

Establishing priorities for Kenya's Tuberculosis National Strategic Plan: a modelling approach

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- Kenya has designed a TB National strategic plan for the period 2019-2023
- This NSP reflects a people-centred approach to planning and evidence-based prioritisation of resource allocation to close the gaps along the patient pathway to quality care
- In a collaborative framework, modelling input was required to project the potential epidemiological impact and to assess the optimal allocation of resources.
- Kenya's NSP activities are framed in the UHC national expansion plan.

NSP Outcomes

Activities to reach each outcome

- 1) Increase Contact Trace in Index Cases to 90%
- 2) Reduce proportion of TB missed in community to 20%
- 3) Increase recognition of symptoms to 80%
- 4) Raise TB, leprosy and other chest conditions awareness amongst general population 90%

- 1) Field visits, Screening 10 contacts per case
- 2) Education workshops on HCW and community
- 3) Media engagement, infographics etc

- 6) Increase TB detection within the health system
- 7) Increase GeneXpert access from 49% to 80% by 2023
- 8) Increase diagnostic sample referral network to 80% for all L2, L3 and L4 health facilities
- 9) Increase number of TB culture laboratories by seven sites
- 11) Adopt chest x-ray and other new WHO guidelines
- 17) Increase the proportion of new and relapse notified TB patients who receive DST to 95%
- 22) Increase TB detection children to 70%
- 25) Increase HIV/TB detected to 90%
- 33 to 34) PPM
- 53) Increase TB case detection rate from 51% in 2017 to 80% by 2023

- 7) Expand GeneXpert to 108 new places, training..
- 8) Work algorithms, couriers etc..

- 13) Reduce LTFU from 5% to <3% among all TB patients
- 14) Reduce death rate to <5% among high risk groups
- 15) Increase TSR from 83.1% to 90%
- 19) Increase DRTB treatment success rate to 80%
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- 21) Reduce the proportion of DR TB patients' households that incurred catastrophic costs to 43%
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- 26) Increase TSR in PLHIV to 85%
- 35) To reduce by half the proportion of households affected by TB facing catastrophic costs
- 48) To reduce Initial loss to follow up from 21% to 0% by 2023
- 54) Increase TSR in KP a to 90%

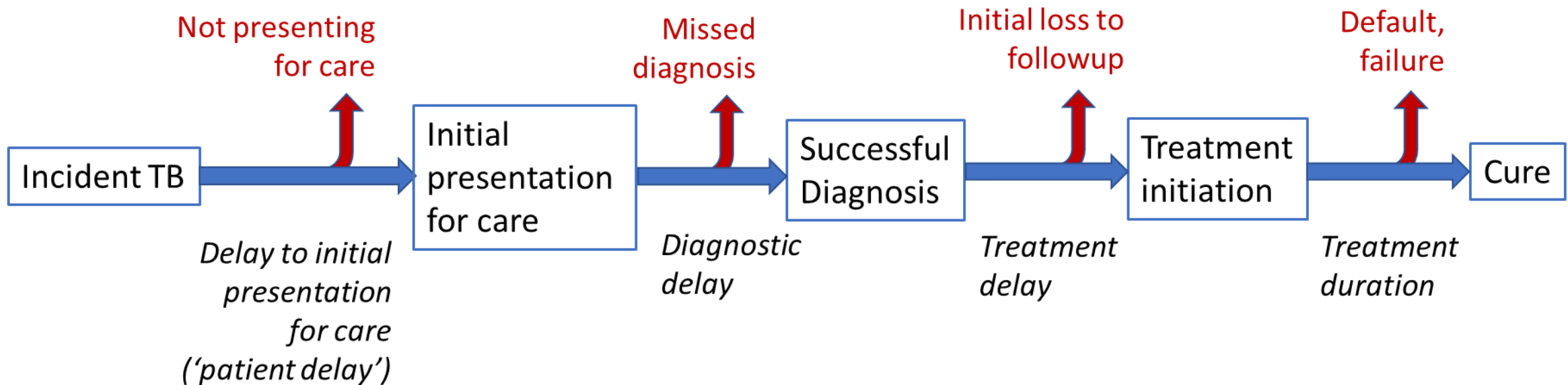
- 15) psychosocial monitoring, adherence tools..

