

TB paper discussion

FINN MCQUAID AND PHILIP WELKHOFF



Paper discussion

Who

- Regularly reads scientific papers?
- Has read this paper?
- Has never read a modelling paper before?

What are the key things to bear in mind when reading a scientific paper?

The most important components of a critical appraisal are an evaluation of the *appropriateness* of the study design for the *research question* and a careful assessment of the key *methodological* features of this design. Other factors that also should be considered include the *suitability* of the statistical methods used and their subsequent *interpretation*, potential *conflicts* of interest and the *relevance* of the research to one's own practice.

(Young & Solomon, Nature, 2009)



Paper itself – the basics

Aim of paper?

Model

- Structure
- Disease?
- Stratification?
- Setting?
- Deterministic or stochastic?

Fig. 1. Graphical representation of the expanded epidemic model used to study the impact of new tuberculosis diagnostics on transmission

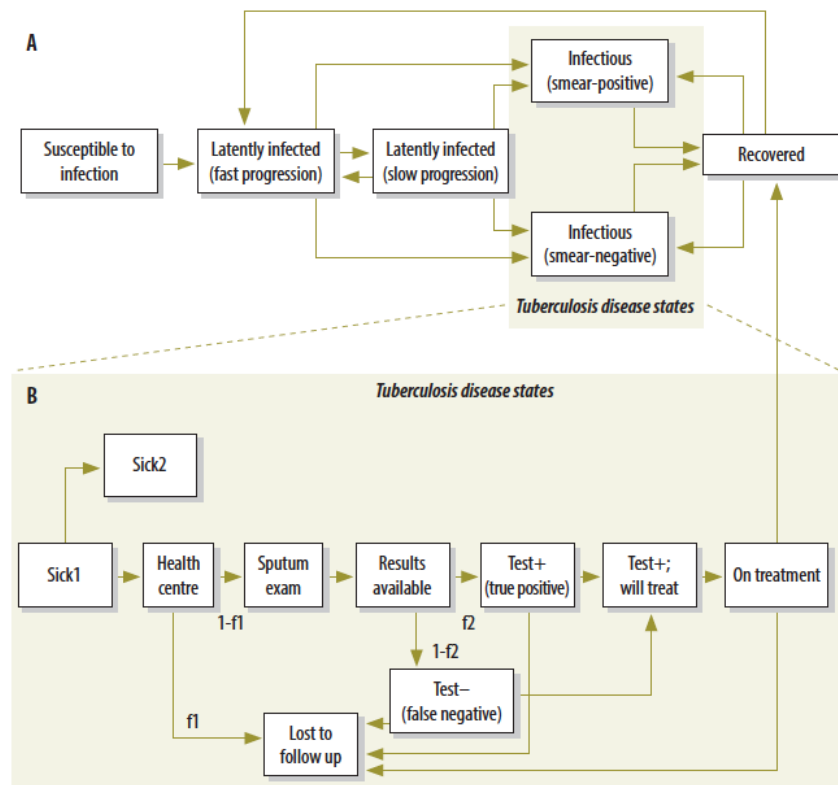


Fig. 2. **Incidence of tuberculosis (all forms) in the United Republic of Tanzania based on WHO estimates and projected incidence based on the calibrated epidemic model**

