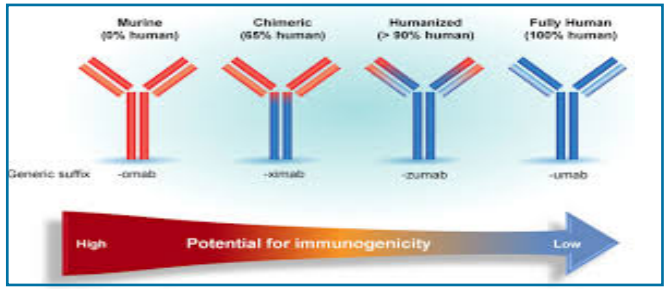
TB Vaccine R&D: Contribution from modelling

Johan Vekemans, MD PhD
TB MAC, Washington DC, Sept 2018.
WHO Initiative for Vaccine Research

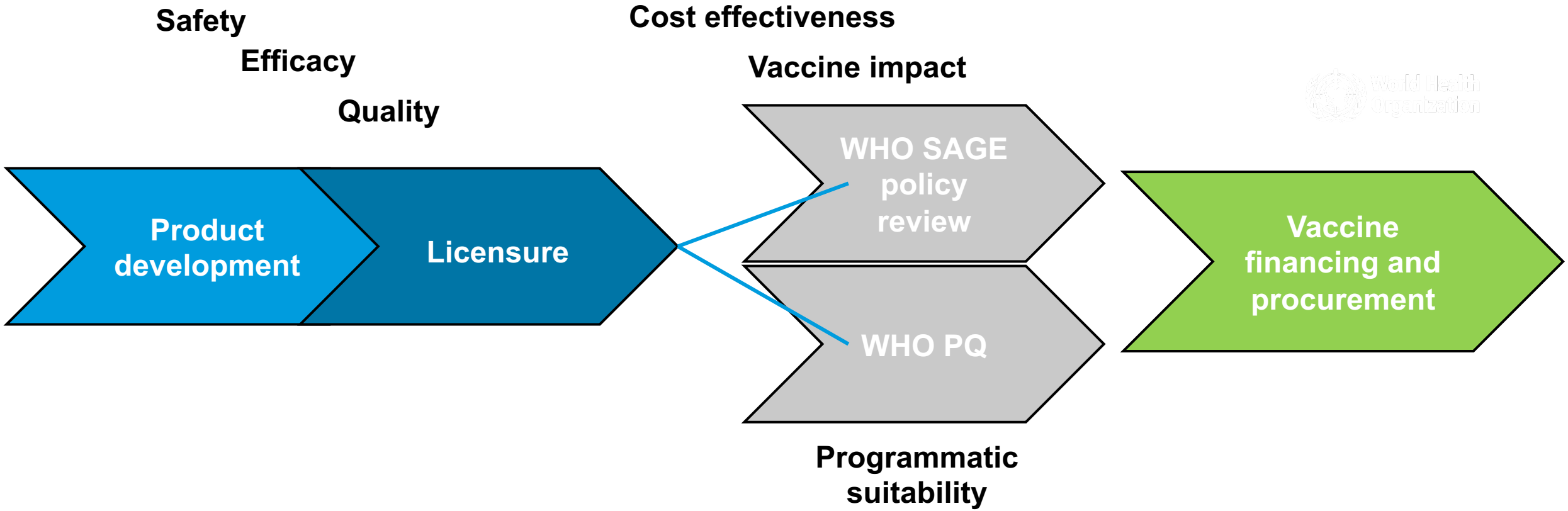
WHO's Initiative for Vaccine Research mission

World Health Organization



Acceleration of vaccine development and *increasing access* to vaccines, in low and middle income countries

Pathway to recommendation and implementation in LMICs



Evidence considered by SAGE	What is being assessed ?
Disease epidemiology, clinical characteristics	Burden of disease, age and geographical distribution.
Vaccine and immunization characteristics	Systematic review of safety, efficacy, impact, effectiveness. Evaluation of schedules. Vaccine availability, manufacturing towards affordable supply. Thermostability of vaccines, cold chain requirements
Economic considerations	Systematic review of economic analysis (cost-utility, cost benefit) Cost-effectiveness in low- and middle-income countries
Acceptability to target populations	Informed by WHO's efforts regarding vaccine hesitancy Source of missed opportunities for vaccination
Health system opportunities	Integration in the Expanded Programme on immunization Interaction with other health services Feasibility of programmatic delivery
Social impacts, legal and ethical dimensions	Considering poverty, household impact of disease, budget impact Principle of rights, fairness, and autonomy

Recent experience:

