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Breaking the Addiction to Technology Adoption

Keywords: technology evaluation, technology adoption decision making, technology management

Abstract

A major driver of cost growth in health care is the rapid increase in the utilization of existing technology and not simply the adoption of new technology. Health economists and their HTA colleagues have become obsessed by technology adoption questions and have largely ignored 'technology management' questions. Technology management would include the life-cycle assessment of technologies in use, to assess their real-world performance; and monitoring of technology indication creep. A rebalancing of focus might serve to encourage a more self-critical and learning culture amongst those involved in technology evaluation analysis. Further, health economists and health technology assessment analysts could make a more significant contribution to system efficiency through rebalancing their efforts away from technology adoption questions towards technology management issues.

Introduction

The focus of this paper is health care technology (drugs, devices, procedures and screening), and specifically its adoption and use in the system. Our premise is that health economists and their colleagues in the health technology assessment (HTA) 'industry' have become obsessed by adoption questions – i.e., should a new technology be available for routine use in the health care system? – and have largely ignored the 'technology management' questions – i.e., once in the system, how do we ensure cost-effective utilization?

Our argument is that, in order to achieve the goals of efficiency and equity through technology use, much greater analytic emphasis is required on the technology management issue, with analysts breaking out of the adoption 'addiction'. This issue will grow more and more in importance as entities, such as clinical care groups in England and integrated care networks more globally, find that budget restrictions mean that service developments cannot simply be 'added-on' to their portfolios without consideration of from where, within such budgets, the required resources will come.

Technology as a driver of cost growth

Total spending on health care in Canada has now passed \$200 billion, with annual increases over the last decade in the range of 7.4% (Canadian Institute for Health Information, 2011). The rate of growth has slowed over the last couple of years but the need to 'bend back the cost curve' is the dominant conversation amongst health care leaders. Likewise in the UK, expenditure is now well in excess of £100 billion but year on year growth is slowing to about 1% in real terms going forward. The pattern in Canada and the UK mirrors trends in other similar developed nations (Callan *et al.*, 2010).

The impact of technological change as a cost driver has been difficult to quantify precisely but is widely considered to be one of the largest contributors to such growth. Thus, effective efforts to address cost growth cannot ignore technology. With the pace at which new technologies appear, there is always pressure on decision-makers – from patients, providers and manufacturers – to expand public coverage for technologies. Both Canada and the UK have long traditions in HTA, with well-established and active HTA processes that directly inform adoption decisions.

Part of the evidence of the need for a rebalancing of effort is the realization that rapid increases in the utilization of existing technology (and not simply the adoption of new technology) represent a major

driver of cost growth. For example, Keenan *et al.* (2007) report that the annual admission rates for cataract surgery in England increased 10-fold between 1968 and 2003; from 62 per 100,000 to 637 per 100,000 in 2004. This increase was not driven primarily by demographic changes; the increase in cataract surgery rates was seen in every eligible age group (Keenan *et al.*, 2007). Similarly, medical imaging examinations have seen large utilization increases: in 2010 in Canada, 1.4 million magnetic resonance imaging (MRI) examinations and 4.2 million computed tomography (CT) examinations were performed, representing annual increases over recent years of 6.9% and 6.2% for MRI and CT, respectively (Canadian Institute for Health Information, 2011).

What issues might be addressed by 'technology management'?

(1) Guarding against sub-optimal performance of health technologies

We see technology management having an emphasis on improvement. This would translate to a role whereby health sector staff and analysts strive for improvement in the quality and cost-effectiveness of the service being delivered. An example of this improvement-focused economic analysis is Turner *et al.* (2011) who took as their starting point the English National Chlamydia Screening Programme and explored, using mathematical modelling, alternative approaches to improving the cost-effectiveness of the existing Programme. They conclude that the focus for efficiency improvement should be on partner notification strategies rather than increasing male screening coverage. Another example is Richardson *et al.* (2009) concerned with gastrointestinal endoscopy and flexible sigmoidoscopy. Their analysis was not questioning the use of these technologies, which represent established and standard of care practices, but rather sought efficiency gains in the delivery of the technology. Specifically, the question was asked whether physician or nurse delivered procedures are more cost-effective? Given the cost pressure frame to our paper, this 'scope of practice' type of question is of great importance. Interestingly, their findings support the higher cost physician-delivered care as being both more effective and cost-effective.

(2) Indication creep

A technology management area related to appropriateness is the concern relating to 'indication creep'. That is, once a new technology has been accepted and adopted for use in one clinical area or patient group, the door is often open for its use to spread to other patient groups, without formal

consideration of cost-effectiveness. Indication creep is found in all clinical specialties. Examples indicated by Djulbegovic & Paul (2011) include:

- Statins – cost-effective in secondary prevention of heart disease but not when used for primary prevention in low-risk patients; and
- Prostate-specific antigen (PSA) test – an important tool for detecting prostate cancer in symptomatic patients but of uncertain efficacy in screening asymptomatic patients.

