The Australian Economic Review, vol. 39, no. 3, pp. 323–9

Policy Forum: Australia's Health Workforce

Medical Workforce Planning: Some Forecasting Challenges

Alan Maynard
Department of Health Sciences, The University of York; and Centre for Health Economics Research and Evaluation, University of Technology, Sydney

Scepticaemia: an uncommon, generalised disorder of low infectivity. Medical school education is likely to confer life-long immunity!
[Skrabanek and McCormick 1989]

1. Introduction

While medical workforce planning is essential, it is generally deeply flawed methodologically and often wrong in the conclusions it reaches. It is usually based on an unquestioning assumption that more health care inputs automatically result in more health and that the efficient and unique way to produce improved population health is through increased investments in the health care workforce (Productivity Commission 2005). Such an approach should be dealt with sceptically in an industry in which patient outcomes are neither measured nor managed and where a significant proportion of health care in common use has no evidence base (BMJ Publishing Group 2005).

Furthermore, workforce planning is traditionally confined to medical practitioners and dominated by members of this profession to the exclusion of the majority of health care workers in nursing and other professions allied to medicine (Australian Medical Workforce Advisory Committee 2005). These outcomes are a product of the economic and political power of medical practitioners, which in the next decade are unlikely to survive.

The objectives of this article are to review the orthodox methods of medical workforce planning and to focus on two areas of policy change: whether non-doctor inputs to the health care production function are complements or substitutes, and how the productivity of the existing doctor workforce can be improved.

2. Medical Workforce Planning

The methods of medical workforce planning tend to be similar, emphasising a fixed coefficient approach (Australian Medical Workforce Advisory Committee 2005; Bloor and Maynard 2003; Maynard and Walker 1978, 1995; Walker and Maynard 2003). Thus, currently in Britain where there has been a large increase in the funding of the National Health Service (NHS) and the intake to medical schools has been increased by 60 per cent in six years (Bloor, Hendry and Maynard 2006; Maynard and Street 2006), the rationale of future planning is that the doctor population ratio in Britain is low compared to other OECD countries of similar economic standing. This naive rationale for the advocacy of further investment in the production of doctors is rarely challenged.

This basis of planning is something easily understood by policy makers but may ignore the issues of doctor substitution, variations in clinical activity and the scope for improving the productivity of the workforce. It is usually accompanied by the modelling of demand- and supply-side flows to identify how, if at all, equilibrium can be achieved.

3. The Demand for Doctors

The demand scenarios typically model the effects of demographic growth only, the extrapolation of past trends in activity, and perhaps

projections of more ambitious activity trends needed to raise service standards to meet public expectations.

The first of these approaches assumes that activity rates per person will continue and is highly conservative, as typically they have risen faster than population growth. The second approach usually extrapolates from activity trends over the last 10 to 15 years. The final method uses activity above recent trends, in the case of Britain using official scenario plans such as those produced by Wanless (2002, 2003). In each case the forecasters may use different growth rates for primary and secondary care and usually favour the latter even though official policy may advocate preference for the former and 'a primary care led' health care system!

There are many factors that affect the growth in demand for health services. One influence on demand is an increasing population associated with the birth rate and migration, where the latter may be legal and illegal in the case of Britain. The expansion of the European Union has increased legal migration but proximity to the continent is also associated with illegal inflows that are poorly measured.

An associated demographic issue is the growth of the elderly population and the health needs this generates. Fries and his colleagues have argued that successive cohorts of the elderly will exhibit improved health and that the consequent compression of morbidity until later years will reduce resource demands (Fries 1980; Fries, Green and Levine 1989). Whilst there is some evidence of this, earlier research results are now being contested (Manton, Corder and Stallard 1997; Manton and Vaupel 1995).

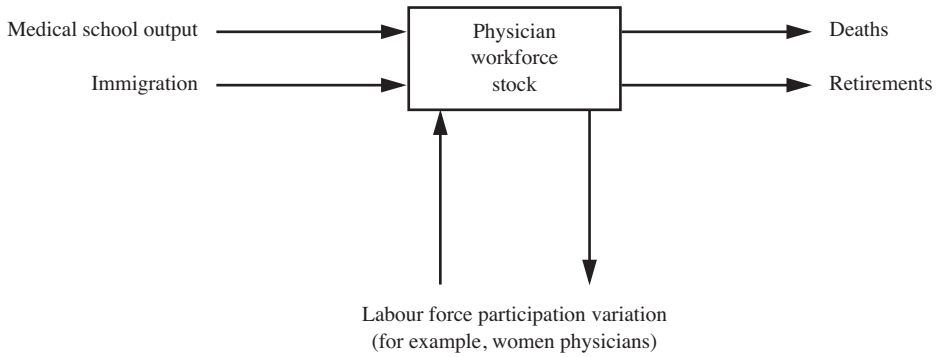
A third demand factor is the effect of changing lifestyle and affluence on morbidity. For instance the incidence of obesity is rising and with it illnesses such as diabetes, a condition that generates, for example, demand for heart and renal care. The incidence of smoking has declined and the banning of its use in public places may depress it further, before some plateauing out perhaps in a forecasting period.