Complex pathway for several candidates

Financing and implementation science are major hurdles

Early clarification of the ‘value’ and use case needed

Two strategic priorities

Developing a safe, effective and affordable TB vaccine for adolescents and adults

- 50% or greater efficacy in preventing confirmed pulmonary TB
- Protect both subjects with and without past Mtb infection
- Protective in different geographical regions and latitudes

Developing an affordable TB vaccine for neonates and infants

- with improved safety and efficacy as compared to BCG

Full document available on WHO IVR website

WHO Preferred Product Characteristics for New Tuberculosis Vaccines

Modelling contribution to early vaccine development

Caution:

- Relevance of animal models need confirmation
- Poor understanding of immunity
- No readily available human challenge models
- Uncertainty over clinical relevance of alternative study designs and innovative endpoints

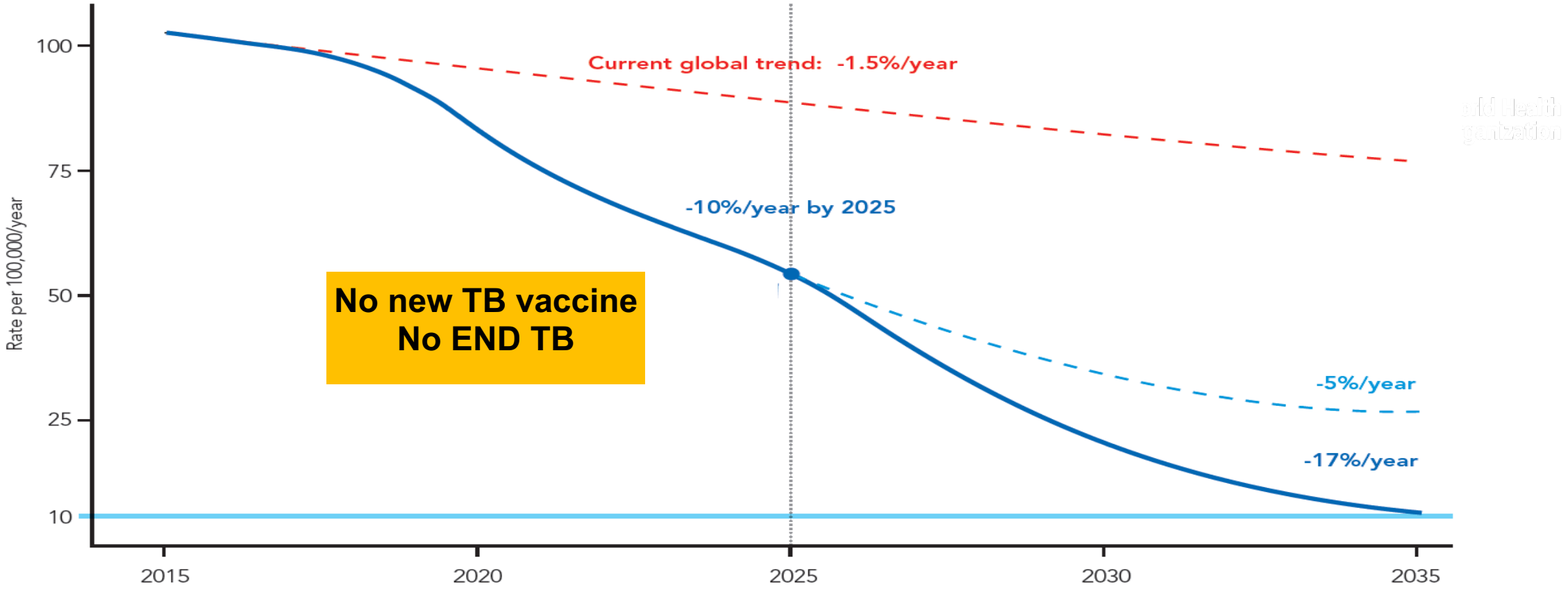
Poor understanding of determinants of protection hinders modelling potential

Preparing for policy and implementation
Key considerations for modelling

- **Use case** and full public value proposition are priorities.
- Priority perspectives:
  - Epidemiologic heterogeneity
  - Whole population vs risk-based approaches?
  - Association with HIV
  - Drug resistance
  - Pediatric TB
  - Sense of urgency AND long term view
- Informing responsible resource management: **Assessment of full public value**. The TB vaccine market will be very heterogeneous and put together with epidemiologic heterogeneity, we know we will need to look at things with a lot of granularity.

Projected trajectory of the TB epidemics, main assumptions

Research and a new, improved TB vaccine is critical



Thank you

World Health Organization