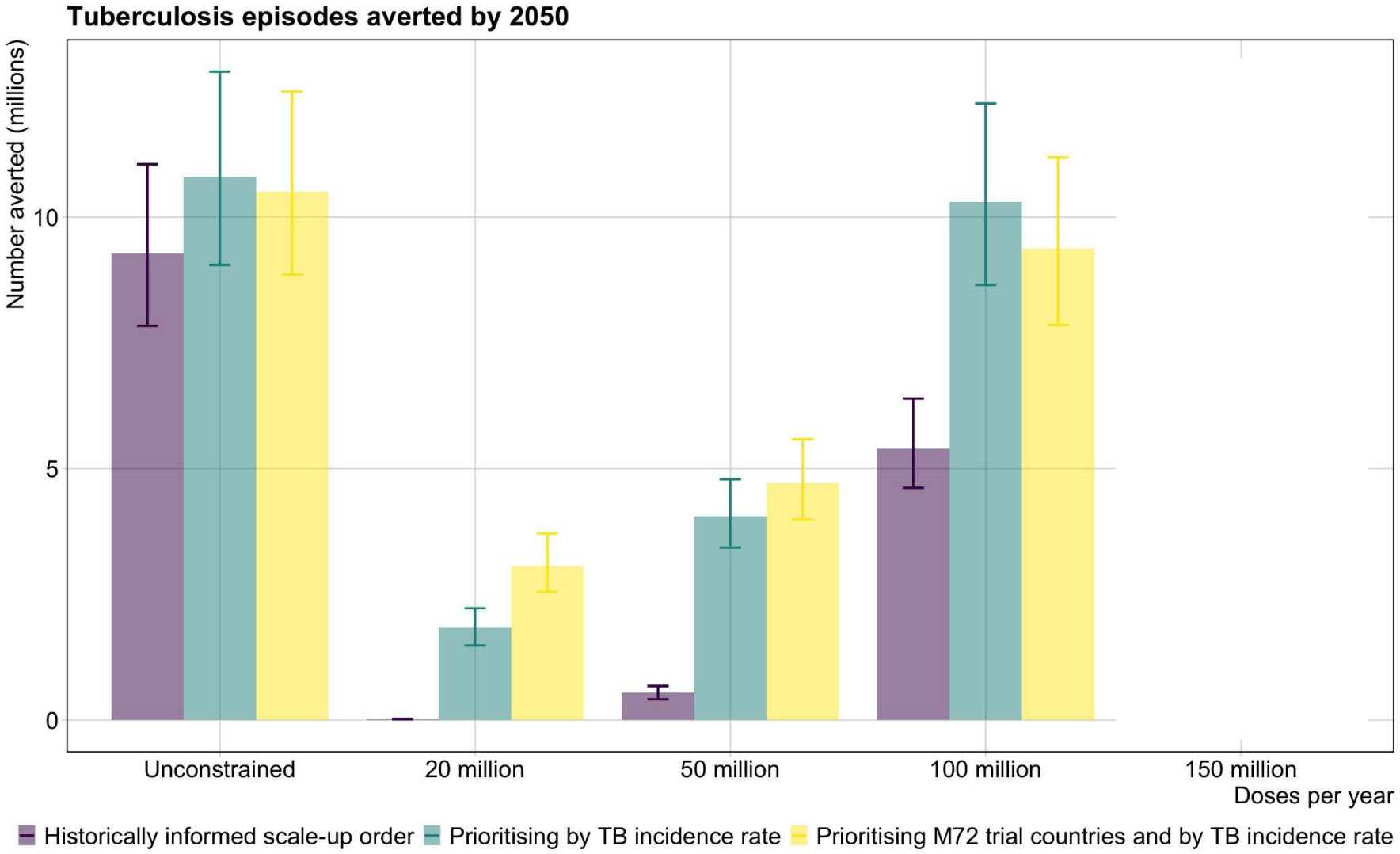
50 million per year

Historically informed order:
~547 thousand averted

TB incidence rate order:
~4.1 million averted

M72 trial countries order:
~4.7 million averted

Results - 100 million doses per year



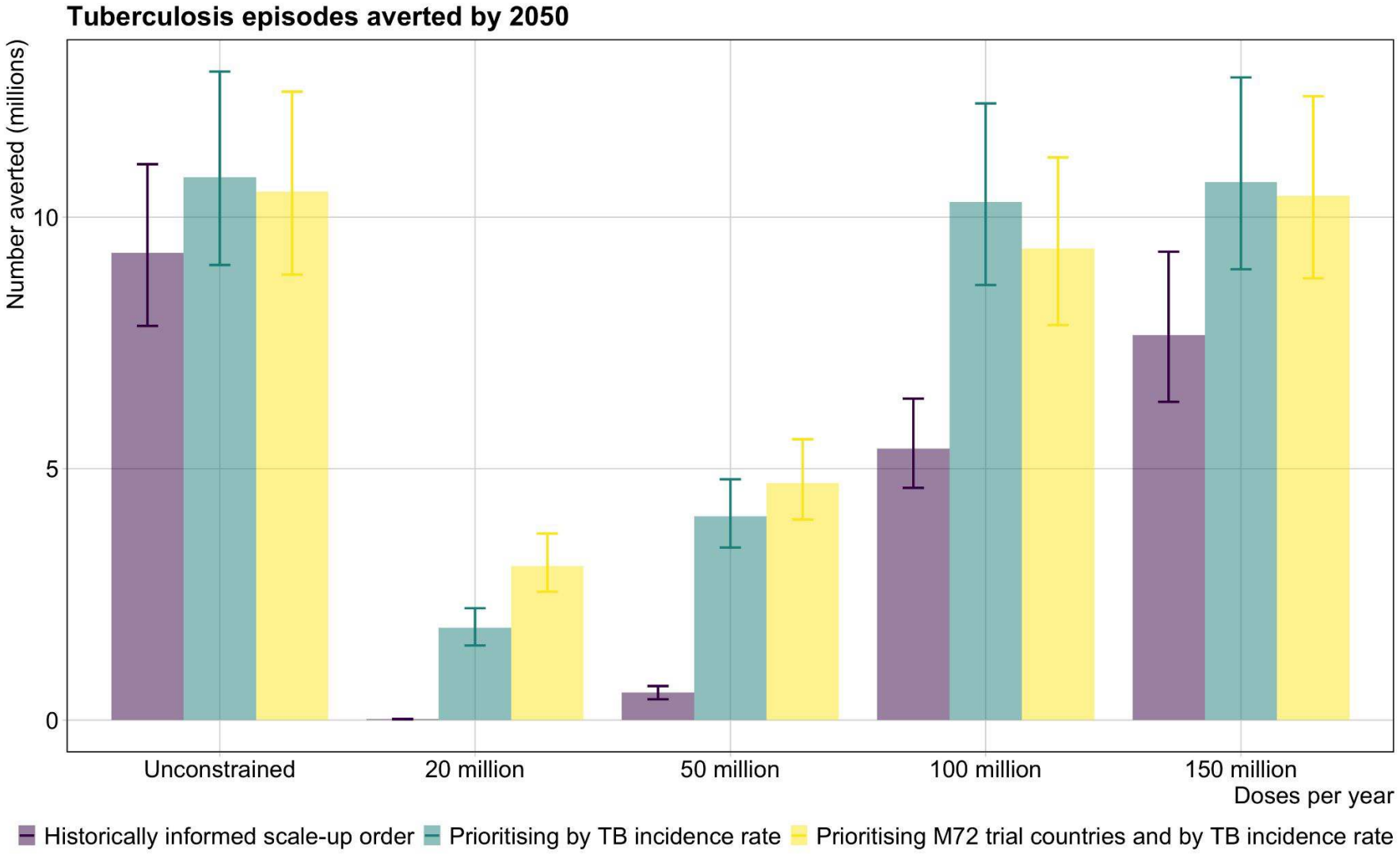
100 million per year

Historically informed order:
~5.4 million averted

TB incidence rate order:
~10.3 million averted

M72 trial countries order:
~9.4 million averted

Results - 150 million doses per year



150 million per year

Historically informed order:
~7.7 million averted

TB incidence rate order:
~10.8 million averted

M72 trial countries order:
~10.4 million averted

Summary

- *Supply constraints likely to* ***make a big difference*** to initial global impact
- ***How*** *we use* limited doses in the early years important for impact

Limitations

- Doses per year were constant from 2030–2050
- Only start new countries if enough doses to maintain already-started countries

Higher level

Important to anticipate demand, boost manufacturing, and address supply issues, to minimise supply constraints & increase potential impact of new TB vaccines

Acknowledgements

Contributors/Advisors (incomplete):