- 23) Increase child <5 on IPT contacts of TB cases
- 27) Sustain IPT over 90%

- 23) Initiate IPT for all bacteriologically confirmed adult child contacts

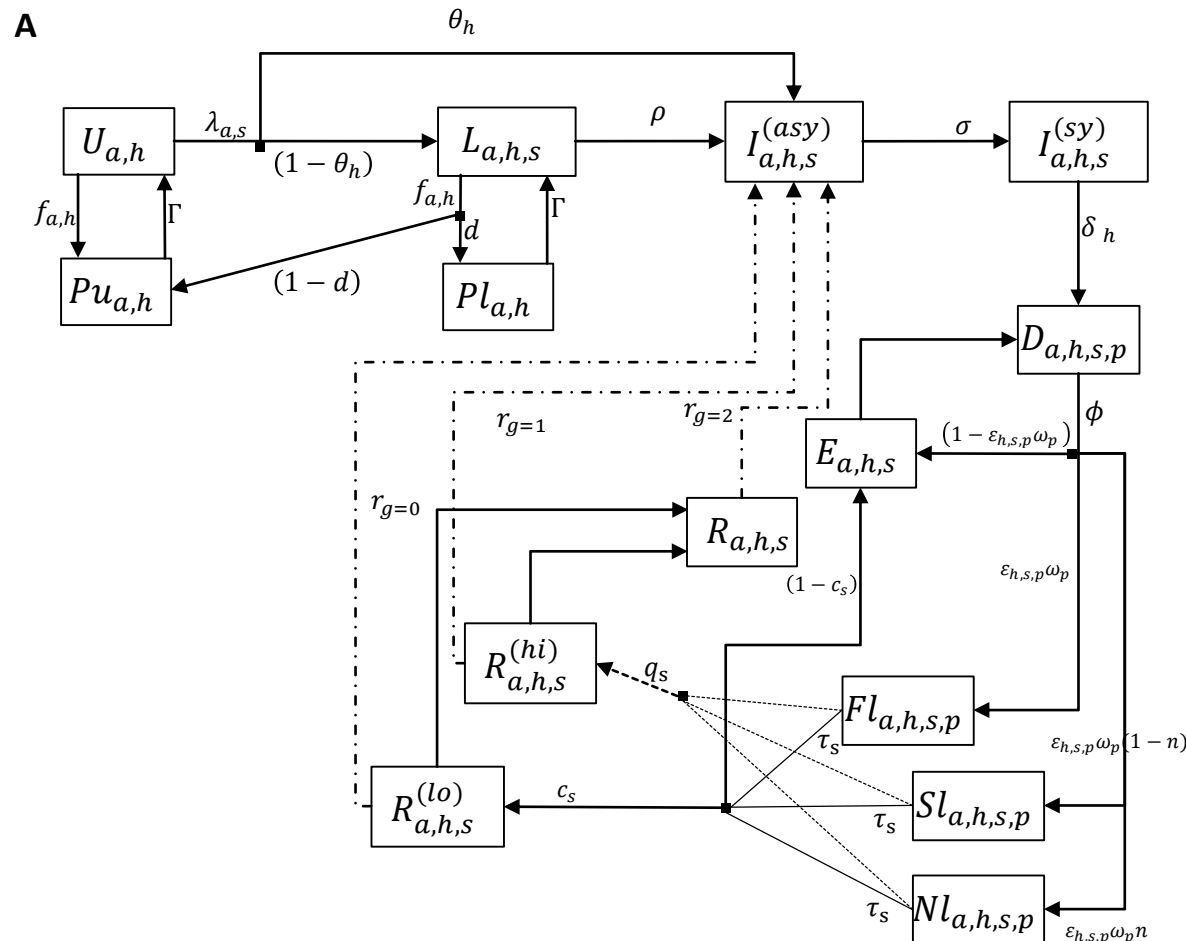
Aggregated Categories (Bundles)	NSP Outcomes	Activities to reach each outcome
Closing pre-care seeking gap	1) Increase Contact Trace in Index Cases to 90% 2) Reduce proportion of TB missed in community to 20% 3) Increase recognition of symptoms to 80% 4) Raise TB, leprosy and other chest conditions awareness amongst general population 90%	1) Field visits, Screening 10 contacts per case 2) Education workshops on HCW and community 3) Media engagement, infographics etc
Closing diagnostic gap	6) Increase TB detection within the health system 7) Increase GeneXpert access from 49% to 80% by 2023 8) Increase diagnostic sample referral network to 80% for all L2, L3 and L4 health facilities 9) Increase number of TB culture laboratories by seven sites 11) Adopt chest x-ray and other new WHO guidelines 17) Increase the proportion of new and relapse notified TB patients who receive DST to 95% 22) Increase TB detection children to 70% 25) Increase HIV/TB detected to 90% 33 to 34) PPM 53) Increase TB case detection rate from 51% in 2017 to 80% by 2023	7) Expand GeneXpert to 108 new places, training.. 8) Work algorithms, couriers etc..
Closing treatment initiation And success gap	13) Reduce LTFU from 5% to <3% among all TB patients 14) Reduce death rate to <5% among high risk groups 15) Increase TSR from 83.1% to 90% 19) Increase DRTB treatment success rate to 80% 20) Increase proportion of eligible DRTB patients on new molecules to 90% 21) Reduce the proportion of DR TB patients' households that incurred catastrophic costs to 43% 24) Increase TSR in paediatric to 90% 26) Increase TSR in PLHIV to 85% 35) To reduce by half the proportion of households affected by TB facing catastrophic costs 48) To reduce Initial loss to follow up from 21% to 0% by 2023 54) Increase TSR in KP a to 90%	15) psychosocial monitoring, adherence tools..
Closing prevention gap	23) Increase child <5 on IPT contacts of TB cases 27) Sustain IPT over 90%	23) Initiate IPT for all bacteriologically confirmed adult child contacts

- How to incorporate the existing efforts to tackle TB into a mathematical modelling approach for exploring future strategies?