Another two influences on demand are public expectations and technological change. As the population grows more affluent it typically tends to deny the inevitability of death and places greater demand on the maintenance of quality of life during survival. This expectation is often fuelled by industry selling technologies that with smart marketing bring the illusion of a cure whilst offering the reality of a marginal extension to life and its quality at prices that are often very high—for example, the new breast cancer drug Herceptin costs over £20000 (A$49000) per patient per year.

4. The Supply of Doctors

These methods facilitate the production of a range of demand forecasts that can then be compared with supply trends. The stocks and flows of doctors can be easily identified in principle, but in practice the mechanics of the medical market are complex due to policy and

Figure 1 The Conventional Workforce Planning Model



personal changes. In Figure 1 the inflow of doctors is determined by the activities of medical schools and open (that is, the EU in the case of Britain) and adjustable (external to the EU) migration trends. Losses to the doctor stock can be modelled from retirement and career mortality data, and emigration. Over the life cycle, participation in the labour force is affected by gender and comparative pay. The former is of considerable importance as the majority of medical school intakes in more affluent countries are increasingly female and, for unknown reasons, female doctors appear, from initial research in Canada and the United Kingdom, to have lower activity rates than their male peers (Canadian Institute for Health Information 2005; Maynard and Bloor 2005). In Britain, current pay rates for doctors have been raised considerably in the last two years, making the United Kingdom relatively attractive in terms of retention and recruitment (Maynard and Bloor 2003; Maynard and Street 2006).

Internationally, there is change in the production process of doctors. The paradox in Britain and some other countries is that at the undergraduate level there is greater emphasis on practical clinical practice, whilst at the post-registration level there is greater emphasis on classroom learning and less on bedside experience. The effect of the former may be to reduce the activity levels of specialists who teach the students in hospitals and primary care. The effect of the latter is less junior input and the need to replace juniors with specialists or non-doctors. This effect is increased by the demand for both shorter hours in training and in practice, the need for an improved 'work-life balance', and the demands for flexible and part-time contracts by male and female practitioners. These participation effects on supply have to be carefully modelled.

The final two elements in supply estimation are skill mix and the productivity of doctors. For both these influences, forecasters are usually conservative in their assumptions and modelling. But in Australia and Britain these are factors that require both more research and greater effort to incorporate evidence into the forecasting.

5. Equilibrating Demand and Supply

In the past, analyses of this nature have been the basis of major investment decisions about whether to expand or reduce the intake to medical schools. Over the last decade internationally more attention has been paid to the use of different skill mixes to deliver patient care, and more recently policy makers have begun slowly and superficially to focus on the capacity of health care systems to raise the productivity of the workers, particularly doctors, they employ. Each aspect of these more 'novel' issues will now be discussed.

5.1 Skill Mix

To what extent are medical-doctor activities routine and capable of being broken down into simple processes easily learnt and delivered effectively by non-doctors? Is such change demonstrably clinically effective and cost-effective and can it be managed into practice? Each of these questions needs careful consideration.

At the level of possibility many medical tasks could be delegated to nurses and other members of the workforce. Nurses can diagnose and prescribe, and in Britain they and pharmacist colleagues are being given minimal training (26 days, plus 15 days of practical work) and transformed into nurse prescribers with access to the full formulary. This undermines the medical monopoly in prescribing and offers consumers access to pharmaceuticals through routes other than their GP (Courtenay and Maynard 2006).

Nurses are being trained as endoscopists and they have an increasing role in the care of the chronically ill where routine supervision and remedial action are established in explicit guidelines and patient pathways (for example, diabetes, heart failure, chronic obstructive pulmonary disease and cancer). Nurses are being trained in Plymouth, England, to deliver simple surgical procedures. Radiographers are not only taking X-rays, they are also replacing doctor-radiologists in the interpretation and delivery of results.