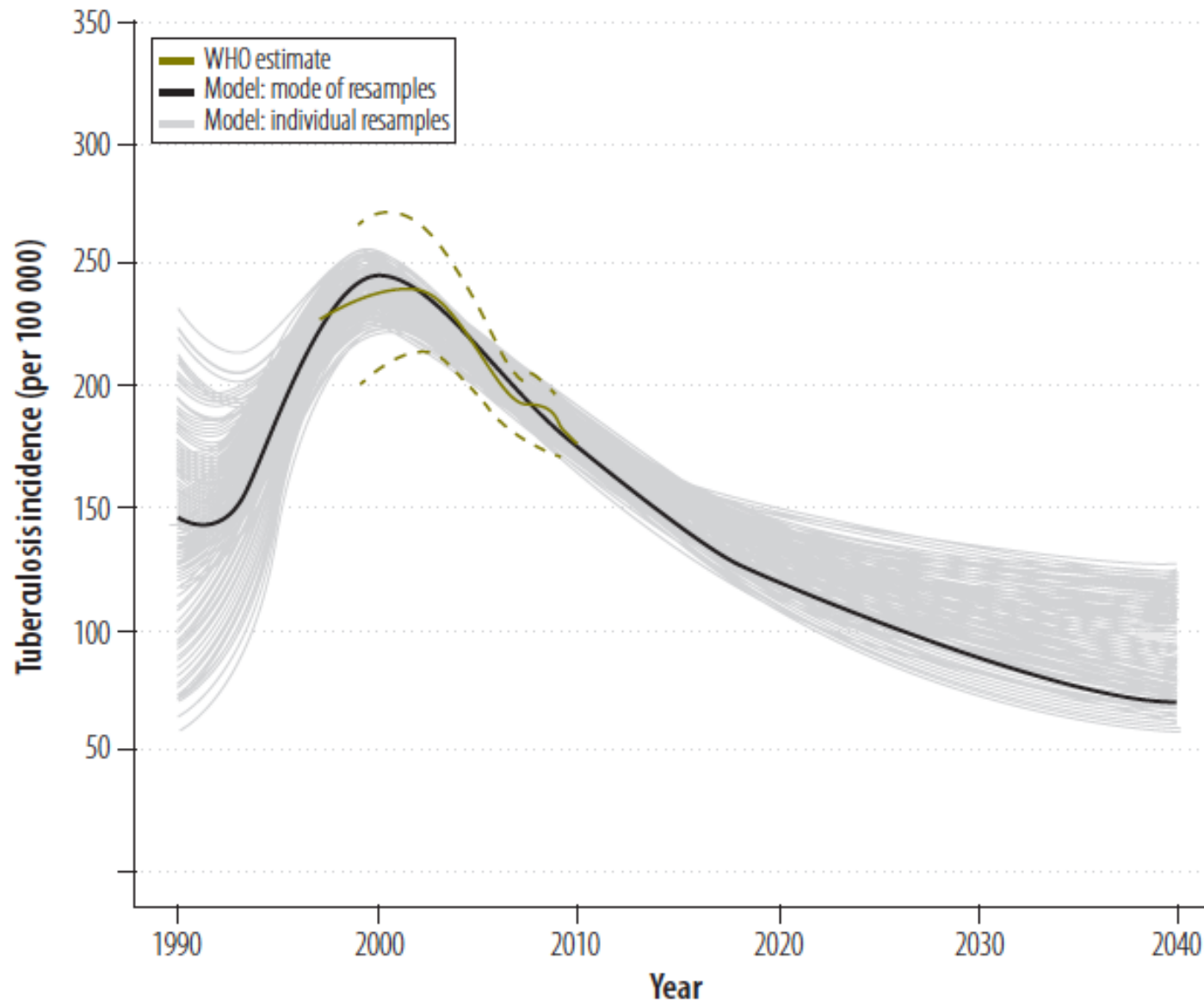