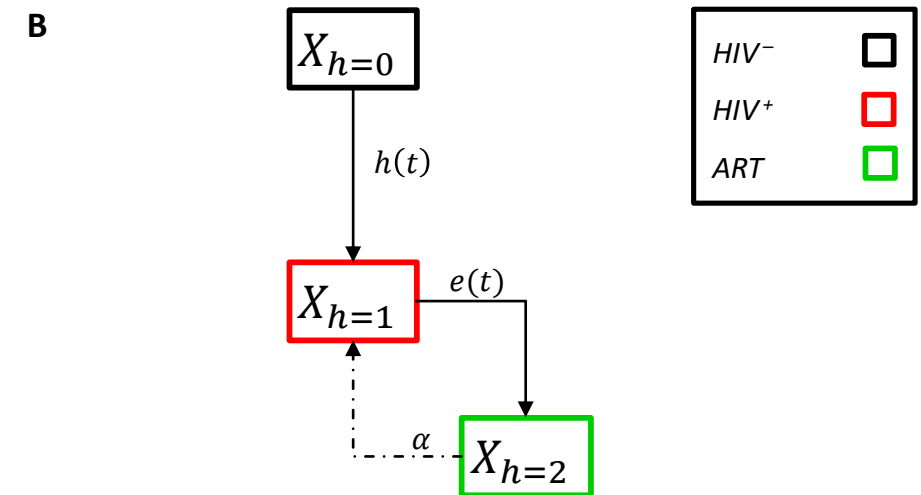


Delay-care cascade of TB

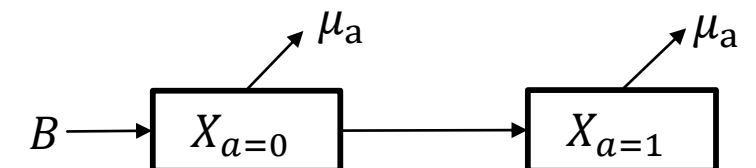
TB model dimension



HIV model dimension

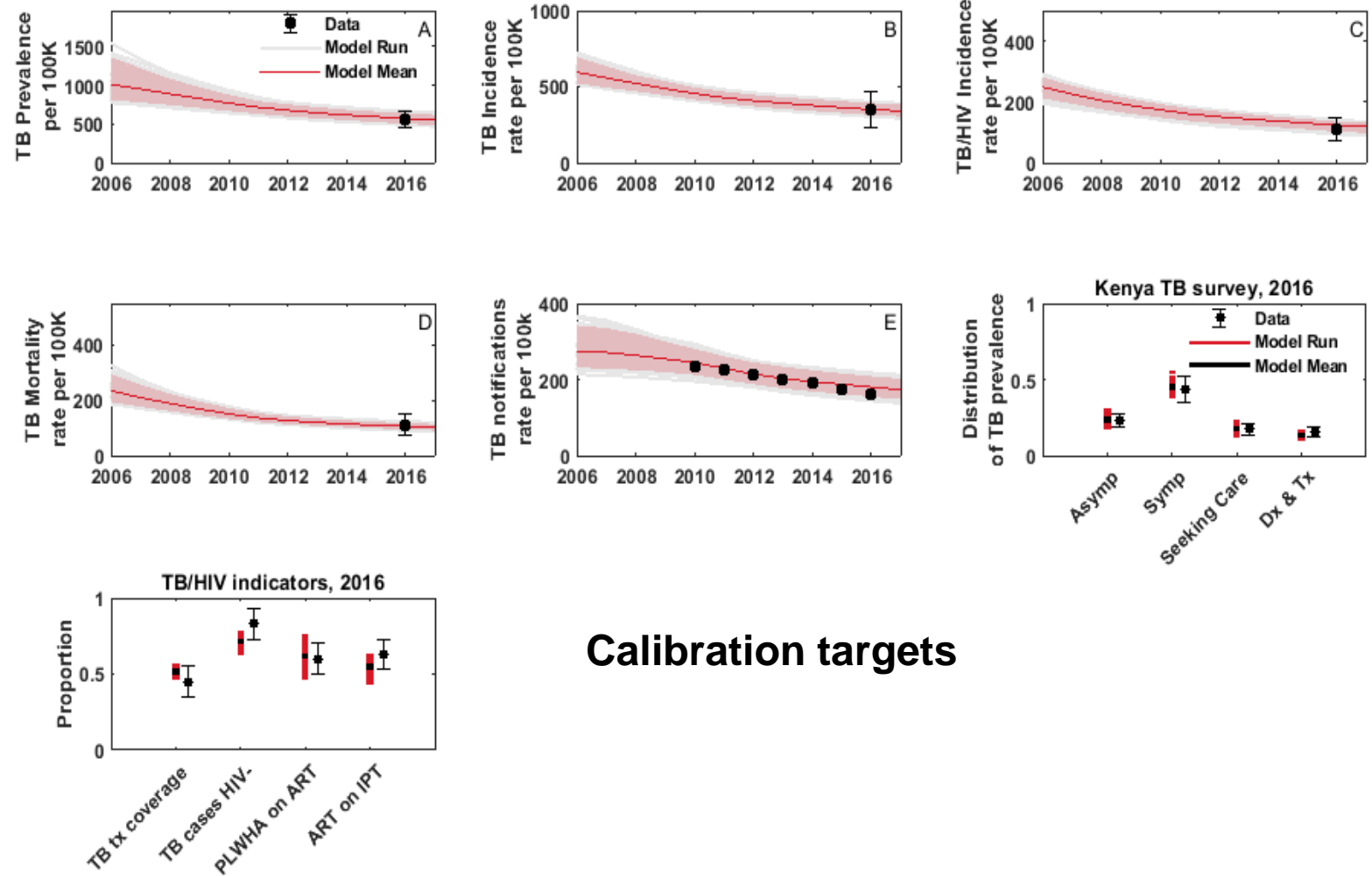


c Age dimension



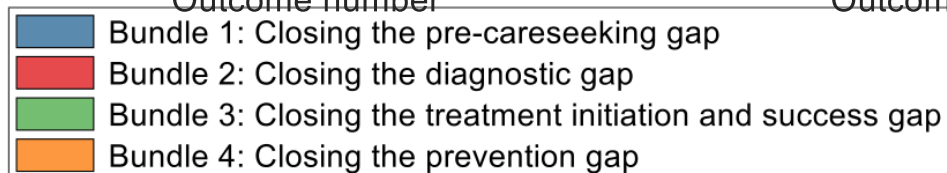
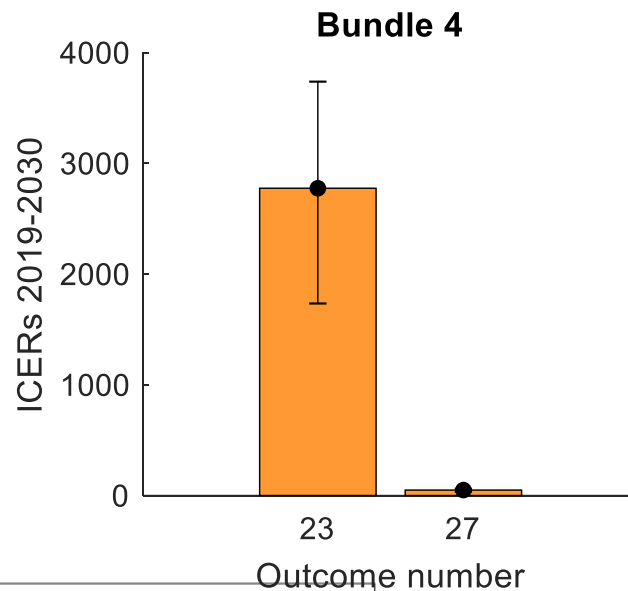
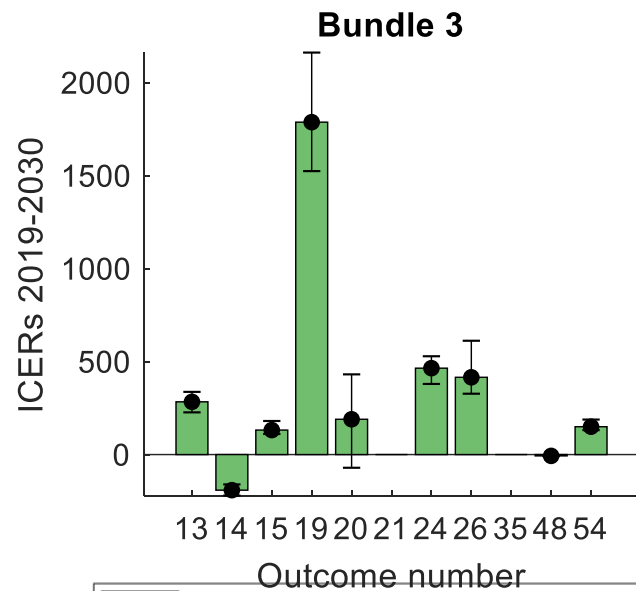
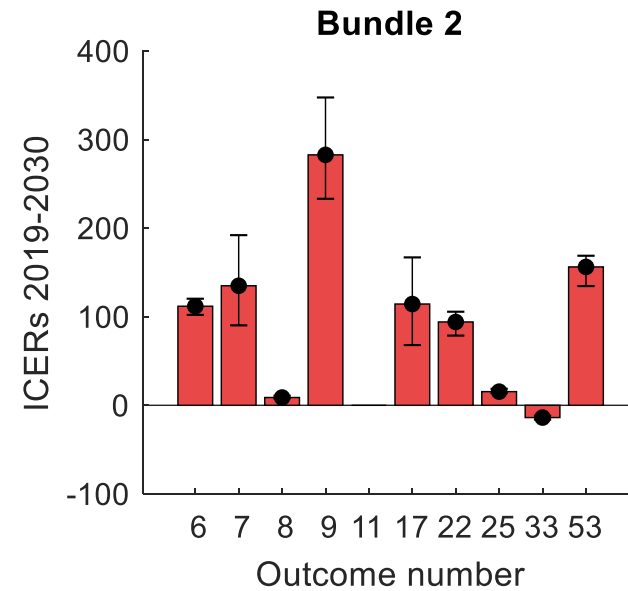
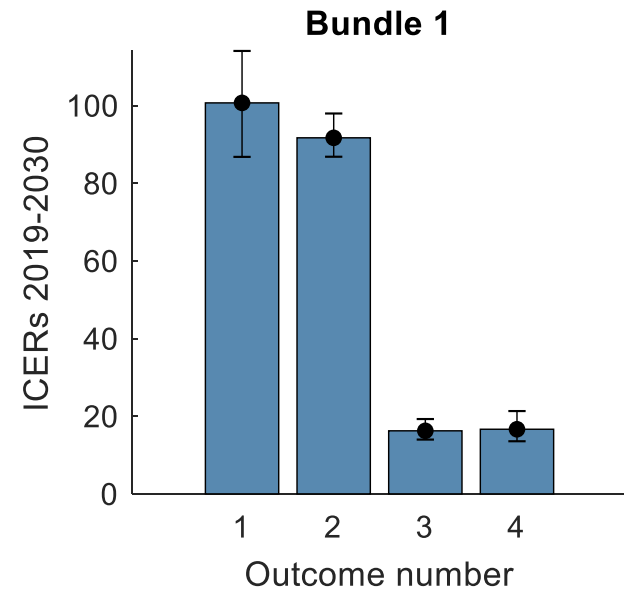
Modelling Kenya's TB NSP

