

Impact of Advances in Medical Technology on Healthcare Expenditure in Australia

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My background

1. My comments are made with a good understanding of health technology assessment (HTA) internationally, some knowledge of the workings of MSAC and ASERNIP-S following my recent work in Australia and as a Non-Executive Director of my local health board in Scotland. The latter is within a system that seeks to provide equitable access to high quality, 'free', health services for all according to need. This must be done whilst achieving health improvement goals and with all health boards remaining within budget year on year, thus requiring difficult decisions about prioritisation of services.

Overall view of the issues paper

2. The overall sense of this document was somewhat surprising. It appears to have been written favouring medical technology and not being critical about the need to assess the value for money of any investment in technology, of managing roll out of new technologies that might have additional training or infrastructure requirements or discussing the crucial need to consider disinvestment of technologies. Consequently, the questions asked seem rather biased in favour of the advancement of technologies.

Specific comments

Section 1: Background to the study

3. Decisions about investment in technology are often difficult because they do not yield savings, but are often add-ons to current systems or a more expensive replacement to an old system (with better performance). The problem is that money is spent to gain additional benefit for the patient or health care savings (fewer bed days) but the latter are not realised because resources are used elsewhere. Furthermore, as we learn to manage chronic diseases better, patient benefits may only yield savings in later years and this does not help healthcare systems that need to balance books within 1 or 3 years.

Section 2

Defining medical technology

4. It is unclear whether the phrase 'knowledge and support systems' includes health promotion. Most healthcare systems realise that they must invest more in health promotion to avoid such diseases as obesity, diabetes etc, thus the importance of health promotion will increase. Furthermore, health promotion will evolve with the advancement of information and communication technology. However, it is noted that you are using the phrase medical technology and not health technology and so perhaps omission of this health improvement element is intended.
5. Discussion of a proposed classification system may be advanced by considering 'impacts', eg by considering when technology could be implemented (some require building infrastructure, eg PET), prevalence, annual incidence, alternatives, expected uptake, additional cost, etc.

Impact of changes in medical technology on distribution of costs and financial incentives across the health system

6. Examples of linkages between different parts of the health care system are generally presented in an economic model that would be used to determine cost-effectiveness.
7. Cost sharing – In Europe and US there is growing talk of 'risk sharing' with Industry, mainly for pharmaceuticals.
8. Other factors affecting level of demand - It is important to consider that the second indication of a pharmaceutical or a modification of hardware may in fact have the highest demand.
9. NICE has done substantial work on evaluating the impact of their technology assessments. This work can be found on the implementation part of their website at www.nice.org.uk.
10. The key reason that may affect whether health service providers adopt technology is the overall state of their budget and whether they have sufficient capital and revenue resources available (the latter need to be available year on year and so often cause more of a problem). Other reasons for not adopting technology include organisational issues, such as infrastructure, staffing requirements, etc.
11. Different factors are used to make decisions about the uptake of different types of technology. In Australia you have a wide variety of bodies evaluating medical technologies and all use different processes. This is partly because the technologies will have undergone different regulatory or approval processes and so have different levels of information available (with pharmaceuticals having the strongest evidence), whilst knowledge support systems probably having very little information available. Also, the risks associated with the technologies are quite different (little for the latter) and this affects how they will be evaluated. In the end, the value of the technology should be balanced against its benefit to patients, its risk to patients and healthcare providers, its cost and sustainability.

Likely future impact of advances in medical technology on healthcare expenditure

12. To obtain a good prediction of the technologies that will have impact over the next 5-10 years, it should be possible to use the horizon scanning services currently run by the Adelaide HTA Unit and ASERNIP-S, with augmentation from an IM&T specialist to cover the predicted knowledge based advancements.
13. Another factor that may influence healthcare expenditure in the next 10 years is the attitudes of patients. However, the other side to this issue needs also to be addressed. That is, as Wanless, 2004 noted, we must see ‘fully engaged’ patients to achieve goals of health improvement. The responsibility of the patient in their own healthcare has not been explored in this document, but would be worthwhile as we move into a culture of informed patient choice.

Impact on economic, social and health outcomes

14. The most commonly used indicators to assess health outcomes in economic models in the UK are Quality Adjusted Life Years (QALYs). These are used to perform cost utility analyses. However, there are criticisms of QALYs due to the biases that can be introduced when measuring quality of life and determining utilities. Other approaches focus on benefit relative to the condition and so lead to the use of cost effectiveness analyses.
15. The main social outcomes of advances in medical technology may be related to improved chronic disease management, keeping people living (and working) at home and out of hospital.

