Author’s response to reviews

Title: The cost-effectiveness of incentive-based active case finding for tuberculosis (TB) control in the private sector Karachi, Pakistan

Authors:

Hamidah Hussain (hamidah.hussain@ird.global)
Amani Moor (Amani.Mori@uib.no)
Aamir Khan (aamir.Khan@ird.global)
Saira Khowaja (saira.khowaja@ird.global)
Jacob Creswel (Jacob@stoptb.org)
Thorkild Tylleskar (Thorkild.Tylleskar@uib.no)
Bjarne Robberstad (Bjarne.Robberstad@uib.no)

Version: 2 Date: 12 May 2019

Author’s response to reviews:

Reviewer 1:

Reviewer reports: Justin Ingels, MPH, MS

1. As a follow-up to my major concern with the first review, it is clear to me that an inappropriate comparison is being made between alternatives in this decision analytic model. The key purpose of cost-effectiveness analysis is to inform a particular decision with the appropriate set of mutually exclusive alternatives. Nearly always, one of the alternatives should be "existing care" or the "status quo" which is the PCF alternative in this scenario. Any alternatives included as comparisons to "existing care" should be defined and include a complete strategy for which the decision maker would select if they determined this alternative was worthwhile (i.e. cost-effective in this case). The alternative as described in this article is ACF alone. That is not really what is happening in this scenario or in any other real-world scenario. In fact, the relevant alternative should be ACF with PCF or ACF as an extension of PCF. The authors themselves recognize this in the Discussion (page 17, lines 10-12): "Essentially, PCF provides certain level of coverage in TB programs and then ACF is needed to reach more people and to reach them earlier." Both of the articles cited by the authors as "consistent with results from other countries" are cost-effectiveness analyses where the appropriate comparison is made,
(1) PCF alone vs. PCF with ACF added on (2). For one article, the authors are explicit that they are considering what would happen to those individuals identified by ACF if ACF did not exist and only PCF existed. In this case, many of those individuals are still identified (though not all) and the analysis is the additional costs of ACF compared to PCF and the estimated additional effects due to ACF compared to a counterfactual where ACF was not in place. The other article does a similar thing by considering a cohort of individuals that move through a world where PCF only exists and one in which ACF exists on top of PCF. Neither article attempts to take a situation where both PCF and ACF exist and compare the patients directly that are identified by each and draw a conclusion about the cost-effectiveness of ACF. That scenario is problematic for several reasons: (1) a very different group of individuals are being compared to one another, this was part of my issue raised first in my previous review, (2) this does not match the reality of the study, other similar studies compare periods where ACF was not in place to periods where ACF was in place OR similar areas where both PCF and ACF are in place to areas where only PCF is in place, (3) this does not match the true decision making context which is either just stick with PCF as existing care or decide to fund ACF on top of PCF, this analysis as constructed attempts to say ACF dominates PCF as a strategy but that is not a fair comparison as constructed and does not match the decision making context.

Response:

We read this comment as concerning the question of independence vs mutual exclusiveness between the two strategies. We originally presented incremental costs-, incremental effects and incremental cost-effectiveness ratio between ACF and PCF, which admittedly and by definition implied that we dealt with them as mutually exclusive. In retrospect, we agree with the reviewer that this also would have required us to consider ACF+PCF as the proper comparison to the existing PCF.

However, at the same time, we have consistently argued that ACF and PCF are in fact not mutually exclusive strategies in this particular context. In Pakistan health care services are delivered by two parallel, independent and competing public and private health systems. The public sector provides free consultation at outpatient level but patients have to pay for their medications, whereas, the private sector operates as a fee for service system. An estimated 67.4% households in Pakistan consult private health providers when they need medical services with the province of Sindh leading at 78.93%. Both active and passive case finding arms are representative of this health system.

We therefore treat both public (PCF) and private systems (ACF) as independent interventions, since they largely address different populations, and therefore both can be implemented at the same time with little mutual influence. Consequently, we have changed the analyses so that we now compare each strategy to a common baseline of no case finding, while avoiding the calculation the ICER between PCF and ACF, in accordance with standard textbooks in economic evaluation (e.g. Drummond 2005). The comparator “no case finding” represents a situation
where TB cases remain unidentified and consequently experience the natural path of the disease. While this is arguably an artificial situation, this analytical approach enables the comparison of these independent interventions as well as comparison between TB screening and health interventions in other parts of the health services more broadly.

We thank the reviewer for “forcing” us to rethinking our analytical strategy. While this does not change the main conclusion of cost-effectiveness, the quality of the analysis has improved. We present the updated results in Table 3 as well as Tornado sensitivity analysis for both arms separately.

Table 3: Absolute and incremental costs, effect and cost-effectiveness from the patients, health facilities and the TB program perspective. For both strategies, incremental values are calculated compared to a common baseline, i.e. no case finding.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Cost/health seeker for symptoms of TB (USD)</th>
<th>Incremental Cost (USD)</th>
<th>Incremental DALYs</th>
<th>Incremental DALYs per strategy</th>
<th>Incremental C/E</th>
</tr>
</thead>
<tbody>
<tr>
<td>No passive case finding</td>
<td>0</td>
<td>0.1806</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passive case finding</td>
<td>6.09</td>
<td>6.09</td>
<td>0.0491</td>
<td>0.1315</td>
<td>46.27</td>
</tr>
<tr>
<td>No active case finding</td>
<td>0</td>
<td>0.1806</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active case finding</td>
<td>2.67</td>
<td>2.67</td>
<td>0.0107</td>
<td>0.1699</td>
<td>15.74</td>
</tr>
</tbody>
</table>

Our results indicate that incentive-based ACF in the private sector is more cost-effective than PCF, and should be considered if resources permits. Also PCF is highly cost-effective when compared to a commonly applied threshold of GDP per DALY averted. We believe PCF and ACF most appropriately should be considered independent in the context of public and private
health sectors in Pakistan, respectively. Our analysis therefore should not be interpreted in favor of disinvestments of the PCF scheme.

2. With respect to Figure 3, net benefits are plotted rather than the ICER and there is no mention of net benefits anywhere in the article. This may be difficult for the average reader to understand. If the authors chose an ICER plot from their options in TreeAge and marked the same cost (where the ICER line crosses a WTP of $150), this would likely be easier to understand for the average reader.

Response:
Thank you for pointing this out we have changed the Tornado diagram as suggested, and present one each for the two strategies.

Reviewer 2: Kátia Marie Simões e Senna

Despite the authors having answered properly my questions, I still feel uncomfortable with the lack of good information about values composition of some parameters.

I agree with the other reviewer on some comments pointed out in question 1: "...For all of the parameters under "Cost" in Table 1, something more than "Primary data" is needed to justify these numbers as only the estimates for "Cost of successful TB treatment" are clear. It's unclear how any of the parameters in Table 1 that cite Reference 33 come from this reference as it is entirely focused on costs and is only referenced with respect to probabilities. Looking at Reference 17 it is also difficult to tell where these parameters come from. (I also cannot tell from Reference 32 if that's what was actually intended for the table)."

Response:
A) We understand the reviewer’s concern and have created a table for the cost parameters and have uploaded it as a supplementary table.

B) Reference 17 and now 34 as below details the intervention and its results in terms of people screened for TB. Tested positive, started on treatment and their outcomes. Probabilities used in Table 1 comes from these papers and may vary slightly based on the data cut off used.
