TB Modelling and Analysis Consortium (TB MAC)

TB MAC Global post-2015 TB Targets – Meeting #2

London, UK

7-9th Oct 2014

Meeting Report

www.tb-mac.org

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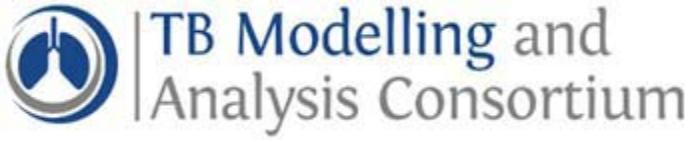

Executive summary

The TB modelling and analysis consortium (TB MAC) is an initiative to improve global tuberculosis (TB) control by coordinating and promoting mathematical modelling and other quantitative research activities.

Our fifth meeting was dedicated to a multi-model exercise that aims to focus efforts of modellers, economists and other experts to assess the new post-2015 GTB global TB targets (which interventions, at what scale, and what resources are required to reach them) in South Africa, India and China.

During the meeting representatives from 11 participating epidemiological models, economists, country TB programmes and other stakeholder organisations, as well as the TB activist community came together to discuss progress made so far, decide on key issues and set out the path towards the next milestones, the Targets Union Conference Symposium in October, and the further revision, publication and dissemination of this work. Most of the main meeting was attended by the whole group of economics, epidemiologists and other experts, to allow optimal progress to be made.

The baseline and intervention guidance were described to update the meeting participants on the information used by the modelling groups to generate the results presented at the meeting. This was followed by presentations of the preliminary results for South Africa, India and China by the country leads. The second day of Epi discussions focussed on interpreting those results. For each country, key preliminary findings and messages were identified, as well as areas where the further modelling or guidance would improve the results. After deciding that the economics and epidemiological work should be aligned as much as possible, each intervention was revisited to provide more detail in the activities involved. This work continued post-meeting through intensive discussions with country experts, resulting in a revised calibration and intervention guidance documentation. A new timeline for the Epidemiological modelling was agreed, with final results due on the 19th December.

From an economics modelling perspective, an initial pre-meeting session was held to present preliminary results from South Africa. Thereafter the economists participated in the main meeting together with the modellers to see the presentation of the epi results and to participate in the interpretation of the findings. The meeting resulted in further joint specification on the interventions that will ensure that the costing work and epidemiological results align. In addition, the economic group reviewed very preliminary work on estimating poverty cases averted from the different model outputs. A plan was also made to further work on the interventions and to finalise the costing model before the end of the year.

Overall the meeting succeeded at making informed decisions on several key issues, and highlighted the direction of the forthcoming work on this critical topic.

1.1

TB Modelling and Analysis Consortium (TB MAC)

Background

The complex natural history of TB, range of possible interventions and great variation in epidemiological settings, mean that TB policy makers and donors face great uncertainty when prioritising TB control activities.

This uncertainty can be reduced and quantified, and the cost-effectiveness of different strategies compared, using mathematical modelling and other quantitative research activities. Several groups of modellers worked separately on issues such as the impact of new diagnostics, drugs and vaccines, but although this work has contributed greatly to understanding the transmission and control of TB, the influence of the work was weakened by a lack of co-ordination, information-sharing, consensus building and prioritisation.

This led to critical research gaps and conflicting policy recommendations which served TB control poorly. Policy making and resource allocation must be based on scientific consensus derived from best analytic inputs, which draw on data and models in epidemiology, economics, demography and related disciplines. The TB Modelling and Analysis Consortium (TB MAC, www.tb-mac.org) aims to improve the interaction between quantitative researchers, policy makers, TB programmes and donors to improve global control. Meetings thus far (see website) have focussed on how modelling can support TB control in high HIV settings, the development, deployment and evaluation of novel TB diagnostics, and rational introduction of new TB regimens.