- **TB/HIV transmission and cascades interaction**
- A transmission model was systematically compared and parameters calibrated against local data and epidemic trends using a Bayesian-melding approach.

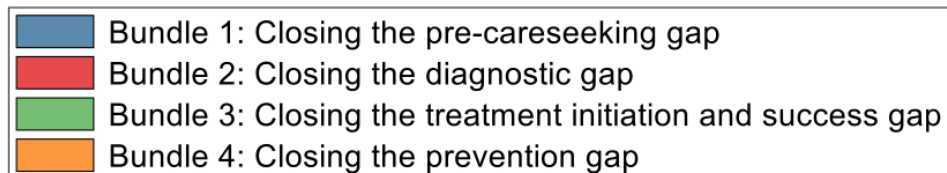
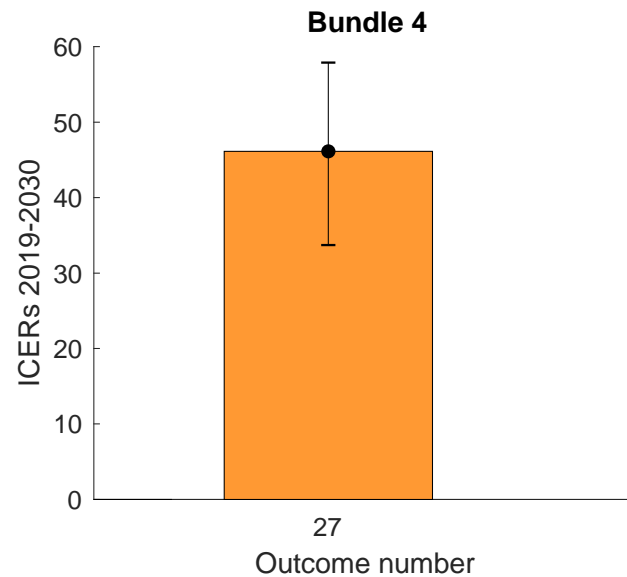
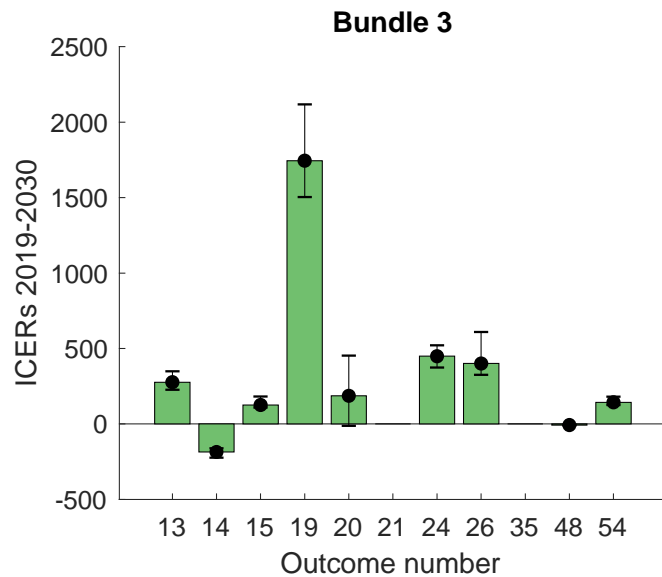
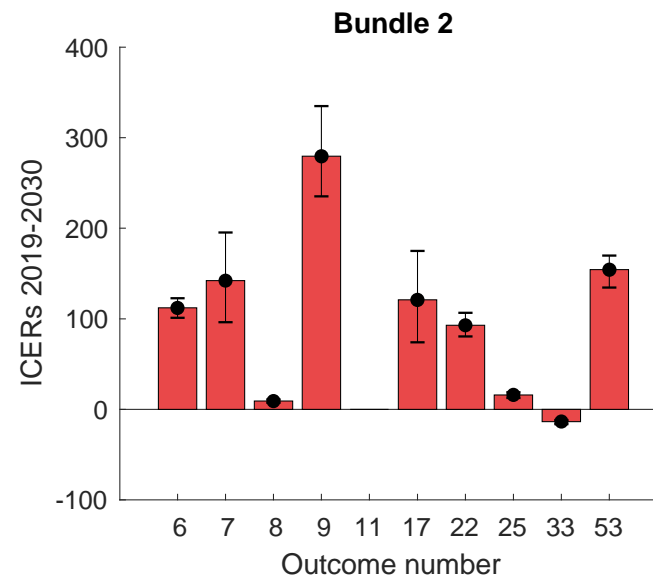
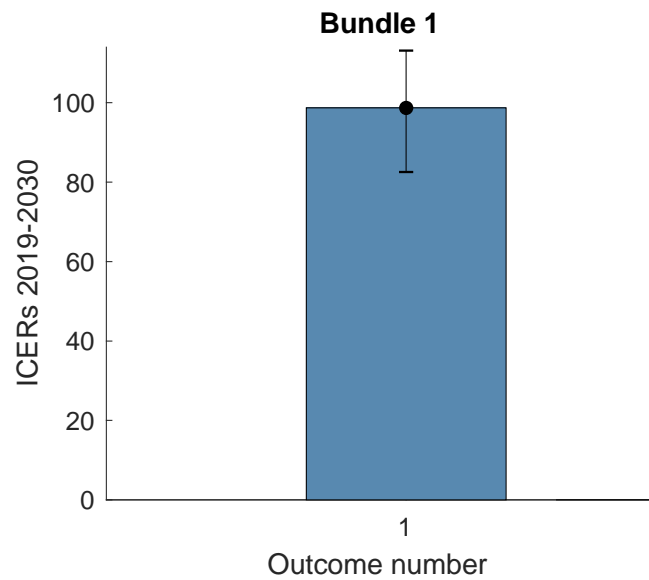


