

## Essential surgery is cost effective in resource-poor countries



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In this issue of *The Lancet Global Health*, Tiffany Chao and colleagues present a systematic, comprehensive, and critical assessment of published estimates of the cost-effectiveness of essential surgery,<sup>1</sup> and thus make an important contribution to the published work on the economics of global health interventions. Their headline finding is that a wide range of surgical interventions are cost effective across a wide range of settings in low-income and middle-income countries, and are competitive with other accepted and broadly implemented interventions. The problems of varying study quality and the difficulty of comparing costs and outcomes between studies are real. Some of the estimates are more inclusive and thus more defensible than others. Although work should continue to harmonise cost estimates in global health programmes generally, these methodological issues are not specific to surgery and they should not obscure the central findings of this study. Debates about surgery's place in the ranks of primary health-care options compared with infectious disease interventions, and about the relative prominence that should be given to so-called vertical delivery care models, are ultimately sterile and outdated. They should be replaced by increased emphasis on identification of value for money whatever the service delivery platform. With regard to surgery, this change means investment in surgical facilities equipped and staffed to provide a set of inexpensive and very effective interventions. What that set of interventions should consist of will vary somewhat by country and Chao and colleagues' study provides substantial guidance regarding which interventions are appropriate where.

One of the barriers to investment in surgical capacity in low-income countries is the correct perception that they require a substantial up-front expenditure in facilities, equipment, and training. However, the scientific literature assessed by Chao and co-workers suggests that when these initial capital costs are properly amortised over their useful life and across realistic surgical volumes, the initial investments are, in reality, modest. Furthermore, the return-on-investments in surgery might be greater than would be suggested by the cost-effectiveness results for each individual intervention type. Potential positive externalities exist in the form of upgraded general surgical capacity resulting from a focus on one type of surgery.

Chao and colleagues mention the case of missions to deliver cleft lip and palate repair that result in precisely this type of development of local surgical capacity. Such positive spillover effects have also been presented as part of the rationale for widespread adoption of antiretroviral therapy for the treatment of HIV. Evidence for these effects with regard to antiretroviral therapy is sparse and somewhat equivocal.<sup>2-4</sup> Nevertheless, the presence of such effects is plausible, warrants further investigation, and, if confirmed, could substantially increase the attractiveness of investments in surgical platforms in resource-poor countries.

Two countries are notable for their near absence in the published work—India and China. Chao and colleagues<sup>1</sup> identified only one study for each country, on cataract repair. Understanding the cost-effectiveness of surgery in these two countries, which account for such a large portion of the global burden of disease, is an obvious priority area for additional research.

A strength of this study<sup>1</sup> is that Chao and colleagues took pains to place the cost-effectiveness ratios in context. Many recently published cost-effectiveness analyses in global health merely state whether the intervention assessed meets the WHO definition of a cost-effectiveness ratio of lower than a country's gross domestic product per head for very cost effective and of one-to-three times greater than the country's gross domestic product per head for cost effective.<sup>5-7</sup> Besides setting such a low bar for cost-effectiveness that almost any intervention with measurable benefits will be cost effective, the WHO threshold provides little guidance to decision makers who may need to confront difficult trade-offs in choosing among options, all of which meet the nominal cost-effectiveness threshold. Nevertheless, reference to the WHO threshold is common and in this study nearly all of the surgical options were "very cost effective" by WHO criteria. Fortunately, the authors position their findings alongside far more useful comparators, namely a set of scaled-up interventions for which governments in resource-poor countries have shown a willingness to pay and whose public health effects are well documented. These interventions include antiretroviral therapy for HIV, BCG vaccine for tuberculosis prevention, vaccination for other childhood diseases, and the provision of bednets for the prevention of malaria.

The use of the Drummond checklist to assess study quality is of limited value, and is more helpful as a guide to authors than as a reliable way to assess internal validity. Each item on the checklist receives equal weight, whereas in reality some are more important than others, or are even so different that they should not be included on the same scale. For example, the question “Were the costs valued credibly?” invites assessment of numerous issues that could easily constitute a checklist in itself. The question “Were costs adjusted for differential timing?”, by contrast, is a more restrictive and typically a far less consequential issue. The latter is about as important as the issue of the proper use of discounting, which is omitted from the Drummond checklist altogether. Thus, as a guide to the critical reader, the final checklist score attached to each study is far less informative than the assessment of each study’s rating on each of the ten questions considered individually.

Whereas a need exists for additional validated techniques for assessment of internal validity, far less work has been done on development of techniques for assessment of external validity. What are the variables that determine whether the benefits from surgery measured by the relative risk reduction of a relevant undesirable outcome or condition will be replicated in another setting? Local economic indices (ie, gross domestic product), epidemiology of the surgical disease, and cost of requisite human and material resources are some of the many factors that can determine the scalability of the intervention. Progress in understanding external validity would confer two kinds of reward. On the one hand, it would allow researchers and decision makers tasked with choosing programme and policy options to select those that are likely to have high effectiveness in the relevant setting. On the other hand, development of such an external validity assessment technique for surgery implies the identification of factors, the presence of which are associated with high effectiveness. Modification of factors that are

manipulable such as task sharing, task shifting, and other manpower choices; provider or patient incentives; or the role of outreach and publicity, thus helps to guide programme design.

Cost-effective surgical interventions are increasingly recognised as important contributors in the developing global health landscape, as the burden of disease from non-communicable diseases and injury rises. More high-quality primary research on effectiveness, coupled with economic analysis, is needed to determine which interventions are right for which target populations. Structural barriers that are unique to implementation of surgical treatments will require innovations in delivery models. Despite these challenges, Chao and colleagues<sup>1</sup> have provided a strong confirmation of the promise of surgery as a vital technique in the future armamentarium of global health.

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We declare no competing interests.

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