TB MAC Aim

To improve global TB control by coordinating and promoting mathematical modelling and other quantitative research activities to provide scientific support for policy decisions and implementation.

TB MAC Objectives

1) **Identify research questions** concerning TB control that require input from mathematical modelling or other quantitative research

2) Facilitate **sharing of data**, **information and expertise** to achieve consensus on current knowledge and knowledge gaps, methodological standards and current best practice for TB control decision-making

3) **Fund** small analytical /modelling research projects

4) **Disseminate results and tools** to key stakeholders including TB control programmes and donors

1.2

TB MAC meeting 5: Global post-2015 TB Targets Exercise

This report describes the fifth TB MAC meeting in London, UK which was the second meeting on the multi-model exercise organised by TB MAC to explore the Global post-2015 TB Targets Exercise.

Objective of overall exercise:

The objective of the overall exercise is to answer two research questions, one with a specific epidemiological focus (I), and the second with a clear economic perspective (II), which builds on the results found in (I).

I. What is the health impact (TB incidence, mortality, DALYs) if a list of existing/near-existing interventions is scaled up to ambitious but feasible levels by 2025, in South Africa, India and China?

II. What are the costs and cost effectiveness of the alternative strategies, and the optimal strategies under different budget/resource constraints?

Background to meeting

The post-2015 WHO Global TB Programme Strategy was ratified by the World Health Assembly on 19th May 2014. The WHO 'End TB strategy 2016-2035' has a vision of a 'world free of TB (Zero deaths, disease or suffering due to TB)' and the goal of 'Ending the Global TB Epidemic' by 2035, defined as

fewer than 10/100,000 cases. Intermediate targets (TB incidence: 50%, mortality: 75%) were proposed for 2025. These new global targets raise many questions. They were said to be ambitious to drive innovation and resource mobilisation, whilst feasible, but how achievable are they at the individual-country level? And which interventions, at what scale, and what resources would be required to achieve these targets?

In this fifth TB MAC meeting we aimed to develop the methods for a multi-model exercise by discussing progress made so far, decide on key issues and set out the path towards the next milestones, the Targets Union Conference Symposium in October, and the further revision, publication and dissemination of this work.

Meeting preparation

Following a decision on the scope and setup of the exercise in February 2014, preparations for this meeting were started at high intensity to enable fruitful discussions and decisions. Epidemiological modelling groups were invited to participate, and roles in both the epidemiology and economics streams were distributed amongst participants.

After the Seattle meeting all participating Epi modelling groups worked to produce results for both the epidemiological and economics analysis using their country models, and working from a shared calibration and intervention summary document. Initial results were reviewed internally, and adjusted where needed based on comments. In preparation for the meeting, results were summarised and shared with the Epi modelling groups. In discussion with the economics team, it was decided to have as many shared sessions as possible, to improve mutual understanding of the work.

On the Economics side, a group of economists was convened with the aim of working together on one cost/ cost-effectiveness model. This involved economists working with key global agencies; those with expertise in costing, those with particular knowledge of economic evaluation methods and those with country experience. This group met as a whole generally, but also in smaller groups prior to the main meeting, working together to finalise the list of unit costs, to prepare a cost-effectiveness model, and to produce the first estimates of cost-effectiveness for South Africa.

Structure and process of meeting

The meeting was structured into four days, see appendix 2.1 for the final agenda. Most of the main meeting (Days 1-3) was attended by the whole group of economists, epidemiologists and other experts. Day 0 was a pre-meeting preparation day, attended primarily by economists. Each day was started with a summary of decisions made the day before and an overview of the day to come.

Day 0 (econ preparation day) focussed on presenting the preliminary cost-effectiveness results for South Africa. Each intervention was reviewed, the costing model described and preliminary incremental cost-effectiveness ratios analysed. This work identified a number of areas that required further clarity from the modellers. At the end of the day a presentation was made on estimating poverty measures from the model results; and several suggestions for different methods were made.

