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LETTER

Better data for country-level TB resource allocation are urgently required

Dear Editor,

Recently, there has been a global effort to standardise cost reporting and collect evidence for programmatic costs (see A to B in Figure 1A), including the Global Health Cost Consortium (GHCC) Unit Cost Study Repository,[1] the VALUE TB project[2] and the iDSI (International Decision Support Initiative) reference case.[3] However, these do not link the costs of activities to the health benefits provided. There are ongoing efforts to collect cost-effectiveness evidence for epidemiological impact, but estimates are only available for a limited number of interventions applied to very specific populations (e.g., HIV-positive, prison inmates etc).[4] Furthermore, the COVID-19 pandemic has increased the pressure on health resources.[5] As such, health impact is frequently not linked to a quantifiable amount of resources/activities, so the crucial link between resource needs and impact remains unknown. Without evidence linking resource need to both impact and cost, country-level decision-makers are largely left to rely on expert opinion to help make resource allocation decisions.[6,7]

To efficiently allocate limited resources, national tuberculosis programme (NTP) staff and technical assistance (TA) teams need to know the likely cost and health impact of available intervention packages. The packages can be quantified by the resources they require to achieve a quantified health impact. This can be categorised into: 1) what resource needs are required for an intervention (e.g., the amount of nurse time and the number of diagnostics); 2) the total cost of these resources (e.g., the unit cost multiplied by the resource amount); and 3) the likely increase in health impact (e.g., an increase in treatment success).

An important example is active case finding (ACF),[8] as spending on ACF interventions, such as the $125m allocated to 'finding the missing millions' in the Stop TB/WHO Global plan,[9,10] and the epidemiological impact have been systematically reviewed for the WHO guidelines for ACF interventions.[11] However, the resources required to achieve these impacts (see A to C in Figure 1A) have not been collated, and therefore the information decision-makers need for resource allocation remains severely limited.[12–14]

To help fill these gaps, we investigated the resource needs data reporting in evaluations of ACF. From published ACF evaluations,[15] we recorded information on 1) the diagnostic algorithm used; 2) the number of tests performed per diagnostic step in the algorithm; 3) human resource requirements; 4) training provided; and 5) auxiliary resource requirements. These were categorised into those with a 'Basic' (1, 2), 'Intermediate' (1–3), 'Comprehensive' (1–5), or no reporting of resource needs. Evaluations were identified from Kranzer et al.'s systematic review[15] and the WHO ACF guidelines (which were co-developed with the review).[11] Full details of the search strategy and inclusion and exclusion criterion are outlined in the review, but in summary the review set out four questions on the impact of screening on TB, which formed the basis of the inclusion criterion. Studies were excluded if TB infection was not defined as active and if they were in a language other than English, Spanish, French, Russian or Japanese. The evaluations identified were then searched for using electronic searches and in correspondence with the original works authors. Five original papers could not be located. We identified 65 evaluations to be re-reviewed for data on resource need.

Most evaluations (75%, 49/65) included a description of the diagnostic sequence, but only 38% (25/65) included data on diagnosis resource requirement; 18% (12/65) included data on human resources, 14% (9/65) on training and 18% (12/65) on auxiliary activities; 22% (14/65) of studies did not report any resource needs information. Thus, the evaluations were classified as Basic (25/65, 38%), Intermediate (7/65, 11%) and Comprehensive (2/65, 3%) in reporting resource needs data (Figure 1B). A detailed database of these data are available at http://tb-mac.org/tb-mac-resource/activity-to-impact-data-and-checklist/. Our results suggest that there is evidence available in the existing ACF evaluation literature that could be used to better support country-level resource allocation decision-making.

However, while there are data available to evidence ACF intervention resource needs, our results also show that there is seldom more than a basic level. Estimates of resource needs for resource allocation based on these limited data are likely to be an underestimate of the actual resource needs, as the data fail to include information on the essential human resources, training and additional auxiliary resources and support required. These resource needs

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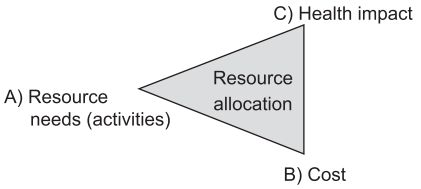
A



B

Type	All *n* (%)	Basic *n* (%)	Intermediate *n* (%)	Comprehensive *n* (%)
1	49 (75)	25 (38)	7 (11)	2 (3)
2	25 (38)			
3	12 (18)			
4	9 (14)			
5	12 (18)			
No data	14 (22)			

Figure 1 **A)** Schematic of the information required for resource allocation; **B)** studies reporting information by resource type and category.

may also incur a significant opportunity cost to the health system, as interventions are not run in isolation of staff and support. In addition, for intervention effects to be validated and replicated across different settings, it is important that these resource needs are recorded in addition to the context, health impact and costs. To this end, we proposed resource-needs reporting (see http://tb-mac.org/tb-mac-resource/activity-to-impact-data-and-checklist/) and would welcome your input (please contact the corresponding author of this article).

Many of these evaluations were originally carried out to investigate health outcomes, not necessarily to collect data on resource needs. Therefore, our aim was not to comment on the quality of any specific evaluation, but rather to assess the availability of resource needs data that could also be linked directly to a measured health impact. However, we hope our work does provide a useful case study on the likely resource data availability across a wide variety of evaluation types. ACF interventions are subject to large variability in resource needs, so the groupings we used (Basic, Intermediate or Comprehensive) may not be appropriate for all interventions.[10]

The data in our database provide an additional useful source for decision-makers and their TA teams to identify ACF evaluations containing resource needs data, from which cost-effectiveness and budget impact estimates can be made, without relying on expert opinion.[6,7] Our results highlight the need for additional data collection and collation, particularly those quantifying resource needs and epidemiological impact, to ensure that decision-makers have adequate access to evidence to inform decisions they face when attempting to allocate limited resources across a range of interventions. This would benefit from the development of a reference case similar to those for collecting cost data.[3]

In summary, existing evaluations do contain useful information, which could be used for resource allocation decision-making at a country level, but these data need to be collated and are likely to underestimate resource needs. We advocate for more extensive reporting of resource needs in future TB intervention evaluations, and further work to make resource needs data available in other areas of TB care and prevention. This would support better decision-making and save lives.

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