Calibration targets

- For each NSP outcome target, the national-level TB epidemic was simulated to 2030, assuming that interventions are scaled up steadily starting from 2019.
- As a comparator, we modelled a 'baseline' where the current standard of TB is continued indefinitely.
- We estimated the 'impact' of a given intervention scenario as the disability-adjusted life-years averted by the intervention (DALYs).
- Incremental Cost-effectiveness Ratios were estimated to understand how efficiently interventions can achieve health gains



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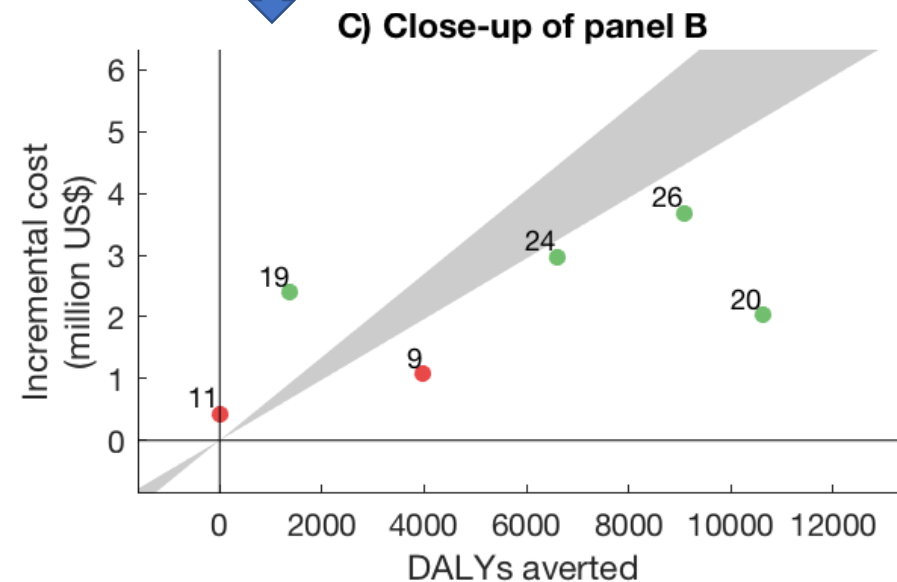
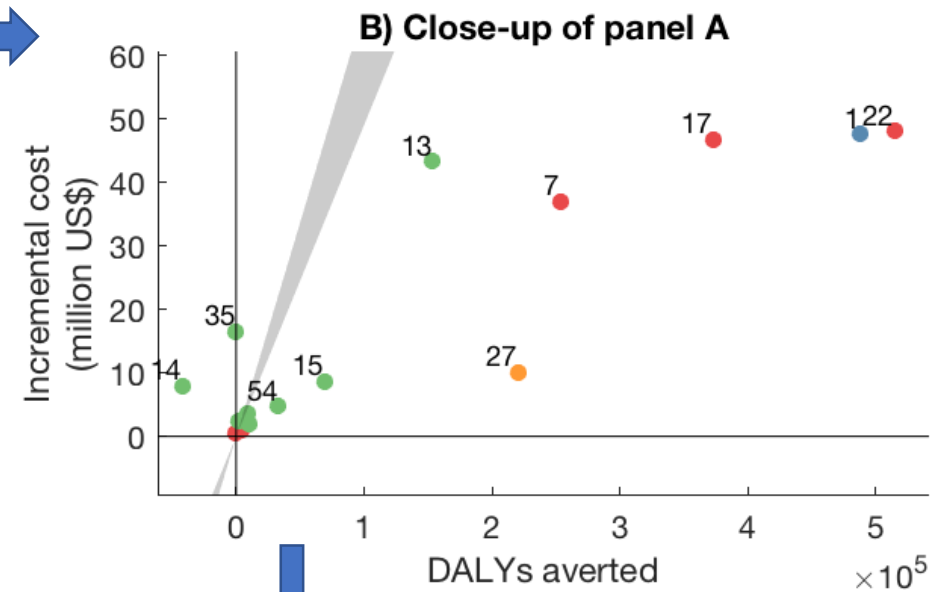
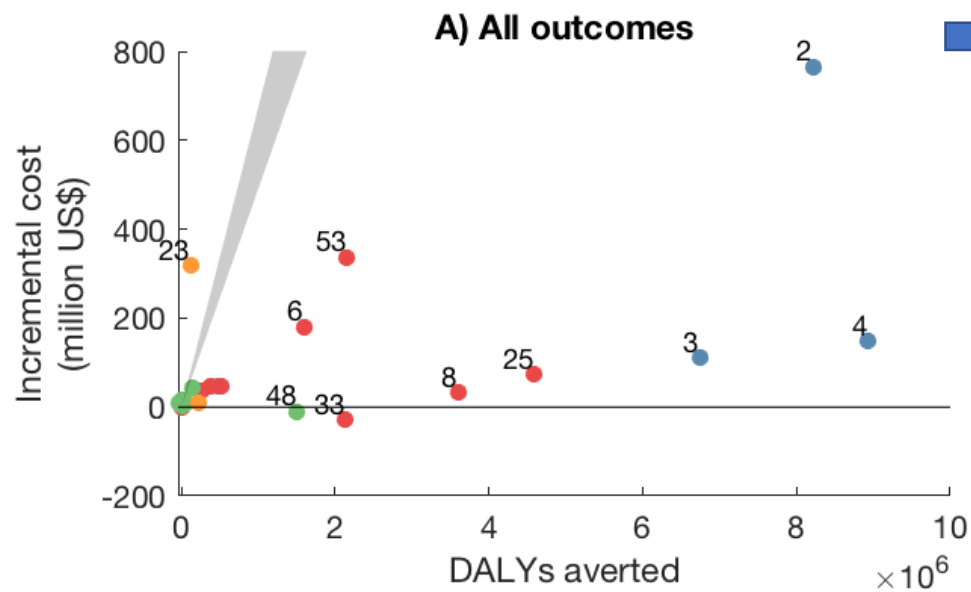


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- The grey region depicts thresholds for cost-effectiveness (\$491 - \$674 per DALY averted)
- There is some uncertainty around this threshold, hence it is a grey *region*, and not a line
- Points above this region are 'not cost-effective', and vice versa