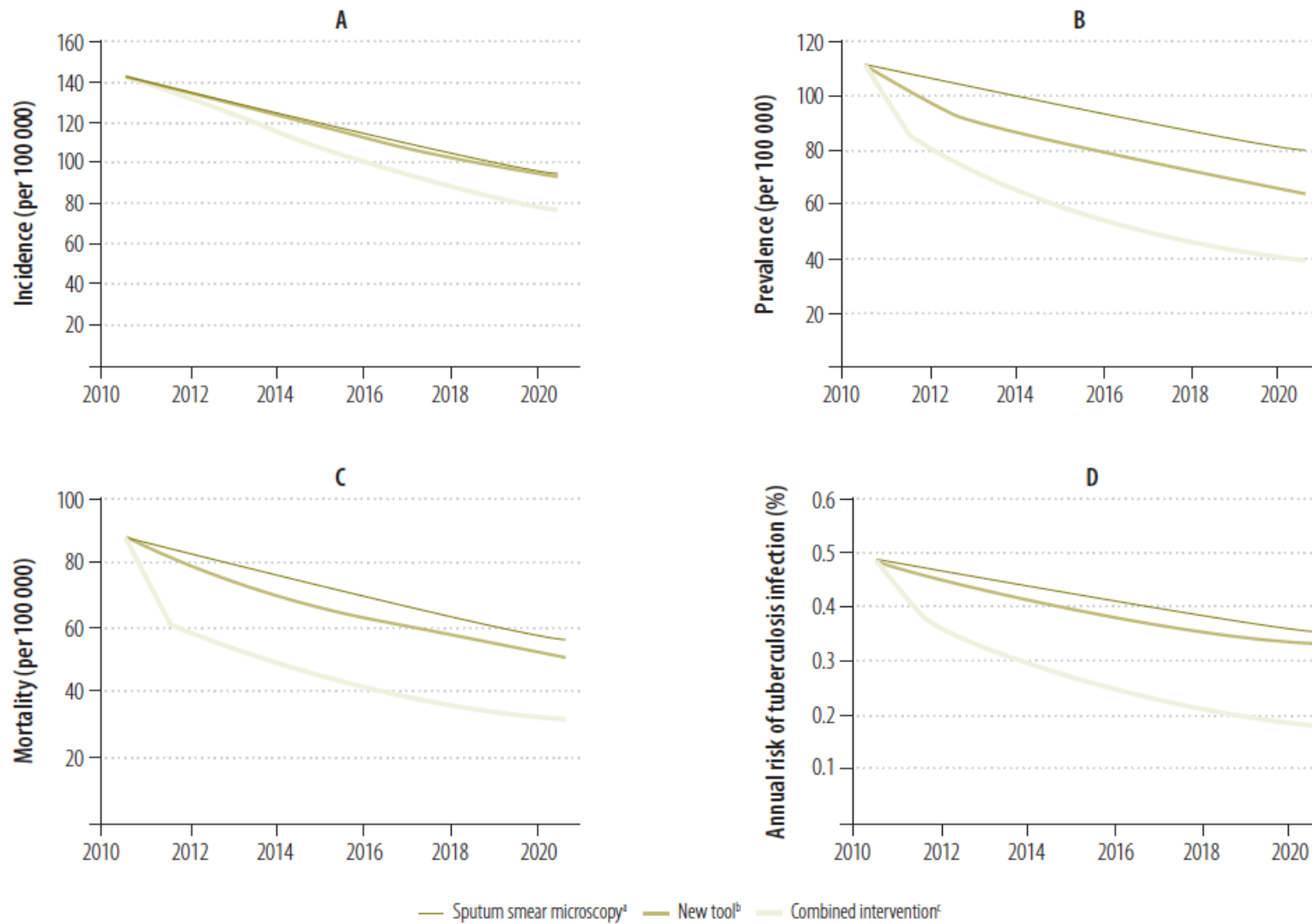