Day 1 focussed on presenting the overall structure of the exercise, and going through the existing calibration and intervention documents in explicit detail, to invite debate on choices and assumptions

that could be improved and ensure participants were aware of the foundation underneath the preliminary results. In the afternoon, the preliminary results were presented by the country leads, to invite questions for clarification, and set up discussions on day 2.

Day 2 was structured as a sequence of group discussions on country specific results, starting from small country specific sub-groups to plenary presentations of the main findings and messages that could be presented in the Barcelona Union meeting and suggested adjustments to the modelling in the next phase. The day was closed by a discussion on cross-country messages.

Day 3 was spent on mapping the work ahead. The main focus was on working through a number of key interventions in a plenary session with input from Epi modellers, economists, advocates and country experts, to establish a the process for the post-meeting discussions with scenario setters. Finally, a timeline was agreed, with an aim to produce final Epi modelling results by the 19th of December. The economists also met in the afternoon of Day 3 and a plan was drawn up to finalise the economic work before the next meeting in the spring of 2015.

1.3

Summary of presentations and decisions Day 0

The session began with a progress outline (Anna Vassall) and meeting goals (Gaby Gomez), before Gaby, Anna and Nick Menzies presented a review of interventions 1, 2a, 2b and 6, with the aim of creating a 'long list' of cost and model revisions to preliminary results. The afternoon session continued with a review of interventions 2c, 4,5 and 7, before a discussion of the poverty results (poverty cases averted and patient costs) following a presentation by Nicola Foster.

1.4

Summary of presentations and decisions Day 1

After a joint session outlining the overall aim for the exercise by Richard White, a presentation summarising the calibration and intervention document was given by Rein Houben. During this presentation, participants were first shown the calibration indicators and values used by the modelling groups to generate the baseline value for each country. The second section explained the rationale behind the interventions, and how models were asked to implement them. Discussion focussed on the

need for more detail on the access to care and improving treatment success variables, and making more explicit that the ACF intervention, as modelled in this exercise, was for the general population.

The country leads for South Africa (Tom Sumner), India (Nim Pathy (Jeremy Goldhaber-Fiebert was unable to attend the meeting)) and China (Grace Huynh) presented the preliminary results from the baseline fits for their respective countries. Questions focussed on the reasons for between model differences in the baseline projections for incidence and prevalence of MDR by 2025. Following the presentation of results from the individual and combination interventions, discussions highlighted a number of outliers, which helped identify a number of differences in interpretation of the intervention (focus of day 3), minor bugs in the model code, and likely between-model variation.

1.5

Summary of presentations and decisions Day 2

After a joint session summarising the main outcomes of day 1 and outlining the overall aims for day 2, participants were divided into 5 small working groups (2 for South Africa, 2 for India and 1 for China) consisting of Epi modellers, economists and country experts. Each group was tasked to come up with a list of findings, messages, strengths and limitations. In the next session, groups were merged into 3 country specific teams. Each team discussed this list, and came to a consensus on the findings, messages, strengths and limitations for each country. These lists were used in the presentations for the Barcelona symposium. Recommendations for further development included providing more consistency across the models on baseline treatment initiations (overall and MDR specific) for the economics, refining the IPT for HIV positive individuals intervention, adjusting the active case finding and treatment success interventions and considering different combinations of interventions. All of these recommendations were included in the post-meeting discussions on the final round of Epi modelling.

1.6

Summary of presentations and decisions Day 3

After a recap of day 2, the agenda was adjusted to create time for plenary discussions on the precise activities and structure of interventions.

The first intervention discussed was continuous IPT for HIV positives. It was decided that given the required model structure, this intervention would only be included for South Africa, where models would have the required dynamic HIV strata. Key adjustments were the limitation to those receiving ART, to reflect likely method of implementation, the clarification of how the screening for entry into IPT should be modelled, and to what proportion of the eligible population.

Participants then discussed the ACF intervention, where choices were made regarding what the intervention meant to represent (ACF in general population), and that for simplicity, HIV testing would not be part of the algorithm.