Prioritising bundles

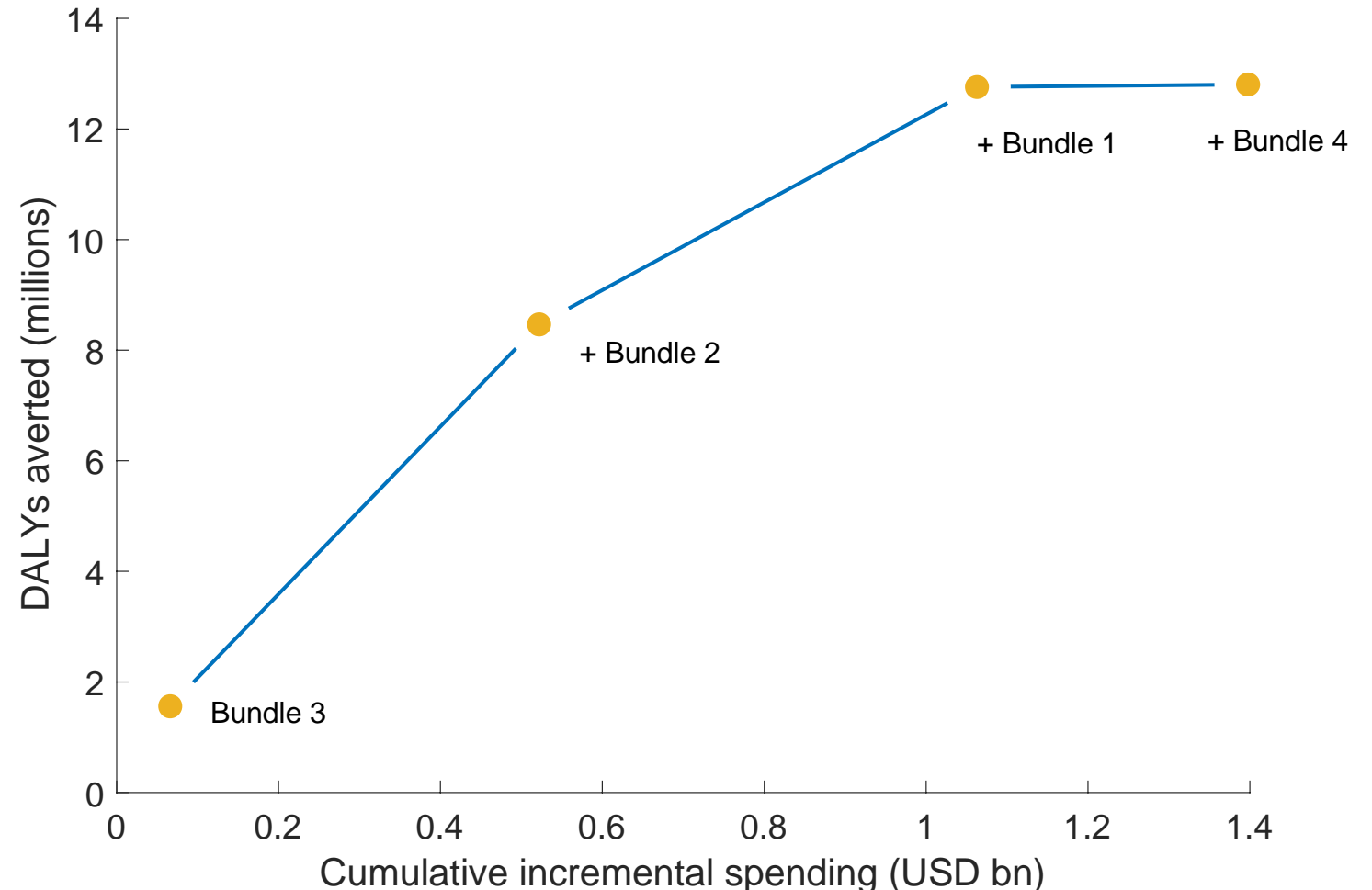
- We follow a standard approach for prioritization, building an 'expansion pathway':
 1. Start with the most cost-effective (lowest ICER) bundle
 2. Select the second bundle that would be most cost-effective in combination with the first (compared to a baseline of no intervention)...
 3. ...and iterate until all 4 bundles are selected
- The resulting series of bundles is in *decreasing order of prioritisation*
- See next slide for results

A simple expansion pathway

*Analysis suggests
decreasing order of priority
as: bundles 3, 2, 1, 4.*

This is:

- 3- Closing Treatment gap*
- 2- Closing diagnostic gap*
- 1- Closing pre-careseeking*
- 4- Closing prevention gap*

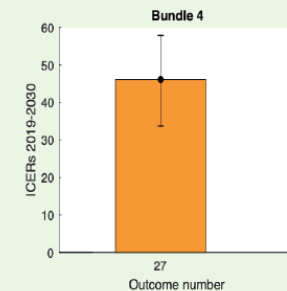
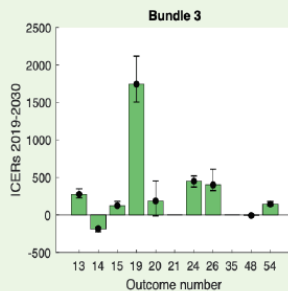
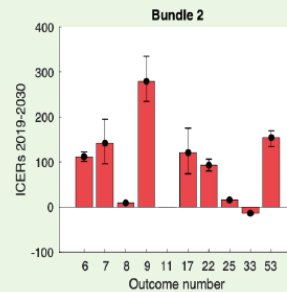
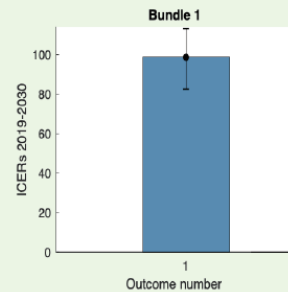


Modelling Kenya's TB NSP

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Modeling was completed of the epidemiological impact of reaching each of the outcome targets. For each outcome target, estimates of impact were considered alongside the combined costs of the activities articulated in the operational plan and designed to enable the targets to be met. The resulting incremental cost-effectiveness ratios (ICERs) helped the programme to review the cost-effectiveness of pursuing each outcome target. The programme defined the most impactful set of activities, given available resources.

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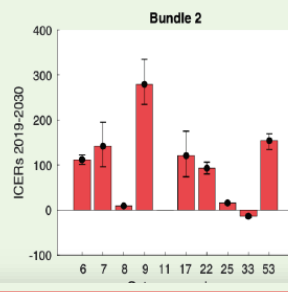
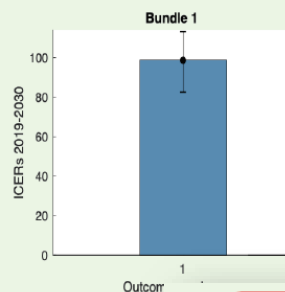
NATIONAL STRATEGIC PLAN FOR TUBERCULOSIS, LEPROSY AND LUNG HEALTH
2019 - 2023 | EXECUTIVE SUMMARY