Mechanisms and processes for ensuring cost-effectiveness of medical technology

16. As described in point 11, most healthcare systems need to consider the ‘added value’ of a technology, not just whether it is effective, but how it compares to its alternatives and whether it is a wise investment of limited resources.
17. The definition of cost-effective is incorrect! Most technologies defined as cost-effective produce a desired health outcome at a higher cost per unit improvement than other technologies, but may be considered cost-effective if you are ‘willing to pay’ the higher cost to achieve the additional benefit.
18. The methods to evaluate cost effectiveness, so-called economic modelling, have advanced tremendously in the last 5 years. These models now consider the impact of a technology over a long timespan (often 20 years or more) and balance the resources spent against the benefits achieved when the new technology is compared with the current standard. These models require a large number of assumptions and so sensitivity analyses, using different assumptions, are crucial. In the UK, sophisticated mathematical modelling techniques called probabilistic sensitivity analyses are now being seen as the gold standard. These show the probability of demonstrating cost-effectiveness in the light of the uncertainties.
19. A technology should not be evaluated purely on the basis of cost-effectiveness, but in the more rounded approach of health technology assessment that seeks to take account of social, ethical and organisational issues as well. For information on international use of HTA see the International Network of Agencies for HTA: www.inahta.org.

Mechanisms and processes for ensuring cost-effectiveness of medical technology

20. NICE and the Scottish HTA Agency (formerly know as the Health Technology Board for Scotland) both strove to achieve transparency and create dialogue and participation of all stakeholders including professionals, patients and industry throughout the HTA process. The recent MSAC review suggests that they will be addressing such issues in the future.
21. A perceived ambiguity in the coverage decisions is that public hospitals do not have to follow MSAC guidance.
22. Internationally the time to undertaken an HTA varies depending on the topic and purpose of the report, but for national coverage decisions NICE (and Scotland) take about 18 months per report. Sweden takes about 5 years because they consider a wide variety of technologies. Scotland has created a rapid review mechanism for new drugs that takes 4-6 months.
23. For most technologies 'experimental studies' would be expected (and a lot more – they need to be of sufficient quality and unbiased).
24. There has been huge debate around health technology assessments of Positron Emission Tomography internationally, with particularly strong criticism from Australian physicians. Their concern is about the level of evidence required to promote investment in a technology. Those involved in HTA fall back to the hierarchy diagnostic efficacy presented by Fryback and Thornbury in Table 1. They believe that investment should only be made where changes in patient management have been shown (level 4), but all too frequently devices only show evidence of diagnostic accuracy (level 2), with no information on how this improved diagnostic accuracy affects the patient. This is a crucial evaluation when the technology is one of a suite of diagnostic tests to be undertaken.

Table 1. Hierarchy of diagnostic efficacy

1	Technical	Technical imaging quality
2	Diagnostic accuracy	Sensitivity, specificity, positive predictive value, Negative predictive value
3	Diagnostic thinking	Likelihood ratio
4	Therapeutic	Changes in therapeutic choices (patient management)
5	Patient outcome	Improvement in morbidity/mortality
6	Societal	Cost-benefit analysis

Fryback DG, Thornbury JR.

The efficacy of diagnostic imaging. *Medical Decision Making* 1991;11(2):88-94.

25. Economic models do take into account long-term impacts, but often the basis for extrapolation to the long-term is unclear. All health service impacts are usually considered.
26. It is unclear what is meant by inconclusive results, but in any case assumptions should be made clear, tested and a range of results presented. These should then be put in the context of the disease and its alternatives, eg a different decision-making process will be used for a life-threatening disease with no alternatives, vs a transitory illness for which therapies are available.

27. Innovation - Canada may be considered as a similar model to Australia, with independent provinces, but one overarching HTA coordinator, facing issues of remoteness with sparse populations and limited access to HTA expertise, but seeking to encourage innovation. Canada has just issued a new Health Technology Strategy that seeks to build health technology assessment into the whole of the innovation lifecycle, improving the quality of information available throughout that lifecycle.
http://www.hc-sc.gc.ca/ohih-bis/pubs/2004_tech/techstrat_e.pdf