For the MDR interventions (intervention 2c and 3), participants agreed that for participation in the epi analysis no further calibration targets would be required. However, for those models participating in the economic analysis, MDR specific targets would be included, especially regarding service utilisation (e.g. number of MDR treatments provided). Furthermore, more detailed intervention activities would be elicited from the scenario setters, focussing on changes in each aspect of non-successful treatment (failure, default and death), which should not include treatment shortening as this was considered falling under 'new tools'. Additional guidance would be provided on the assumed level of initial default for MDR treatment, and where needed treatment success of first line Rx provided to TB cases with MDR disease.

Finally, intervention 1 for South Africa was discussed (intensified case finding in clinics). A decision was made to use the number of visits to public health centres as a starting point for estimating the effect of the intervention, which was to ask every adult that comes to a clinic about TB symptoms. Data from a study done in South Africa (Claassens et al, IJTLD 2013) was identified to give an estimate of prevalence of disease.

The final session of the meeting was used to discuss post-meeting timelines with the Epidemiological modelling groups, essentially whether to aim for final Epi modelling results before the Christmas break (Dec 19th) or mid-January. Following a vote, a majority favoured submitting final results before Christmas.

1.7

Time line for next steps

Following discussions at the meeting, the following timeline was agreed for the Epi modelling:

- 7th Nov - Final Guidelines to the Epi modelling groups

- 5th Dec – Preliminary results sent to TB MAC secretariat for internal review

- 12th Dec – Final results from internal peer review to Epi modelling groups

- 19th Dec – Final Epi modelling results submitted to TB MAC secretariat

Q1 2015: Write and submit main Epi paper.

Economics Stream

7th of Nov – work with Epi team to ensure final guidelines sent to modellers incorporate full list of economic outputs and are based on 'costable' interventions

12th of Dec – Send all comments back on preliminary results (econ outputs) to modellers

End of Jan – Produce economic results for South Africa

End of Feb- Produce economic results for India

End of March – Produce economic results for China

End of April – TB-MAC 6 meeting to present results back to policy makers

Q2 2015: Write and submit main Econ paper

APPENDICES

2.1 Meeting Agenda and Participant List

Appendix 2.1: Meeting Agenda and Participant List

Agenda

TB MAC post-2015 TB Targets meeting

7-9th Oct 2014
Savill Court Hotel, Wick Lane, Bishopsgate, Windsor Great Park, Surrey TW20 0XN

Meeting objectives:

1. Review final epi results - baseline and interventions
2. Present preliminary estimates of economics work for South Africa
3. Enhance coordination between modelling and economic groups
4. Decide interpretation and main findings and message(s) for Barcelona presentation and main epi paper
    a. decide key findings, messages, strengths and limitations to emphasize
    b. decide if any sensitivity analyses are needed to strengthen the Epi modelling paper
    c. decide on outline of epi paper with writing core group & timelines
    d. Present ideas and foster collaboration on other epi publications
5. Decide plans for finalising economics work

Key outputs from meeting. [Day/Session in which this should be achieved]

Note: not every session leads directly to an output, but lays groundwork for later sessions that do.

- Epi
    - Key findings overall [Day2-s8]
    - Key findings per country [Day2- s5-7]
    - Key strengths and limitations [Day2- s5-8]
    - List of any further work required before presentation [Day3- s3]
    - For Barcelona presentation, agree country input schedule & timelines [Day3- s3]
    - List of any further work required before publication [Day3- s3]
    - List of responsibilities and timelines for main Epi paper [Day3- s3, s6]
    - Get input on other papers
        - List of topics [Day3- s3]
        - List of lead authors, interest from other grps and timelines [Day3- s3, s6]

- Econ
    - Preliminary economic findings [Day 0 and Day 3- s2]
    - Agreed costing approach and intervention/ intervention scenarios to include [Day 0]
    - Agreed list of model adaptations to include [Day3-s3b]
    - Draft plan to finalise economics work, including outputs, persons, responsibilities and timelines [Day3- s3b]