Modelling Kenya's TB NSP

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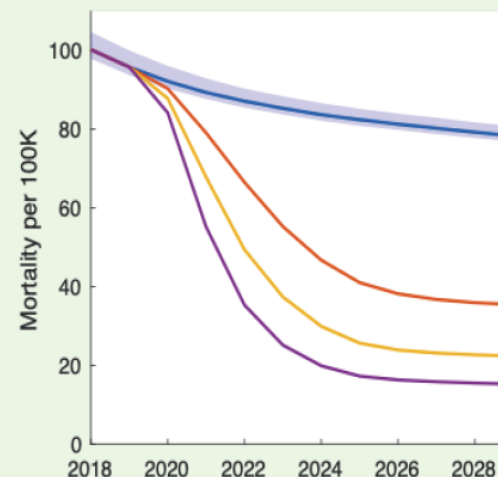
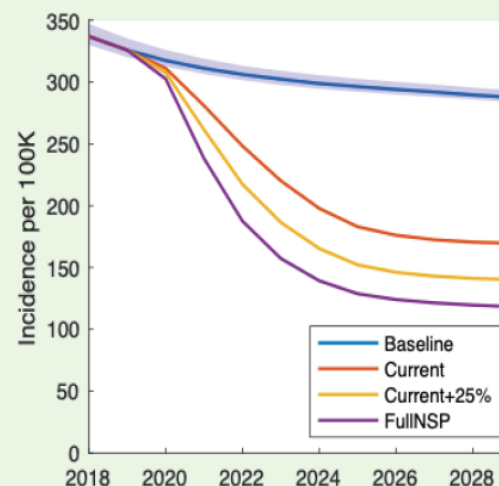
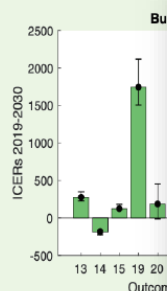
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Modeling was completed of the epidemiological impact of reaching each of the outcome targets. For each outcome target, estimates of



Using the results of the cost-effectiveness analysis as well as priorities defined in step 1, the activities of the operational plan were prioritized to optimise the impact of the programmatic response. Activities and their associated costs were allocated into one of three funding tiers: fully funded NSP (i.e. all activities); resource availability consistent with 2018 levels, and 2018 levels + 25%.

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NATIONAL STRATEGIC
2019 - 2023 | EXECUTIVE SUMMARY

NATIONAL STRATEGIC PLAN FOR TUBERCULOSIS, LEPROSY AND LUNG HEALTH
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- In recent years, Kenya has embarked in an ambitious expansion to achieve UHC, with an aim to attain UHC by 2022.
- UHC has been piloted in four counties (Isiolo, Kisumu, Machakos and Nyeri), ensuring in these places:
 - a) Strengthening health systems at the County level
 - b) Strengthening community health services
 - c) Strengthening Public Health Services
 - d) Ensuring availability of essential commodities and basic equipment at the facility level
 - e) Removal of user fees at level 4 and 5 public health in order to further reduce out of pocket expenditures for the population.

- TB services have been independently expanded over the years to ensure national coverage.
- But the most recent TB cost survey shows that 27%¹ of households affected by DS-TB had experience catastrophic costs due to TB.
- This figure goes up to 86%¹ for households affected by DR-TB.
- A close assessment of these costs shows that it is mostly driven by indirect non-medical costs as as nutrition and transportation.

Aggregated Categories (Bundles)

NSP Outcomes

UHC Overlap

Closing pre-care seeking gap

- 1) Increase Contact Trace in Index Cases to 90%
- 2) Reduce proportion of TB missed in community to 20%
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2) Reduce barriers of access

Closing diagnostic gap

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33) Reduce the share of the private sector

Closing treatment initiation And success gap

- 13) Reduce LTFU from 5% to <3% among all TB patients
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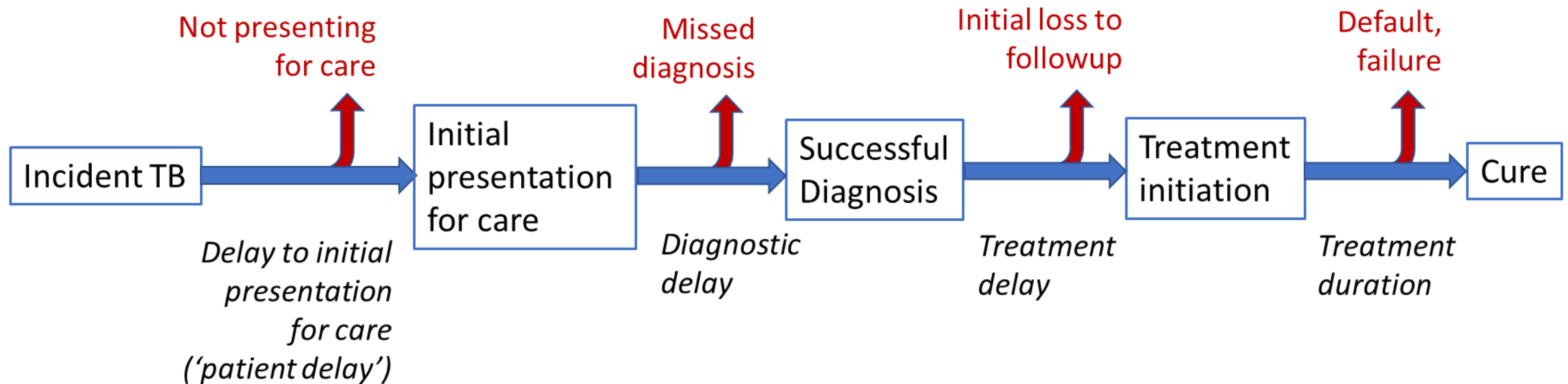
20) Increase access to public services and new molecules

35) Remove most out of pocket expenses – not modellable

Closing prevention gap

- 23) Increase child <5 on IPT contacts of TB cases
- 27) Sustain IPT over 90%

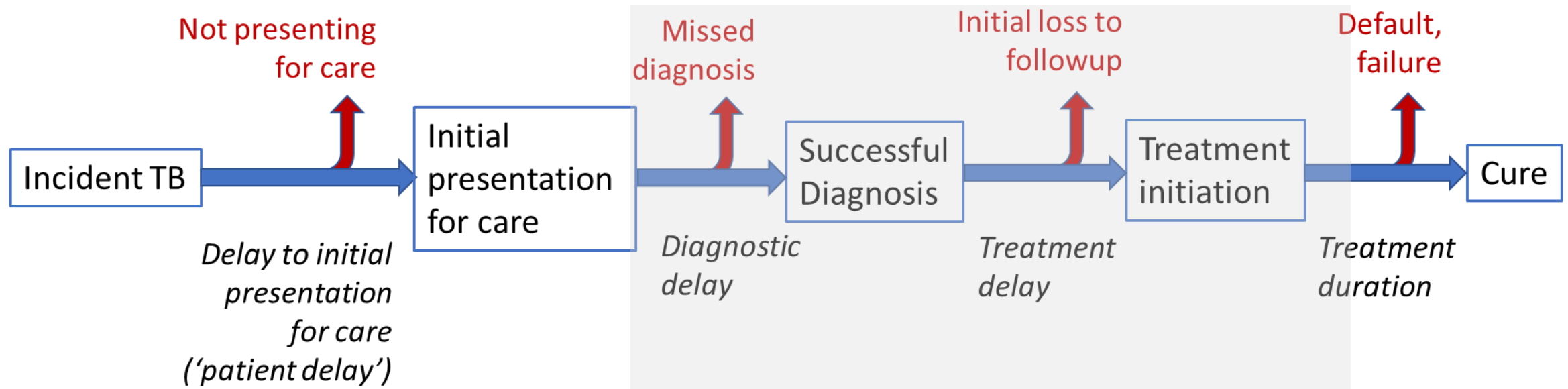
What does UHC means for TB?



