Using cost-effectiveness for subsidy decisions

Last century if a patient presented with chest pain or dyspnoea the only laboratory examination we may have considered was a visual inspection of the urine, and the treatment options might have included bloodletting and foxglove. Today we enjoy a far greater ability to investigate and treat. This technological luxury has led to rising health care costs and the consequent need for cost controls, either implicit or explicit. Health care managers may have to consider whether to allow tissue plasminogen activator (t-PA) rather than streptokinase for acute myocardial infarction, which patients should be allowed HMGCoA reductase inhibitors, whether intravascular ultrasound should be available, and what should be the access to coronary bypass, stenting, and angioplasty. The list grows ever longer. An article in this issue asks us to consider abciximab in preventing restenosis after angioplasty in high risk patients.1

Use of cost-effectiveness analyses
Given budgetary limitations, how are we to choose? Commonly this occurs by lobbying from groups interested in the new technology, and the budget is constrained by capturing the amount spent in a particular area. Some policy makers are turning to evidence-based medicine, not so much as a means of improving patient care, but as a means of containing costs. Health economists advise us to ask, ‘is this value for money?’ and hence would require a cost-effectiveness analysis before accepting a major new technology. Many states and countries have expressed interest in this method.

Oregon has attempted to prioritise all existing and new medical procedures on their cost-effectiveness. In the early 1990s, Australia and Ontario, Canada both adopted a more incremental approach by requiring a cost-effectiveness analysis for each new pharmaceutical listing for state subsidy.2 In Australia, this subsidy accounts for more than 90% of prescription drug costs. In 1993, after an initial guideline development phase,3 cost-effectiveness analysis became mandatory for all of the 60 to 80 submissions for pharmaceutical benefits subsidy.

How does this work in practice? First we need good evidence on the incremental benefit of a new agent. For example, the GUSTO trial showed in 40 000 randomised patients that t-PA was superior to streptokinase for thrombolysis in acute myocardial infarction, with a net difference of 0.9% in death or disabling stroke. This has generated much argument about whether such a benefit is worthwhile. However, if the two agents were identical in price what would most people choose? The question then is the price difference (in Australia about AUS$2000) worth this well established but small benefit? Suppose the average life expectancy of the additional survivors is 10 years. The cost-effectiveness is then the difference in cost divided by the difference in life years, that is roughly AUS$2000/(0.009 × 10) or AUS$220 000 per life year gained. A more sophisticated economic model based directly on GUSTO trial data showed a cost-effectiveness in US dollars of $32 000 per life year gained.4 This analysis included additional features such as discounting and cost offsets.

What is acceptable?
So how do we decide if an agent is acceptable value for money? It is important to understand that there is no magic value. The cut off level depends on the available budget and the competing alternatives within that budget. Table 1 lists the cost-effectiveness results of a number of recent studies; ideally we would begin the funding at the top of the table and work down until we ran out of money, and thus obtain the maximum possible benefit for the resources available.

In using such a cost-effectiveness league table, it is essential that like is compared with like. This is not simply a matter of a common monetary unit—for example, 1993 US dollars. How the resource items are measured and costed, how the benefits are estimated, what costs are included, and what discount rate is used may all shift the results of the cost-effectiveness analysis. Hence to make cost-effectiveness analyses comparable Australia and Ontario both have detailed guidelines specifying precisely how the analysis is to be done.2,3 For example, cost offsets, which are the reductions in use of other health care resources induced by the new treatment, may sometimes be pivotal. In the Scandinavian simvastatin survival study, the use of simvastatin in patients with established coronary artery disease showed a decrease in procedures such as angioplasty and coronary bypass, and a decrease in hospitalisations compared with the control groups. This resulted in about a third of the costs of simvastatin being repaid through reductions in other health care expenditure.5

Abciximab
The abciximab analysis in this issue1 follows the Australian guidelines in many respects. The 1995 revision of the Australian guidelines introduced a requirement for a “preliminary economic evaluation of the randomised controlled trial”. This specifies that, if an appropriate controlled trial existed, an initial analysis should be based purely on the data within that trial. This is the method in the initial analysis by Aristides et al, which shows that the additional cost of abciximab is $13 012 per patient free from a serious event at six months’ follow up. This is useful information, but does not tell us what the long term benefits might be. In order to answer this we might follow patients in the trial for five or 10 years, but most of us are not patient enough to do this. As an alternative, having established the benefit at six months, Aristides et al developed a model to predict what this longer term follow up might show and in particular what difference it might make to survival. This modelled analysis shows the cost of life you gained of $5547, which would appear quite acceptable compared with other cardiovascular interventions (table 1).

There are two caveats to concluding that abciximab is

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Table 1 Examples of recent cost-effectiveness analyses

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Group</th>
<th>Cost/QALY</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simvastatin5</td>
<td>Men with IHD</td>
<td>US$5400</td>
<td>SS5 trial + projection</td>
</tr>
<tr>
<td>Abciximab5</td>
<td>High risk patients undergoing PTCA</td>
<td>AU$8547</td>
<td>EPIC trial + model</td>
</tr>
<tr>
<td>Simvastatin5</td>
<td>Women with IHD</td>
<td>US$10500</td>
<td>SS5 trial + projection</td>
</tr>
<tr>
<td>t-PA (cf streptokinase)4</td>
<td>Myocardial infarction</td>
<td>US$32678</td>
<td>GUSTO + projection Model</td>
</tr>
<tr>
<td>Implantable defibrillator4</td>
<td>High risk of sudden death</td>
<td>US$37000–infinite</td>
<td>Model</td>
</tr>
</tbody>
</table>

IHD, ischaemic heart disease; QALY, quality adjusted life-years.
acceptable value for money. First, this is a projection from relatively short term data on events rather than mortality. Second, the population in the EPIC trial on which the model is based was selected because of a high risk of ischaemic complications during and after PTCA. Benefits are usually smaller for patients at lower risk. Consequently, the value for money will almost certainly be less in average risk or low risk patients as the costs will be much the same but the absolute benefit reduced.

The role of cost-effectiveness analysis may be likened to a diagnostic test. First, it requires a standardised method and calibration if results are to be compared. Second, even well standardised tests will still suffer inaccuracies. Finally, while a very helpful assessment, it is only part of the picture. Judgment is still required to interpret and use the results.

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1 Aristides M, Gilksman M, Rajan N, Davey P. Effectiveness and cost effectiveness of single bolus treatment with abciximab (ReoPro) in preventing restenosis following percutaneous transluminal coronary angioplasty in high risk patients. Heart 1997;78:12–17.

STAMPS IN CARDIOLOGY

The electrocardiogram on stamps (part 1)

The electrocardiogram usually appears as part of the design in stamps issued for World Health Days relating to cardiovascular diseases: your heart is your health (1972), hypertension (1978), antismoking campaign (1980). The electrocardiogram has a prominent place in the design of the stamp from Poland issued for the 1972 campaign. In the Albanian stamp of the same year the central design features are the electrocardiograph machine and the single channel electrocardiogram tracing. Electrocardiographic monitoring is shown on the 1972 Austrian stamp.

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