Day 0: Monday 6th Econ pre-meeting preparation day (Econ group only): *Boardroom 2*

Breakfast: 0700 - 0945 (Orchid Restaurant)

#	Time	Session [Presenter]	Objectives & Decisions
1	1000-1045	Chair: Anna V Introductions - 15m [All] Progress against work outline - 15m [Anna] Goals for meeting - 15m [Gabi]	Obj: Inform group of who's who, where we are in the exercise, and what the coming three days aim to achieve. Decisions: none
2	1100-1245	Chair: Anna V Review of interventions 1, 2a, 2b and 6 [Gabi Anna and Nick] and discussion , with coffee break at 1130	Obj: To present the current status of costing for each of the interventions Obj: To discuss and receive comments on results on CEA and cost analysis Decisions: 'long list' of cost and model revisions to preliminary results (finalisation of future work done on last day of meeting, once all modelling results have also been seen)
	1245-1345	**Lunch** (Orchid Restaurant)	
3	1345-1545	Chair: Anna V Review of interventions 2c,4,5 and 7 [Gabi Anna and Nick] and discussion	Decisions: 'long list' of cost and model revisions to preliminary results (finalisation of future work done on last day of meeting, once all modelling results have also been seen)
	1545-1615	**Coffee break** (Boardroom 2)	
4	1615-1700	Chair: Nicola F Presentation of poverty results	Obj: To discuss and receive comments on results related to poverty cases averted and patient costs Decisions: none (finalisation of future work done on last day of meeting, once all modelling results have also been seen)
5	1700-1800	Chair: Nicola F Transmission modelling 101 [Richard/Tom]	1 hour session for those uninitiated yet interested in transmission modelling, to get familiar with basic language, process and considerations, a brief summary of the models used in the TB targets exercise

Evening activity: 1800-2000 TB MAC Reception, Library

Day 1: Tues 7th – Start of main meeting Day 1 (Epi + Econ): *Upper Hall*

0800-0830 Run with Olivia and Rein (optional)

Breakfast, 0700 - 0945 (Orchid Restaurant)

#	Time	Session [Presenter]	Objectives & Decisions
1	1000-1045	Chair: Michael Kimerling Introductions - 15m [All] Rationale, and progress against overall work outline and overall aims for meeting - 10m [Richard] Detailed aims and timetable Epi stream - 10m [Rein] Detailed aims and timetable Econ stream - 10 min [Anna]	Obj: Inform group of who's who, where we are in the exercise, and what the coming three days aim to achieve. Decisions: none
2	1045-1115	Chair: Michael Kimerling Epi paper proposals [Richard/Rein]	
3	1115-1215	Chair: Michael Kimerling Update on baseline and interventions, focus on key decisions made since Seattle [Rein]	Obj: Inform non-modellers (and remind modellers) of key decisions around the baseline and interventions package. Decisions: none
	1215-1315	**Lunch** (Orchid Restaurant)	
3	1315-1445	Chair: Gavin Churchyard Results from South Africa [Tom] *Note: handouts will be made available*	Obj: - Brief summary of background information & context for South Africa. - Describe baseline fits and intervention impact results - Highlight anomalies, values/results that needed investigation - Address questions, clarify where needed. Decisions: none Outcomes: list of questions for discussion on day 2
4	1445-1615	Chair: Gavin Churchyard Results from India [Nim] *Note: handouts will be made available*	Obj: - Brief summary of background information & context for India - Describe baseline fits and intervention impact results - Highlight anomalies, values/results that needed investigation - Address questions, clarify where needed. Decisions: none Outcomes: list of questions for discussion on day 2
	1615-1645	**Coffee break** (Upper Hall)	
5	1645-1815	Chair: Gavin Churchyard Results from China [Grace] *Note: handouts will be made available*	Obj: - Brief summary of background information & context for China. - Describe baseline fits and intervention impact results - Highlight anomalies, values/results that needed investigation - Address questions, clarify where needed. Decisions: none Outcomes: list of questions for discussion on day 2
6	1815-1830	Chair: Gavin Churchyard Wrap up + admin issues [Richard/Olivia]	