What does UHC means for TB?

- Increased coverage of public system?

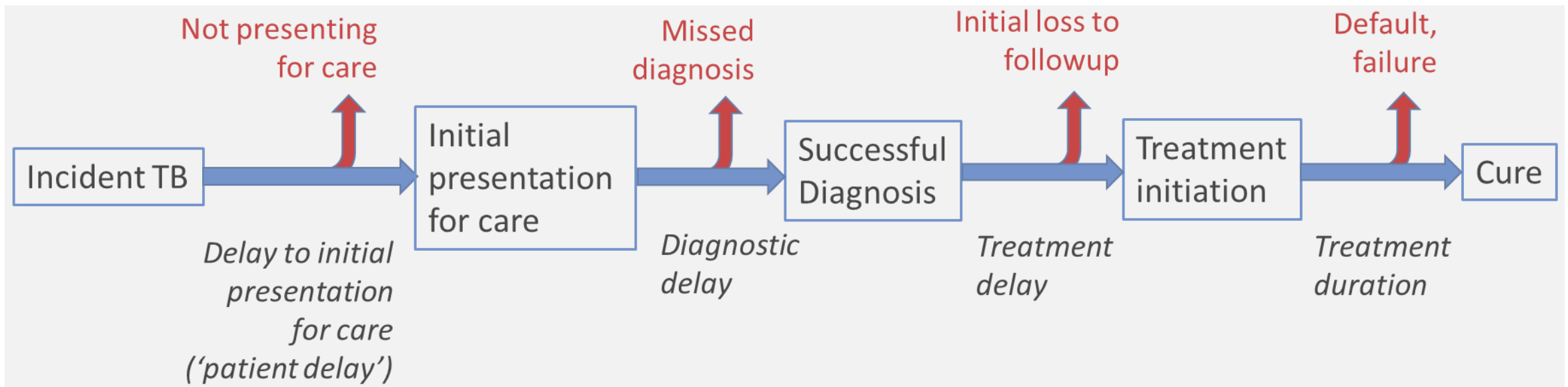
- Reduce barriers of access
- Reduce the share of private sector
- Increase treatment initiations and completion



What does UHC means for TB?

- **Increased coverage of public system?**
- **More services?**

- Reduce barriers of access
- Reduce the share of private sector
- Increase treatment initiations and completion
- Engage the community
- New molecules for SL
- Community based activities

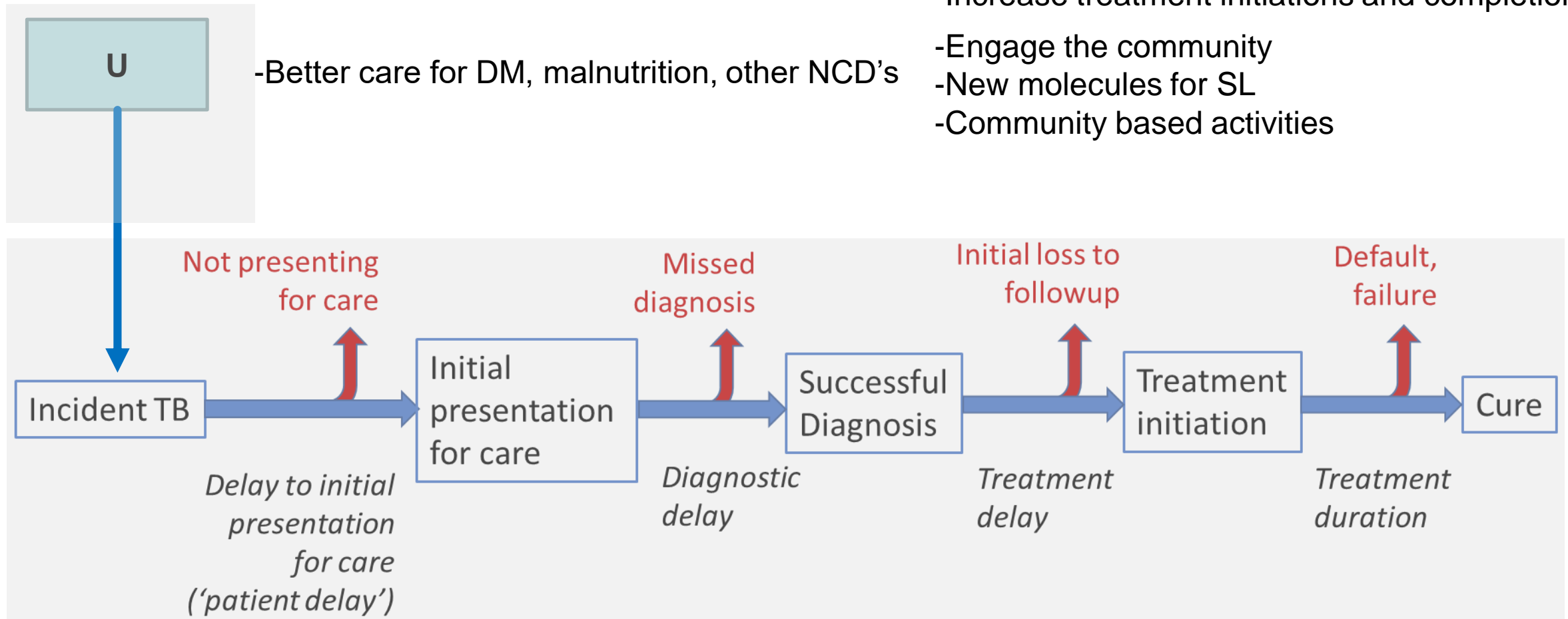


What does UHC means for TB?

- Increased coverage of public system?
- More services?

- Reduce barriers of access
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-Better care for DM, malnutrition, other NCD's



- Unintended discussions around UHC surged during this exercise
- UHC will have cascade effects on most of the outcomes that can be improved by expanding access to services
- More evidently for the traditional TB care outcomes (low hanging fruit)
- Less intuitive for the upper stream of the cascade:
 - E.g. Bringing general health services closer to the community could reduce care-seeking delays.
 - A faster assessment and treatment of other chronic diseases might prevent TB reactivation in many individuals.
- Modelling UHC and TB?, it is a challenge and it requires multiple sources of expertise !

Acknowledgements



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