

Cost and value analyses in medical education: common errors to avoid

Medical education is associated with substantial cost, so there are a growing number of cost analysis research projects in medical education. Superficially at least these projects should be straightforward, but many errors can occur in their execution. This article highlights some errors that commonly occur and explains how to avoid them.

Introduction

Medical education is associated with substantial cost (Walsh, 2010). This has attracted growing interest from medical educators who wish to ensure that medical education delivers the best possible value for money (Howard et al, 2011). Currently there is a weak evidence base on which to make decisions regarding what offers best value in medical education (Walsh, 2013). This has led to a growing number of cost analysis research projects in medical education (Oates et al, 2014; Watson, 2014).

Superficially at least these projects should be straightforward. At their core they involve baseline measurement of costs and then an analysis and subsequent interpretation to seek value. However, cost and value analyses are not straightforward. Many errors can occur at the cost-gathering stage or during analysis, and errors can have marked effects on the end results. At their worst errors can result in stark misjudgements: a low cost educational intervention might be considered to be high cost; a cost-ineffective medical education programme may be chosen over a cost-effective one; or the costs to the learner might be entirely ignored.

This article highlights some errors that commonly occur in cost analyses in medical education and explains how to avoid them. The article does not deal with all possible errors that might be committed in this field. Rather it takes a pragmatic approach by concentrating on the most common errors that are likely to have the greatest impact on costs and/or outcomes.

Common errors

Omitting hidden costs

The foundation stone of cost analyses in medical education is a thorough and comprehensive measurement of the costs of an

education programme (Walsh et al, 2013). If significant costs are missed, then the rest of the analysis will be unsound.

Hidden costs are those typically not accounted for in formal financial budgets. For example medical students may spend considerable amounts of time in general hospitals where they are taught by practising doctors and nurses within those hospitals. These teachers are not medical school staff, so their salaries will not appear in education budgets. However, they are essential and should be included within analyses because in other medical education environments the medical school might be charged for this service. Equally the regional hospital may decide at some future point to withdraw this service to the school. Hidden costs may feature in almost any aspect of the medical curriculum – the costs of faculty, learners, facilities or consumables may be hidden.

Paying too little attention to the main costs

This error is best demonstrated by means of a practical example. An educator is working out the costs of an educational programme. The faculty makes up €8000 of the costs, learners €1500 and consumables €500. The educator makes an error in calculating costs: he/she underestimates faculty costs by 10% and consumables by 10%. This will result in an €800 error in faculty costs but only a €50 error in consumables costs. Because the faculty costs are so large, any error in their calculation will be significant; the opposite is true for consumables costs. The lessons to be drawn are equally clear – analysts must pay most attention to where most of the funding is spent. This is often faculty (as in this example) – but it may not always be so.

Failing to realize that costs are often incomplete

Most providers of medical education have an annual expenditure. These providers

may be as big as a ministry of health or as small as a local postgraduate training authority. However, the provider's spend may not tell the whole story.

For example a ministry of health may spend €1 billion annually on health-care professional education. However, this is unlikely to be the only spend on health professional education – even the only public spend on this activity. The ministry of education may also spend funding on this activity as may the ministry of local government (some public health practitioners may be employed by local government). Doctors may pay for some of their continuing professional development out of their personal monies or might receive grants from corporate or commercial bodies to pay for this.

Paying insufficient attention to opportunity costs

Opportunity costs are vital in any analysis of the economics of medical education. Like any other form of cost, how opportunity costs are viewed depends on the perspective of the stakeholder involved (Raftery and Palmer, 1999). Consider the opportunity costs of undergraduate education from the perspective of the government. An 18-year-old student is attending his/her first year in medical school. There are no tuition fees – the government pays the entire cost of €30 000. At first view, it appears that the cost is €30 000. However, some within the government may view things differently. They might think that the student, by studying medicine, is losing out on the opportunity to work and in turn the government is losing out on any ensuing taxes that the student might pay while in work. The student might pay €10 000 in taxes. Thus the opportunity cost to the government is €40 000 (€30 000 in fees plus €10 000 in lost taxes). In this case this opportunity cost matters to the government. The student may consider that he/she has no costs as he/she is not paying tuition fees – but, from

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another perspective, the student may see him-/herself as losing out on €20 000 as he/she is not in work. Thus the opportunity cost to the student is €20 000.

