

CHERE'S SUBMISSION TO THE PRODUCTIVITY COMMISSION'S  
RESEARCH STUDY ON THE  
IMPACT OF ADVANCES IN MEDICAL TECHNOLOGY ON HEALTHCARE  
EXPENDITURE IN AUSTRALIA

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a. Identify the key drivers of medical technology demand.

A key issue in the Australian health care policy debate is whether the use of health care technology is optimal. In economic terms, the litmus test is whether utilisation is at a point of equilibrium where the technology's marginal costs are equal to the marginal benefits. In addition, health policy makers are also concerned with equity aspects of health care and aim to ensure that Australians enjoy a high level of access to high quality and cost-effective technologies.

The key question is therefore whether technology is used too much, too little and by whom?

In the health care market there is ample opportunity for inefficient use of technology. Moral hazard can play a part in health care decision making at both the patient and provider level. Judging whether there is too much or too little use of health care technology is, however, extremely complex. For example, observing an increase in the use of a certain health care technology are insufficient grounds to claim that moral hazard has played a part in the decision making process. Further evidence on whether the increased utilisation is warranted would be needed.

A forthcoming OECD publication entitled "Health Technology and Decision Making" identifies a number of key drivers for health technology diffusion and uptake (OECD, forthcoming). The authors acknowledge that "the level of uptake of new health-care technologies are the aggregate outcomes of a large number of decisions made by politicians, health-care administrators, doctors and patients, just to mention a few". Apart from the presence of disease, decisions about the uptake and diffusion of health care technology will be influenced by:

- *Aggregate income levels.*
- *Reimbursement mechanisms:* Financial incentives for purchasers to buy, and providers – both organisations and individual clinicians - to adopt, new technologies, including the way in which health care is financed and organised, *e.g.* competition between providers.
- *Regulation:* the regulatory environment.
- *Behavioural determinants:* the behavioural, organisational and cultural environments, *e.g.* the extent of local freedom to make decisions (as opposed to

central control), the level of competition amongst health-care institutions, or a cultural imperative where “new is better” (versus conservatism in prescribing) (OECD, forthcoming).

In addition, health technology assessment/evidence-based planning should be regarded as an overarching determinant on policy and practice. In effect, the evidence on new technology is one of the key policy amiable determinants to influence the demand for health care technology. In fact, with sufficient signalling from the production and use of evidence, it may even have a role to play in direction of innovation for new and emerging technologies.

The vital aspect in this debate about optimal use of technology is that there are two factors involved: the costs and effectiveness of the technology. These two factors should not be separated. It makes no sense to arrive at a policy position that encourages or discourages the use of technology solely on the basis of costs or solely on the basis of effectiveness. Decisions about the uptake have to be made on both aspects to arrive at a level of utilisation that is judged optimal.

*How can the various components of medical technology and technological change be measured? Can proxies (such as medical research and development (R&D) expenditure) be used where direct measures are unavailable?*

The use of R&D expenditure by itself has its limitations, as it does not indicate the outcome of such expenditure. For example, it would provide no information on the success or failure of that expenditure and the impact it has had on technological change. Furthermore, in global world of innovation, an individual nation’s spending on R&D may have little bearing on the eventual outcome of that research activity.

For some marketable technologies, an alternative approach might be to track the global patterns for patents for a set of technologies and link these to both public and private R&D spending. This might provide a more complete picture of the outcome of the R&D spending and offer an opportunity to also examine technology change, health spending and of course, ultimately, health outcomes.