Evidence of such creep does not in itself point to system inefficiencies but it does highlight important technology use questions for investigation. We would want to encourage ‘managed creep’, with analysis and monitoring of the impact on service efficiency. This requires the clinical community and health economists to work together to develop frameworks for such analysis.

(3) Technologies failing to deliver promised benefits

Another area of concern (but this time with the analysis-side of the equation) is whether, when a technology is implemented into clinical practice, we see the scale of benefits and costs that were predicted at the time of adoption. That is, how good are our analysis-based predictions of costs and benefits? For example, have we seen the predicted health gains, and cost profiles, from the widespread use of new cancer or Alzheimer’s drugs? It seems remarkable that we cannot answer such questions with any degree of certainty – we should be testing the predictive validity of our analysis work in a more systematic and rigorous manner. As analysts, we too should be seeking improvement – such a learning experience would require understanding the predictive validity of our analyses and, where the results are poor, understanding why.

Pathology

If the premise is accepted then the question is, why the adoption focus is so prevalent? Let us consider both the demand (the paymasters) and supply (the analysts) sides of technology evaluation work.

On the demand side, the problem can largely be summed up as ‘he who pays the piper, calls the tune’. Funding is more readily available for analysis work focussed on adoption decisions and so it is no surprise that we see more activity on that side. The funding comes from both private and public sector sources, and much of it flows in the context of reimbursement decision making. Those organisations with a stake in the technology adoption decision (e.g. pharmaceutical and device manufacturers)

naturally wish to strengthen their product's claim for reimbursement. In some jurisdictions, coverage decision making agencies mandate that an economic analysis be undertaken before a new technology will be appraised. The consequence then is that public bodies such as the National Institute for Health & Care Excellence (NICE) require analytic support to allow technology appraisal decisions to be made.

This is all well and good, and we are not critical of this development in itself, it is the lack of balance (between adoption and management analytic activity) that is the concern. In the field of technology appraisal, agencies such as NICE and the Canadian Agency for Drugs and Technologies in Health (CADTH) have been largely mandated (by their own paymasters) to focus on adoption. More naturally one would look to health care delivery organisations, charged with delivering safe and effective care to their populations whilst remaining within budget, (e.g. health authorities, primary care trusts, etc.) to give emphasis to the management issues. It is, therefore, disappointing, but not surprising, to read Robinson *et al.* (2012): 'in reality PCT boards focussed more on developing robust priority-setting processes around new service developments than other areas.' The move from prioritising service developments to scrutinising whole budget areas needs to involve, or even be led by, clinical care groups and integrated care networks, especially as it is clinicians who are the main resource-influencers in any health care system.

On the supply side, health economists and HTA analysts have seen benefits flow in their direction and so the response has generally been one of either active or passive encouragement of the adoption focus. Why would we want to be playing a different tune? Our answer is simple: if we do not address this issue then the work of health economists might serve to diminish rather than enhance health sector efficiency and equity.

Treatment options

(1) Life-cycle technology evaluation

Working in close partnership with health sector decision makers, health economists should adopt of model of evaluation and assessment throughout the life cycle of health technologies. This speaks to work on development of administrative data systems that allow effective monitoring of technology in use in the system. Of course there are substantial resource implications in this route that would have to be weighed carefully but the potential benefit – greater efficiency and equity in the management of resources – surely would suggest that

consideration is, at least, justified. The development of in-service data collection of patient-reported outcomes, as we see in both England and Canada (Devlin & Appleby, 2010; McGrail *et al.*, 2012; Bryan *et al.*, 2012), is a move in this direction.

(2) Decommissioning focus

As part of routine assessment of existing technologies, there needs to be a much greater focus on decommissioning (i.e., disinvestment) of services (Cooper, 2010; Donaldson *et al.*, 2010). The track-record on decommissioning, either in terms of stopping ineffective services or scaling back of low value services is woeful. Efforts in the UK and Australia suggest relatively low yield on targeting purely ineffective services (perhaps because clinical practice naturally evolves away from services that are not clinically effective), but opportunities abound on releasing resources from effective – but lower value – services (Elshaug *et al.*, 2007). It is here that health economists could be making a major contribution to real world decision making, especially given the current climate of fiscal constraint.

(3) Assessments of predictive validity

The final recommendation is for tracking the validity of analysis predictions for the technology at the time of coverage. Fostering a more self-critical and learning culture amongst those involved in technology evaluation analysis is critical. This requires analysts, once the given technology is in routine use, to see the value in re-visiting the initial analyses to allow for refinement of the application of research methodologies but also on-going (i.e. ‘real time’) assessment of true effectiveness in relation to actual costs.

Conclusion

The primary symptom we are concerned by is the poor alignment between goals and activity of health economists and HTA analysts in the field of technology evaluation. The vast majority of our analytic effort in technology evaluation is focused on the adoption decision rather than the system use of technologies. This paper is a call for health economists and their collaborators to become more engaged with technology management questions and break out of the adoption trap.

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