Such changes have been facilitated in Britain by a rapid increase in funding and by the

consequent shortage of labour occasioned by the government's ambitious agenda to reduce access waits and improve the process quality of care. However, the evidence base for most of these changes is poor. Government has opted for a radical alteration of the nature of service delivery but has not invested in the evaluation of the clinical and cost-effectiveness of these changes (Courtenay and Maynard 2006; Lankshear et al. 2005).

With or without that evidence base, the nice issue is whether these changes are substitutes or complements, or both. The use of specialist nurses in diabetes may improve the quality of the service but not diminish the need for clinicians. The use of nurse prescribers in primary care may increase expenditure and service delivery but not reduce the workload of GPs. In both cases the service mode is 'enriched' and workforce and service costs may increase. During the 'managed care' era in the United States in the 1990s, 'non-physician practitioners' were initially seen as substitutes for doctors and bold forecasts of unemployed physicians were made. However, this unemployment of doctors failed to materialise and the stock of non-physician practitioners has grown rapidly in the last 15 years, as has expenditure. In the absence of patient outcome measures it is not clear whether these service changes are successful or not in improving population health in a cost-effective manner.

5.2 *The Productivity of the Health Labour Force*

The importance of this issue in terms of the management of the workforce and the control of the system is as obvious as it is neglected in policy making and research. The Productivity Commission (2005) report deals with this central issue in appendix C, a clear incentive for readers to interpret it as a marginal issue.

Productivity is usually defined as a relationship between inputs and outputs. In health care, 'outputs' can be defined alternatively as processes of care (activity) or patient-reported outcomes.

There is a long and well-established literature on activity appraisal, which internationally identifies the common problem of variation in clinical activity at the level of the individual practitioner, the hospital, and the region and between countries. Patients of similar age, gender and health characteristics receive very different types and levels of medical care. To vary is human, but the nice issue is whether the variations identified in health care internationally can be supported by evidence of good practice.

Often they cannot be sustained. For instance, over three decades Wennberg and his colleagues have analysed the variations in the activities of practitioners in the US Medicare program, a federally funded, national program that provides care for the elderly (*Variations Revisited* 2004). Recently this work has identified a variation in expenditure per Medicare enrollee of 60 per cent. This difference is not explained by price variations, illness rates or the socio-economic status of enrollees but is the result of variations in the volume of activity for each patient. Furthermore, Fisher (2003, p. 1665) concluded that those in high spending regions 'did not have lower mortality rates, better functional status or higher satisfaction'. Similar variations in activity can be seen in the United Kingdom (Bloor and Maynard 2006).

Variation also manifests itself in the treatment of chronic diseases, which are major elements in health care expenditure inflation internationally. There is a good evidence base about how to control diseases such as hypertension, diabetes, asthma and chronic obstructive pulmonary disease and thereby reduce morbidity and mortality. Furthermore, the management of these diseases can be done well by nurses and the costs of the generic drugs to control progression and avoidable events such as stroke and heart attack are low. Despite care being available and cost-effective, health care workers fail to provide. For instance in the United States, the Rand Corporation estimates that US consumers get only 55 per cent of the health care they need (Kerr et al. 2004).

Given the variations that can be observed in clinical practice and the failure of health care systems to deliver demonstrably cost-effective care for the chronically ill, increased management and incentivisation of productivity in

terms of process might reduce avoidable mortality and morbidity considerably and reduce or moderate the rate of growth of system costs. It is remarkable that such potential productivity gains are not incentivised more vigorously and incorporated into workforce planning.