- **India** (Kiran Rade, Raghuram Rao, Sandip Mandal, Hisham Moosan, Sanjay Mattoo, Dheeraj Tumu, Sarika Mehra)
- **Indonesia** (Nugroho Soeharno, Sri Rezeki S Hadinegoro, Auliya Suwantika, Popy Yuniar, Fitra Yelda, Widyaretna Buenastuti)
- **South Africa** (Gavin Churchyard, Mark Hatherill, Helen Rees, Willem Hanekom, Mmamapudi Kubjane, Salome Charalambous, Leigh Johnson)
- **Brazil** (Julio Croda, Marcio Natividade, Daniele Pelissari)
- **WHO** (Nebiat Gebreselassie, Matteo Zignol, Gitte Giersing, Raymond Hutubessy)
- **IAVI** (Shelly Malhotra, Johan Vekemans, Shaun Palmer, Lew Schrager, Puck Pelzer, Gabriela Gomez, Derek Tait(ex))
- **GMRI** (Alex Schmidt, Claire Wagner, Charles Holmes, Emilio Emini(ex))
- **BMGF** (Geoff Garnett, Ann Ginsburg, Puneet Dewan, Sameer Kumta, Daniel Chin(ex), Anne Kasmar(ex), Yogan Pillay, John Fawcett, Sarah Ewart, Ashling Mulvaney)
- **TBVI** (Bernard Fritzell, Nick Drager)
- **Wellcome** (Jaspreet Turner, Sally Nicholas, Charlie Weller)
- **Vaccitech** (Tom Evans)
- **Harvard** (Nicolas Menzies)
- **Boston University** (Allison Portnoy)
- **LSHTM** (Gwen Knight, Tom Sumner, Tomos Prŷs-Jones, Christinah Mukandavire, Chathika Weerasuriya, Matt Quaife, Rebecca Harris, Mark Jit, Danny Scarponi…)

And many, many others…