WHO Global Task Force on TB Impact Measurement

Meeting of subgroup to review WHO methods used to produce estimates of TB disease burden
Geneva, 11-12 May 2022

Group work on methods for producing estimates of TB incidence and mortality in the context of the COVID-19 pandemic (Day 1):
synthesis of feedback
# Groups

<table>
<thead>
<tr>
<th>Group 1</th>
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<th>Group 4</th>
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</table>
| Sevim Ahmedov  
Anna Dean  
Rein Houben (facilitator)  
Giorgi Kuchukhidze  
Sandip Mandal  
Harry Moultrie (rapporteur) | Juan Carlos Bossio  
Ted Cohen (facilitator)  
Pete Dodd  
Edine Tiermersma (rapporteur)  
Barbara Tornimbene | Nim Arinaminpathy  
Melanie Chitwood (rapporteur)  
Nnamdi Nwaneri  
Raghuram Rao  
Kerri Viney  
Richard White (facilitator) | Sandra Alba (facilitator)  
Macarthur Charles  
Philippe Glaziou  
Finn McQuaid (rapporteur)  
Norio Yamada |

Feedback sent by others who could not join in person also considered and reflected:
Ibrahim Abubakar, David Dowdy, Mohammad Noor Farid, Nick Menzies
## Suggested improvements

**“Feasible and necessary” in next 2 months**

|------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| **Model parameter values, priors, fits, posteriors, code, UI bounds** | Yes       | Yes       | Yes       | Yes       | Gp 1, Gp 3: Publish full model details, organize external review  
Gp 2: Greater emphasis on transparency and reproducibility  
Gp 3: Post code to GitHub  
Gp 3: Provide outputs on prevalence and percentage of disease due to recent infection  
Gp 3: Incorporate annual data to inform value of $k$  
* Nim can make materials available in about 3 weeks time; volunteers to review? |
| **Projections**                                                        | Yes       | Yes (but) | Yes       | Yes       | Gp 1: Mixed views about whether or not projections should be included in global TB report; if they are, continue to assume recovery after last data point, including to allow direct comparison with previous projections  
Gp 2 and Gp 4: Add uncertainty intervals to projections  
Gp 2: Don’t publish country-specific projections  
Gp 2, 3: Add scenarios to projections (different scenarios for recovery)  
Gp 4: Be very cautious about how these are communicated  
Gp 4: be very clear the projections are based on assumption of recovery after last data point and make it obvious where the cut-off point is for availability of data (e.g. in plots, using a change in line colour or a vertical cut-off line). |
| **Selection of countries to be modelled** (n=30, p8, p13)             | No        | Yes       | No        | Yes       | Gp 2: Consider modelling countries with proportionally large notification drops even if they are small in absolute terms?  
Gp 4: Include others that would help with the statistical model e.g. from West Africa?  
Gp 4: Involve countries more in country selection  
* Nim: 1-2 additional countries OR regional model (then applied to non-modelled countries in the region instead of statistical model) are options that are feasible in next 2 months |
## Suggested improvements

### “Feasible and necessary” in next 2 months

|---------------------------------------------------------|-----------|-----------|-----------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Statistical model                                       | Yes       | Yes       | No        |           | Gp 1: Use modelled results from 30 countries this year  
Gp 1: Use regional approach with appropriate country selection for dynamic model to support regional rate ratio estimates  
Gp 2: Concerns about representativeness of modelled countries - improve representativeness of modelled countries used for other countries |
| Assumptions about reductions in transmission during lockdowns, other restrictions | ?         | ?         | Yes       |           | Gp 1: Consider using data from countries with high quality surveillance to assess if increases or decreases plausible  
Gp 2: Apply $k$ to TB mortality, to see if this can account for changes in notifications without diagnosis rate changes  
Gp 2: Add scenario for $c=0$ during lockdown (no TB transmission)  
Gp 4: Hard to do something better at the moment, but assumption should be applied across longer time periods (not just strict lockdowns). Use various sources of information to inform this e.g. mobility data, economic data |
| Dropping DR-TB structure from model                     | Depends   | No        | No        | No        | Gp 1: DR-TB structure important for high DR-TB burden countries  
Gp 2: Discuss this on Day 2, needs to be harmonized with approach used for DR-TB incidence estimation |
## Suggested improvements