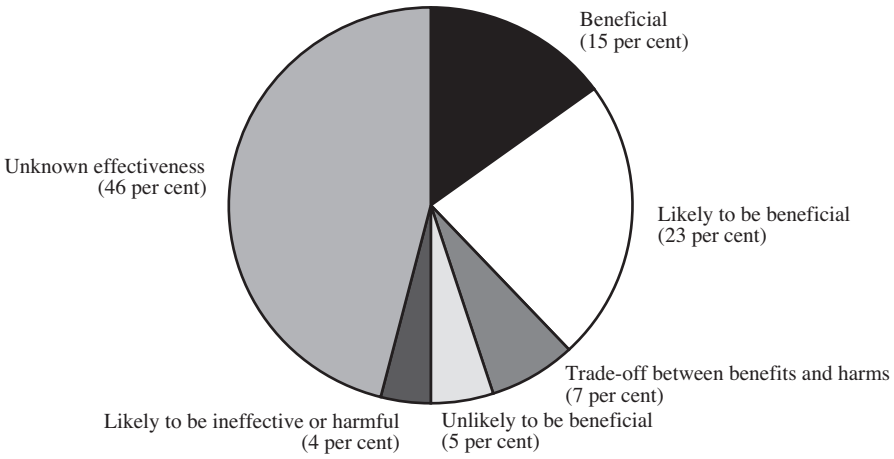
A third issue in the consideration of productivity is the evidence base for medical practice. The usual assumption of the public and many policy makers is that more inputs create more outputs, This is where 'scepticaemia' is essential as there are many routine medical practices in use today that have no scientific evidence base. One guesstimate of the extent of proven and unproven clinical procedures is shown in Figure 2, where it is shown that 46 per cent of interventions are unproven (BMJ Publishing Group 2005). Given the uncertainty this must produce in the minds of practitioners, it is perhaps unsurprising that there are such large variations in clinical practice.

Any appraisal of activity may often raise questions about the relative success of competing clinicians. Is the low-activity surgeon 'slowly but surely' producing good outcomes for his or her patient or is the high-activity surgeon likely to exploit economics of scope and scale and produce superior outcomes? Such questions are asked but rarely answered because of the obsession of the medical profession with measures of failure (for example, relative mortality rates) and its reluctance to measure success in terms of whether the patient is 'better' after treatment.

Patient-reported outcome measures (PROM) come in generic and specific forms and have been used routinely in thousands of clinical trials but never as a means of measuring success in routine clinical practice. The most commonly used generic measures are ones that can be used across therapeutic categories—that is, EQ-5D (<http://www.euroqol.org>) and SF-36 (<http://www.sf36.org>). Such measures evaluate the mental and physical functioning of patients before and after treatment, facilitating the answering of questions such as 'what is the relative success of competing orthopaedic surgeons in restoring mental and physical function for patients three and six months after an operation?' (Kind and Williams 2004).

One Anglo-Australian insurer, the British United Provident Association, has used SF-36 routinely since 1999 in England as a means of ensuring consumer protection against poor clinical practice and as a means of appraising the clinical success of the specialists its employs in its hospitals (Vallance-Owen and Cubbin 2002). Currently, the UK NHS is evaluating such measures for elective surgery and as a result of the Atkinson report (Atkinson 2005) and increased government interest in measuring success rather than merely activity and access, their use in the NHS is likely to increase. The great policy puzzle is why

Figure 2 Uncertainty about Clinical Effectiveness



Source: BMJ Publishing Group (2005).

practitioners and managers have been so slow to invest in the production of such information. Perhaps one explanation is that by 'confusing' decision making with such data, cosy assumptions would be undermined and deficient practice would become embarrassingly more transparent.

6. Overview

> A doctor's reputation is made by the number of eminent men who die under his care.
> [George Bernard Shaw]

The scepticism exhibited by Shaw a century ago is generally absent in health care policy making today. In the twenty-first century there are proven interventions that can save lives, although public and private systems are less than efficient in delivering them (Nolte and McKee 2004). However, much is unproven and decision makers continue to be reluctant to invest in information systems that inform them of the relative successes of providers, measured in terms of PROM.

There is an obvious need to invest in evaluation of PROM systems. Also the evidence base about skill mix remains inadequate, although this has not inhibited radical policy changes. Investment in skill mix evaluation and PROM would facilitate better management of the large medical workforces worldwide and most importantly ensure the provision of appropriate and efficient care for patients and due economy in the use of resources for taxpayers and insurance scheme members.

For decades medical workforce planning has ignored these issues and stayed comfortably myopic in terms of focusing on doctors, when the majority of the workforce has other skills, many of which could perhaps replace physician inputs. As medical workforce policy changes in Australia, hopefully the lessons from international errors can be learnt, with investment in evaluating change so that facts rather than the opinion of medical 'experts' dominate the improvement of care for patients.

June 2006

References

Atkinson, A. 2005, *Atkinson Review: Final Report: Measurement of Government Output and Productivity for the National Accounts*, Palgrave Macmillan, Basingstoke.

Australian Medical Workforce Advisory Committee 2005, *The General Practice Workforce in Australia: Supply and Requirements to 2013*, AMWAC Report 2005.2, Sydney.

Bloor, K., Hendry, V. and Maynard, A. 2006, 'Do we need more doctors?', *Journal of the Royal Society of Medicine*, vol. 99, pp. 281–7.