Evening activity: 1910 - shuttle leaves for offsite dinner at Bel & The Dragon

Day 2: Wed 8th – full meeting Day 2 (epi + econ for first half of day): *Upper Hall*

0800-0830 Run with Olivia and Rein (optional)

Breakfast, 0700 - 0945 (Orchid Restaurant)

#	Time	Session [Presenter]	Objectives & Decisions
1	0930-1000	Chair: Ted Cohen Recap day 1, explanation of day 2, divide into working groups	Obj: Remind participants of day before, explain objectives and methods of day 2. Decisions: Memberships of working groups (n=8 max) for morning (put up on slide, or print evening before)
2	1000-1200	Working group discussions on key messages, strengths and limitations of the exercise	Obj: Formulate 2 independent groups per country what the key messages, strengths and limitations are of the results Decisions: from each working group: Prioritised list of 5 findings (results section paper) 3 main messages (discussion in paper), 3 main strengths and 3 main limitations (discussion paper) for each country. To be presented (with rationale) to main group. Note: Groups should preserve longlists as well to illustrate reasoning. There may be space for this in the appendix
3	1200-1230	Chair: country lead for each country (Tom Sumner, Grace Huynh, Nim Pathy) Within country - Presentations of prioritised lists from the two working groups	Obj: Get 2 perspectives on same data/results Decisions: none
	1230-1330	**Lunch** (Orchid Restaurant)	
4a	1330-1500	Chair: Country lead for each country (2 countries in 1 main room, 1 country in other room) Country working groups decide on prioritised	Obj: Merge the 2 lists of the working group, and prioritise. Prepare a presentation for the whole group. Presentation should cover the initial lists of each group, differences between lists, thought process and decisions made toward final priorities Decisions: prioritised list of 5 findings (results section paper) 3 main messages (discussion in paper), 3 main strengths and 3 main limitations (discussion paper) for each country. To be presented (with rationale) to main group. Note: Groups should preserve both lists to illustrate reasoning. There may be space for this in paper appendix
4b	1330-1700	Chair: Anna Vassall (Econ group only)	Obj: discuss epi work and identify 'shortlist' additions/changes needed for the economic analyses Decision: Finalised list of additional calibration targets, outputs and interventions amendments required for epidemiological models to participate in the economics work
5	1500-1545	Chair: Sahu Suvanand Results from China [Grace]	Obj: share with whole group interpretation of results, invite discussion Decision: Finalised and prioritised list of 5 findings 3 main messages, 3 main strengths and 3 main limitations for China
	1545-1615	**Coffee break** (Upper Hall)	
6	1615-1700	Chair: Sahu Suvanand Results from India [Nim]	Obj: share with whole group interpretation of results, invite discussion Decision: Finalised and prioritised list of 5 findings 3 main messages, 3 main strengths and 3 main limitations for India
7	1700-1745	Chair: Sahu Suvanand Results from South Africa [Gavin Churchyard]	Obj: share with whole group interpretation of results, invite discussion Decision: Finalised and prioritised list of 5 findings 3 main messages, 3 main strengths and 3 main limitations for South Africa
8	1745-1830	Chair: Sahu Suvanand Key messages for overall exercise	Obj: consolidate individual country messages into maximum 3 overall messages from exercise
9	1830-1845	Chair: Sahu Suvanand Wrap up + admin issues [Richard/Olivia]	

Day 3: <u>Thur 9th – full meeting Day 3 – mostly joint epi-econ, apart from 1-3pm</u>
Upper Hall

0800-0830 Run with Olivia and Rein (optional)