Mistiming costs

Cost outlays in medical education may occur at different times – how to capture these in the context of a cost analysis can be problematic, as illustrated by this example. A new medical school is being set up and will admit its first students in autumn 2018. Building work begins in 2016 and will end in summer 2018. How should these costs be allocated and related to outcomes?

One way would be to allocate all the building costs to 2018 and relate them to outcomes that year, but this would put too much cost on this year. An alternative approach would be to write off the building costs and start with a clean slate in 2018. This would cause the opposite problem and would ignore a large proportion of costs.

The correct approach would be to spread the costs of the building work over the lifetime of the building and allocate an appropriate amount to each academic year. Methods used to ensure that this is done properly include discounting, amortization and accounting for depreciation. Details of these are beyond the scope of this article, but the important thing is to remember the principle of spreading the initial costs over the lifespan of their use.

Misunderstanding transfer of payments

Educational costs sometimes have to travel a byzantine journey before they reach their destination. The same is true of medical education costs. Look at the following example. A ministry of health pays a grant to a student; the student then pays it to the college; the college then pays it to the relevant department. Alternatively the ministry may pay the college directly which then passes on the funding to the relevant department. Regardless of the exact route, a common error in education is to double or even triple count. Payments might be transferred from one owner to the next but they should not be accounted for in cost analyses until they become expenditure, i.e. until they are used in the delivery of medical education. Lack of rigour in accounting can sometimes mean that costs seem to double – simply because they are counted twice.

Failing to account for development costs

Any new innovation in medical education will be associated with development costs. These will mainly occur in the first year. However, the initial development costs will result in long-lasting benefits. How should all this be accounted for in a cost analysis? For example, a medical school introduces a new problem-based learning curriculum. Up to now it has had a traditional curriculum, so an extensive ‘train the facilitators’ programme is set up to help the faculty learn how to run problem-based learning groups. The cost of the programme occurs mainly in year one. If the costs and benefits are analysed only for year one, the new problem-based learning curriculum may appear too expensive to be economically achievable. In this case it would probably be better to spread the costs of the initial train the facilitator programme over a number of years.

Misallocating joint costs

Joint costs are costs shared across a number of different educational activities. For example a biochemistry lecturer might have 60 students in his/her class. The cost of the biochemistry lecturer to each individual student should be his/her cost divided by sixty – but in medical education things are rarely that simple. Five students might be struggling and might need more time than the others. The lecturer will be unlikely to spend all his/her time lecturing – he/she is likely to spend at least some time on management duties, not all of which will be associated with a clear educational outcome. How then to apportion the lecturer’s costs to outcomes?

The simple answer is that there is no single method to do this. The best approach is to allocate the costs to the outcomes in the most rational and yet feasible way. It is also important to be transparent about how costs and outcomes were allocated in the final report – so that users of the report will know exactly what has been done.

Conducting the wrong analysis

A number of different analytic methodologies are available when conducting a cost analysis in medical education: these include cost-effectiveness analysis, cost-benefit analysis and cost-utility analysis. All have inherent advantages and disadvantages, and each should be used in specific circumstances.

Using the wrong method of analysis will render results incorrect or meaningless. For example a cost-effectiveness analysis should only be conducted when comparing two or more interventions. No medical education intervention is cost effective in itself, only in the context of comparative interventions. Cost-benefit analyses can be very useful but should only be used when both costs and outcomes (or benefits) can be measured in monetary terms. Attempting to inappropriately assign a monetary value to an outcome will render results meaningless. For example better team skills are vital among practicing physicians but it is impossible to assign a monetary value to them. All cost analysis methods have their place, but they should only be used in this specific place.

Conclusions

This article outlines the most common errors that can occur in cost analyses in medical education. However, other serious errors can occur. Medical educators need to pay close attention to detail when conducting cost analyses and in special circumstances may need to seek expert advice. [BJHM](#)

Conflict of interest: none.

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KEY POINTS

- Cost analyses in medical education are becoming more popular.
- Cost analyses can be associated with significant errors.
- Common errors include omitting hidden costs, paying too little attention to main costs and opportunity costs, mistiming costs, misunderstanding transfer of payments, failing to account for development costs, and conducting the wrong analysis.