Bloor, K. and Maynard, A. 2003, *Planning Human Resources in Health Care: Towards an Economic Approach: An International Comparative Review*, Canadian Health Services Research Foundation, Ottawa.

Bloor, K. and Maynard, A. 2006, 'Consultant clinical activity is the key to improving productivity', *Health Service Journal*, 6 July, pp. 18–19.

BMJ Publishing Group 2005, *Clinical Evidence Concise*, December, British Medical Association Publishing, London, <http://www.clinicalevidence.com/ceweb/products/concise.jsp>.

Canadian Institute for Health Information 2005, *Canada's Health Care Providers: 2005 Chartbook*, Canadian Institute for Health Information, Ottawa.

Courtenay, M. and Maynard, A. 2006, 'Debate: Nurse prescribing', *Eurohealth*, vol. 12, no. 1, pp. 4–6.

Fisher, E. S. 2003, 'Medical care—Is more always better?', *New England Journal of Medicine*, vol. 349, pp. 1665–7.

Fries, J. F. 1980, 'Aging, natural death and the compression of morbidity', *New England Journal of Medicine*, vol. 303, pp. 130–5.

Fries, J. F., Green, L. W. and Levine, S. 1989, 'Health promotion and the compression of morbidity', *Lancet*, 4 March, pp. 481–3.

Kerr, E. A., McGlynn, E. A., Adams, J., Keesey, J. and Asch, S. M. 2004, 'Profiling the quality of care in twelve communities: Results from the CQI study', *Health Affairs*, vol. 23, no. 3, pp. 247–56.

Kind, P. and Williams, A. 2004, 'Measuring success in healthcare—The time has come to do it properly!', *Health Policy Matters*, iss. 9, University of York, York.

Lankshear, A., Sheldon, T., Maynard, A. and Smith, K. 2005, 'Nursing challenges: Are changes in the nursing role and skill mix improving patient care?', *Health Policy Matters*, iss. 10, University of York, York.

Manton, K. G., Corder, L. and Stallard, E. 1997, 'Chronic disability trends in elderly US populations: 1982–1994', *Proceedings of the National Academy of Sciences of the USA*, vol. 94, pp. 2593–8.

Manton, K. G. and Vaupel, J. W. 1995, 'Survival after the age of 80 in US, Sweden, France, England and Japan', *New England Journal of Medicine*, vol. 333, pp. 1232–5.

Maynard, A. and Bloor, K. 2003, 'Do those who pay the piper call the tune?', *Health Policy Matters*, iss. 8, University of York, York.

Maynard, A. and Bloor, K. 2005, 'Physician productivity in the UK NHS', paper presented to 9th International Medical Workforce Conference, Melbourne, November.

Maynard, A. and Street, A. 2006, 'Seven years of feast, seven years of famine: Boom to bust in the NHS?', *British Medical Journal*, vol. 332, pp. 906–8.

Maynard, A. and Walker, A. 1978, *Doctor Manpower 1975–2000: Alternative Forecasts and Their Resource Implications*, Research Paper 4, Royal Commission on the National Health Service, HMSO, London.

Maynard, A. and Walker, A. 1995, 'Managing the medical workforce: Time for improvements?', *Health Policy*, vol. 31, pp. 1–16.

Nolte, E. and McKee, M. 2004, *Does Health Care Save Lives? Avoidable Mortality Revisited*, Nuffield Trust, London.

Productivity Commission 2005, *Australia's Health Workforce*, Research Report, Canberra.

Skrabanek, P. and McCormick, J. 1989, *Facts and Fallacies in Medicine*, Tarragon Press, Glasgow.

Vallance-Owen, A. and Cubbin, S. 2002, 'Monitoring national clinical outcomes: A challenging programme', *British Journal of Health Care Management*, vol. 8, pp. 412–17.

Variations Revisited: A Supplement to Health Affairs 2004, Health Affairs: Web Exclusive Collection, <http://www.healthaffairs.org>.

Walker, A. and Maynard, A. 2003, 'Managing medical workforces: From relative stability to disequilibrium in the UK NHS', *Applied Health Economics and Health Policy*, vol. 2, pp. 25–36.

Wanless, D. 2002, *Securing Our Future Health: Taking a Long-Term View*, HM Treasury, London.

Wanless, D. 2003, *Securing Good Health for the Whole Population: Population Health Trends*, HM Treasury, London.