**To explore in coming year**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Gp 1</th>
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<th>Gp 3</th>
<th>Gp 4</th>
<th>Suggestions/comments</th>
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<tbody>
<tr>
<td>Assumptions about reductions in transmission during lockdowns and other restrictions, and with COVID-related behaviour change</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Gp 1: Complete analysis/assessment of available data from India + Uganda WHO could issue call for analyses/models related to impact of COVID on TB transmission Explore use of mobility data or other data that could be a good proxy for the extent to which restrictions were in place (e.g. economic data) Gp 2: Revisit assumptions when more data available e.g. explore relationship between notifications and mortality Differentiate between mild and advanced disease More nuanced reflection of COVID policies and behaviour changes on transmission Gp 3: Try to incorporate more uncertainty in how lockdowns/restrictions affected TB; consider contribution of other behavioral changes and interventions (vaccination, masking) Use economic indicators and undernutrition as proxy for return to normal? Remove Ukraine from set of modelled countries Gp 4: Incorporate effect of household structure on transmission?</td>
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<td>Accounting for COVID impacts on broader TB determinants</td>
<td>Yes</td>
<td>?</td>
<td>Yes</td>
<td>Yes</td>
<td>Acknowledgement this is hard to do Gp 1: Concerns regarding feasibility of collecting appropriate data for the relevant time period for inclusion in the model: requires further exploration; particular interest in nutrition data Gp 2: Very important but depends on how much longer the model will be applied Gp 4: Use multiplication factor to reflect how CFR has potentially changed? Additional model compartments (but necessary data may not be available). Errors in model results arising from not incorporating these impacts will increase over time</td>
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<tr>
<td>Statistical approach</td>
<td>Yes</td>
<td>No</td>
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<td>Gp 1: Use regional groups and regional IRRs? Gp 4: Try to model more countries to reduce use of statistical model</td>
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# Suggested improvements

## To explore in coming year

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<td>Ukraine</td>
<td>Yes</td>
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<td>Assess impact of war in Ukraine and surrounding countries – methods to deal with notification ~ incidence assumption.</td>
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<td>In-depth analyses for specific countries</td>
<td>Yes</td>
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<td>“Deep dives” for specific countries could be very useful e.g. India, using notification as well as prevalence survey and other data</td>
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<td>User friendly model interface</td>
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<td>More disaggregated assessment of who</td>
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<td>Yes</td>
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<td>e.g. by disease severity, age, sex. These have repercussions for link between incidence and mortality; warrants further investigation</td>
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<td>experienced disruptions</td>
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<td>Incorporate extended natural history</td>
<td>Yes</td>
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<td>Data to parametrize a more nuanced model with additional TB disease states will increasingly become available. Process to incorporate additional states needs to be started. (e.g. Subclinical, minimal, and clinical??)</td>
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<td>compartments into model</td>
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<td>Other</td>
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<td>Yes</td>
<td>Use more country-specific factors in the model</td>
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1. **Projections!** Mixed views on whether they should be in the global TB report
   - Are these advisable?
   - Considerable (Gp 1 said “massive”) uncertainty in the models
   - Potential for reputational damage if they are not correct
   - Caution needed on projections
   - Focus on reported data rather than projections in Global TB Report

   - Is publication of projections in the Global TB Report 2021 a one-time event?
     - If continue:
       - Featured topic rather than in main report?
       - Publish projections for alternative “scenarios” with uncertainty intervals
       - “Scenarios” not “predictions”, with uncertainty
       - Review/assess accuracy of previous projections for 16 countries

2. Is use of country-specific modelling for the short term or longer-term?
   - Is there an expiry date for use of country-specific models for estimates?
   - Only during period of COVID disruptions?

3. Need to start from data as much as possible (back to TF strategic areas of work 1 and 2)
   - Importance of investments in strengthening TB surveillance and periodic surveys (e.g. prevalence surveys)