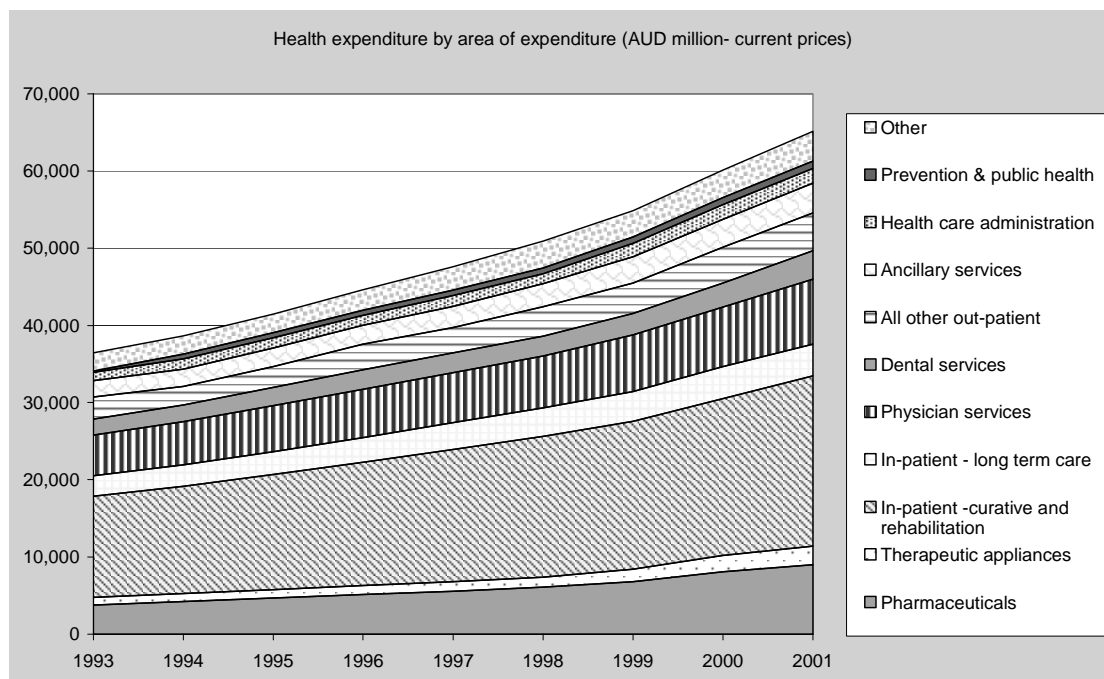
For non-marketable technologies (e.g. knowledge, service arrangements) greater effort and investment is needed in the area of health services and health economics research. In this field alternative approaches to measuring technological change may come through bibliographic research and surveys on utilization and outcomes.

- b. Identify the net impact of advances in medical technology on healthcare expenditure over the past ten years.

Figure 1 shows total health care expenditure in Australia between 1993 and 2001 by broad area of category (OECD, 2004). In current prices, Australia's health care expenditure has increased by 79% from \$36.5 to \$61.4 billion. By far the biggest expenditure category was inpatient – acute and rehabilitation. This category accounts for over one-third of total health care expenditure. And whilst inpatient expenditure has increased over the period, its relative share of total expenditure fell slightly over the 1993-2001 period. In other words, other expenditure categories increased more over the same period.

The technological components that can be easily identified from this graph are expenditure on pharmaceuticals and therapeutic appliances. In 2001, these two items explain approximately 17.5% of total expenditure. Pharmaceuticals and therapeutic expenditure grew by 137% and 148% between 1993 and 2001 respectively. Aside from public health and prevention activity, these two categories of expenditure saw the biggest percentage increase.

**Figure 1**



Source: OECD, 2004

The rising expenditure on pharmaceuticals is explained by both volume and price factors. Table 1 shows the rise in the number of scripts subsidised under normal PBS arrangements as well as the total benefits between 1992 and 2001. The table shows that whilst the total number of scripts increased by 50% over the ten year period, the total benefits paid increased by 214%. The average payment per script rose by 112%,

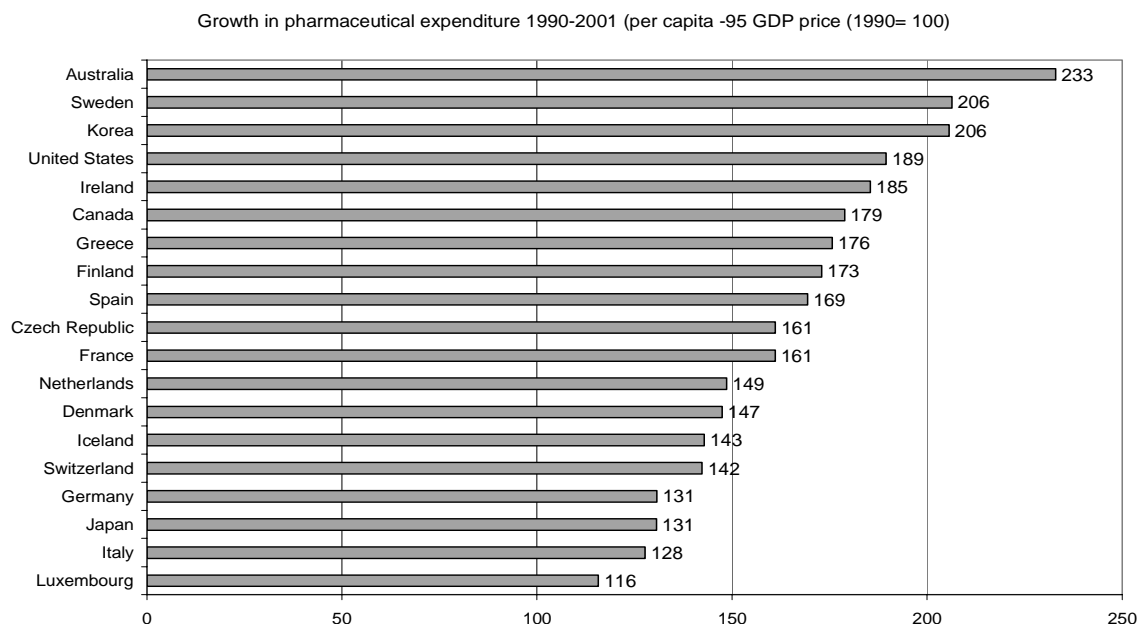
indicating that pharmaceutical price rises is a stronger factor in explaining expenditure increases than consumption.