Breakfast, 0700 - 0945 (Orchid Restaurant)

#	Time	Session [Presenter]	Objectives & Decisions
1	0930-1000	<u>Chair: Shufang Zhang</u> Recap day 2, explanation of day 3	Obj: Remind participants of day before, explain objectives and methods of day 3. Decisions: None
2	1000-1200	<u>Chair: Shufang Zhang</u> Economics session - preliminary results from economic model for South Africa [Gabi and Nick] Discussion on shortlist of modelling work [David Dowdy and Anna]	Obj: communicate preliminary results economic analysis and discuss and receive feedback on the proposed shortlist of modelling work required to meet the economic objectives Decisions: None
	1200-1300	**Lunch** (Orchid Restaurant)	
3 a	1300-1500	<u>Chair: Tim Hallett (Epi group only)</u> Path Forward: Epi stream [Rein]	EPI Obj: Identify what are next steps before Barcelona - what sensitivity analyses are needed for Barcelona symposium and paper - country input process before Barcelona meeting or core epi paper? Decisions: Task list + responsibilities and timeline post meeting for Epi stream
3 b	1300-1500	<u>Chair: Anna Vassall (Econ group only)</u> Path Forward: Econ stream.	ECON Obj: To finalise plans to prepare final econ results Decisions: Task list + responsibilities and timeline post meeting for Econ stream
	1500-1530	**Coffee break** (Upper Hall)	
4	1530-1600	<u>Chair: Tim Hallett</u> report Epi and Econ work back to whole group	Obj: share decisions for next steps and invite discussion Decision: Agreed post meeting task+responsibility list + timelines
5	1600-1615	<u>Chair: Tim Hallett</u> Wrap up + admin issues [Richard/Olivia]	

TB Modelling and Analysis Consortium

BILL & MELINDA GATES foundation

TB MAC post-2015 TB Targets meeting
Participant List

Nimalan	Arinaminpathy	Imperial College of London
Andrew	Azman	Johns Hopkins Bloomberg School of Public Health
Nicolas	Bacaer	IRD
Michael	Borowitz	Global Fund
Fiammetta	Bozzani	London School of Hygiene and Tropical Medicine
Stewart	Chang	Institute for Disease Modeling
Susmita	Chatterjee	Public Health Foundation of India
Gavin	Churchyard	Aurum Institute
Ted	Cohen	BWH/Harvard School of Public Health
Colleen	Daniels	Treatment Action Group
David	Dowdy	Johns Hopkins Bloomberg School of Public Health
Philip	Eckhoff	Institute for Disease Modeling
Nicola	Foster	University of Cape Town
Ines	Garcia Baena	World Health Organization
Philippe	Glaziou	World Health Organization
Gabi	Gomez	AIGHD/UvA
Alison	Grant	London School of Hygiene and Tropical Medicine
Tim	Hallett	Imperial College of London
Matt	Hamilton	Futures Institute
Andreas	Handel	University of Georgia
Rein	Houben	London School of Hygiene and Tropical Medicine
Grace	Huynh	Institute for Disease Modeling
Michael	Kimerling	Bill & Melinda Gates Foundation
Yoko	Laurence	London School of Hygiene and Tropical Medicine
Emma	McBryde	University of Melbourne
Nick	Menzies	Harvard University
Sun	*Qiang (remote)*	*Center for Health Management and Policy, Shandong University*
Allison	Rhines	Stanford University
Francis	Ruiz	NICE
Josh	*Salomon (remote)*	*Harvard School of Public Health*
Andrew	Siroka	WHO
Sze-chaun	Suen	Stanford University
Tom	Sumner	London School of Hygiene and Tropical Medicine
Sahu	Suvanand	WHO
Anna	Vassall	London School of Hygiene and Tropical Medicine

TB Modelling and Analysis Consortium

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Participant List

Stephane	Verguet	University of Washington
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Shufang	Zhang	The Global Fund