Fig. 3. Projected incidence, prevalence and mortality trends for pulmonary tuberculosis and annual risk of latent tuberculosis under three diagnostic scenarios^a

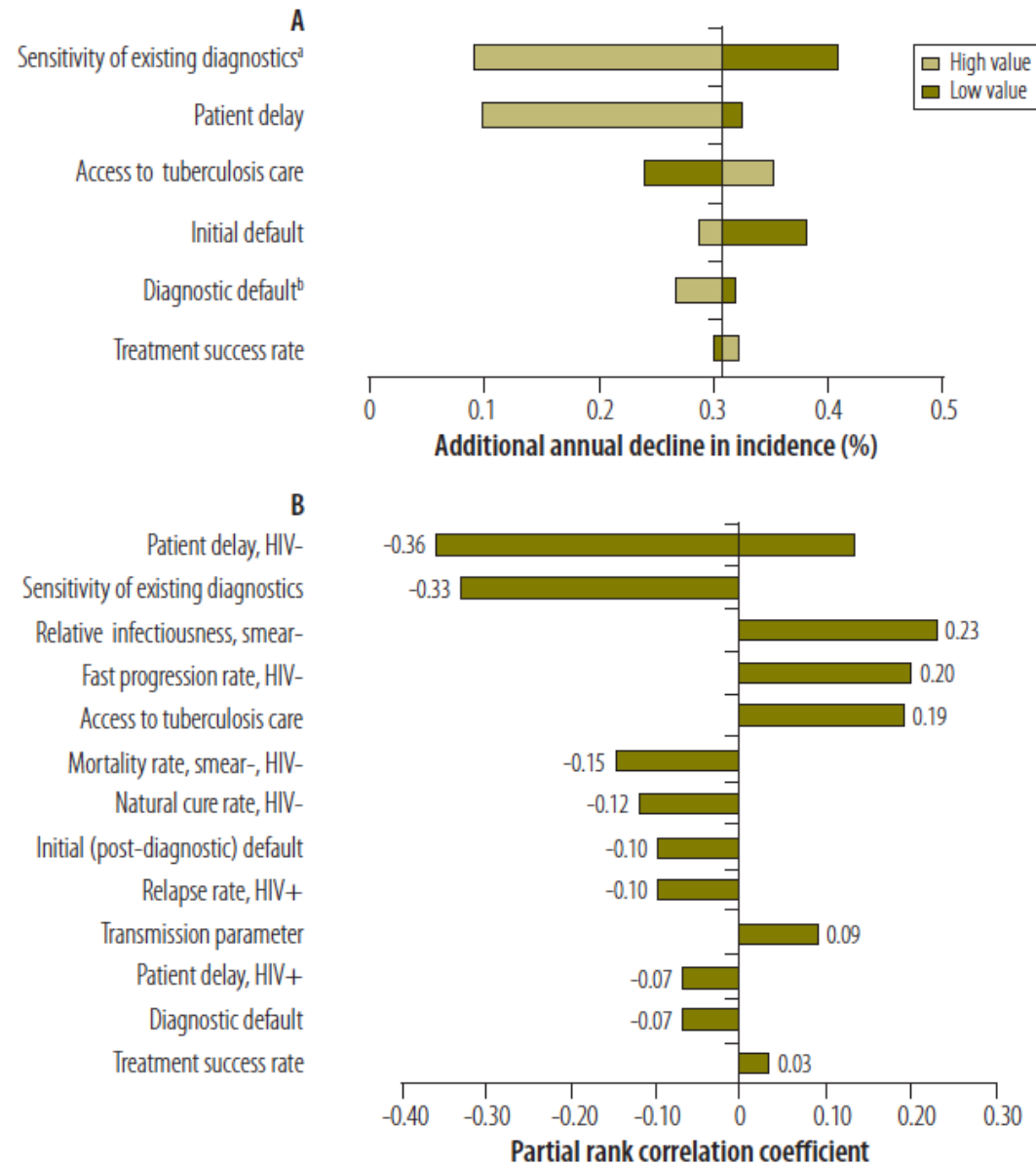


^a Scenario I: sputum smear microscopy under the reference case operational context (corresponding to the mode values of operational parameters in Table 2).

^b Scenario II: use of the new tool (with 70% sensitivity for smear-negative disease) to replace sputum smear microscopy in Scenario I.

^c Scenario III: use of the new tool in combination with other interventions that shorten the average patient delay and increase access to care and treatment success rate (with parameter values corresponding to the 90% posterior limits in Table 2).

Fig. 4. **Sensitivity analysis on the influence of operational factors on the impact of a sensitivity diagnostic tool on annual decline in pulmonary tuberculosis incidence**



Overarching questions

What is the research question and is it clearly explained?

What are the primary findings?

Are the findings original?

What model techniques are used?

What is the model structure?

What are the major model assumptions, and are they clearly explained?

Do you think modelling is a useful method to explore the research question? Or would other more conventional epidemiological methods be more appropriate?

Do you think the model is 'valid'?

Was a sensitivity analysis performed?

What was explored, what was not?



Areas to consider

AIMS

1) Research question/hypothesis

METHODS

2) Model structure

3) Model assumptions

4) Parameters

5) Fitting and sensitivity

RESULTS

6) Values and general outcomes

CONCLUSIONS

7) Discussion and limitations



Timings

Group work

Presentations

- 3 mins per group (2mins discussion)
- 3 of the most interesting/hotly debated points from the discussion
 - Good / Bad / Ugly

Summary



Modelling papers

What is their overarching aim/question? Is modelling appropriate to answer it and did they use an appropriate model? Did they validate their model structure?

What are their key assumptions? The ones that will make a *difference* to their results... Did they do any sensitivity analysis around these?

Where are their parameters from?

Is the model appropriately calibrated? As in do you trust the “baseline” scenario which should be “reality”

What are the primary findings? Are they original? Is the uncertainty reflected in the results?

How do their conclusions relate to their aim, their assumptions and do you trust that they can make these conclusions given the model? What are the limitations? How relevant are the results to the field? (and to your work?)

Summary

Thanks to Gwen Knight