**Table 1: Total number of PBS subsidised prescriptions, benefits and average benefit paid – 1992-2001 (current prices)**

Normal Arrangements PBS	Total Services	Total \$Benefit	Average PBS payment \$
1992	100,974,886	1,287,749,069	12.75
1993	111,582,290	1,583,367,083	14.19
1994	115,171,249	1,776,907,225	15.43
1995	121,752,161	2,061,605,900	16.93
1996	125,377,050	2,313,530,316	18.45
1997	124,410,964	2,457,239,317	19.75
1998	124,762,369	2,623,408,103	21.03
1999	132,816,479	3,004,378,654	22.62
2000	142,156,479	3,450,825,776	24.27
2001	150,162,267	4,049,620,089	26.97

Source: HIC, 2004

**Figure 2**



Source OECD, 2004

OECD figures suggest that Australia's per capita expenditure on pharmaceuticals was highest amongst all OECD countries for which data was available in 1990 and 2001 (Figure 2). In part, this is probably a reflection Australia's historically low expenditure

base but also be a reflection of Australia's commitment to cost-effectiveness analysis where price determinations are now influenced by measures of costs and effectiveness.

So whilst the pharmaceutical sector saw the biggest expenditure growth, this may in part be explained by the innovative breakthroughs in this sector – not necessarily a sign of out-of-control expenditure growth.

The pharmaceutical sector provides an interesting case study for Australia because it illustrates the gap between the process driven national decision making infrastructure (through PBAC) and the many millions of prescribing decisions that take place outside of that context (i.e. the doctors' room).

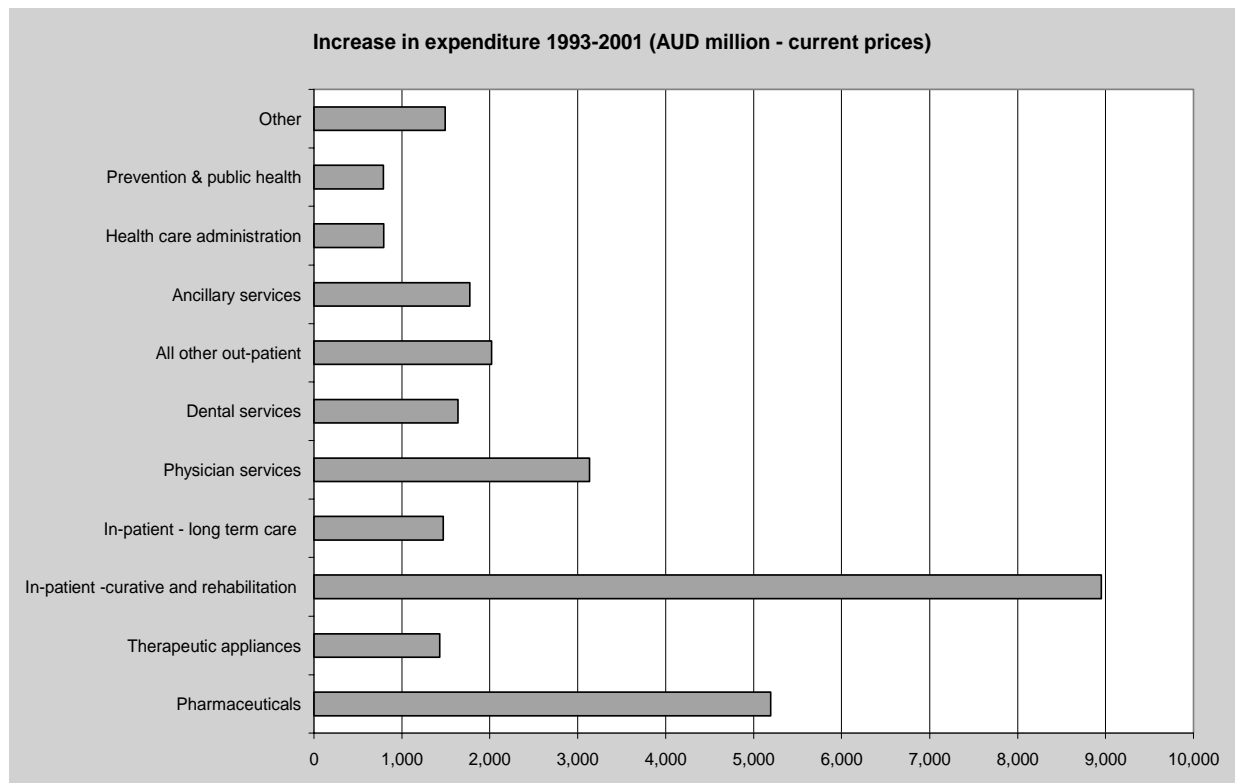
In a review of PBS submissions between 1993 and 1996, Birkett et al (2001) investigated the extent to which volumes and cost predictions made in the submissions are reflected in reality after listing. The review shows that those predictions were always wrong. Usage predicted in the submission was greatly underestimated in two thirds of submissions and greatly overestimated in one third. This provides preliminary evidence that prescribing patterns are not in line with best available evidence.

The PBS example illustrates the challenge for Australia's policy makers; How to influence decision-making within the broader context of Australia's health care system? The policy making challenge is centred on producing evidence on cost-effectiveness that is relevant to a greater number of stakeholders and creating a health system environment where evidence based practice is encouraged through incentives and decision-making support.

As indicated above, Australia's total expenditure rose by \$28.7 billion (or 79%) between 1993 and 2001 (current prices). Figure 3 shows the growth in expenditure over this period by broad service category. Inpatient (acute and rehab) expenditure rose by around \$9 billion and pharmaceuticals by over \$5 billion. Physician services were the third biggest category, with expenditure rising by over \$3 billion.

The technology factor that drives these expenditure increases is difficult to identify within broad categories such as inpatient and physician services. Rising expenditures may be due to volume, staffing costs as well as technology use. It may be possible, for some state based inpatient data collection to separate cost drivers within the in-patient category. For example, these collection can identify costs, volume, staffing costs, pharmaceutical use, administrative costs, medical and surgical supplies etc (see for example the NSW "yellow" book).

**Figure 3**



Source: OECD, 2004

- c. As far as practicable, identify the likely impact of advances in medical technology on healthcare expenditure over the next five to ten years, and identify the areas of significant potential growth.

Estimates of the likely impacts of advances in medical technology on health care expenditure need to be treated with caution. A recent paper by Di Matteo (2005) offers a valuable critique of the existing work conducted in this field. Di Matteo goes on to estimate the impact of income, age distribution and time effects on health expenditure in the United States and Canada. In line with other recent works, the study finds that Ageing and income explain a relatively small portion of health expenditure increases, once time effects have been taken into account. These time effects can be interpreted as the upper bound proxy for technological change, but it is also likely to incorporate the effect of expenditure inertia, consumer preferences and expectations and policy changes.

- d. Identify existing mechanisms and processes for ensuring cost-effectiveness in the use of medical technology, and any gaps in these processes.

One of the key issues in the Australian debate around health care technology is that its reputation as a world leader in the production and use of evidence to influence supply and uptake rests on two Australian Government policy processes; namely PBAC and MSAC. As good as the intentions of these two programs are, they leave a large gap in the production and use of evidence for a range of technology types, including public health and health promotion and service arrangements such as hospital-in-the-home and stroke services. For those types of technologies, Australia relies on Ad Hoc arrangements that may or may not include consideration of economic issues.

Furthermore, the PBAC and MSAC arrangements need to take into account its interaction with other parts of the health care system. For example, greater consideration needs to be given to the impact of new technologies on issues such as workforce skills. It also needs to consider its impact on the incentives (as well as Australia's capacity) to produce high quality evidence to support claims of cost-effectiveness.

Further consideration should also be given to provide both MSAC and PBAC with more policy options to overcome uncertainty in the results of cost-effectiveness analysis of new technologies (*e.g* conditional listing of new technologies with a requirement for further data collection) and establish risk-sharing arrangements with industry to create incentives for cost-effective practice.

Related to this is the need for greater access to linked health data that would enable better impact analysis of specific health innovations over time. Australia has numerous administrative databases including disease registries (cancer and diabetes) which could provide a powerful resource for researchers if data were systematically linked. In this regard, West Australia is exemplary for its leadership on linked health data, and for the numerous policy relevant studies that have investigated the links between health innovations and outcomes (for example, see studies on effectiveness of immunisation programs and IVF; multiple births and birth defects). The issue of enabling better access to linked health data is longstanding and was raised with the Productivity Commission in a submission on the Economic Implications of an Ageing Australia study (see Professor Jeff Richardson's submission). The Australian Government needs to assert strong leadership and commit financial resources to advance access to linked health data.

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